Coexistence with large carnivores in the north west of Spain

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Declaration

I, Agnese Marino, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

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Abstract

Relationships between humans and large carnivores are multi-layered and built on a variety of values, beliefs and interactions. When the experience of coexistence is predominantly negative, both local livelihoods and carnivore conservation can suffer. By focusing on an area of Spain where local communities have always lived alongside wolves and bears, this research aims to study how local experiences of coexistence are shaped by governance approaches. The study is a comparison between four different sites with distinct socio-political characteristics and with different large carnivore management policies. Semi-structured and informal interviews were carried out with over 60 informants, and both quantitative and qualitative data were collected from a sample of livestock farmers (n=271), hunters (n=157) and beekeepers (n=40), in order to compare carnivore acceptance levels and narrative constructs across the study sites.

The thesis begins by introducing the broader context in which interactions with carnivores take place, and by exploring how changes in the landscape and in traditional livestock farming practices driven by agricultural policy have shaped local perceptions of the environment and of resource user's role within it. The thesis then presents a synthesis the wolf governance systems in place across the study sites, and explores their effects on coexistence between wolves and local resource users. Using theories on environmentality, I analyse the ideological approaches underlying carnivore governance, and then look at how these approaches are received on the ground, by examining how local resource users either assimilate or resist governance approaches. The final chapter then focusses on two study areas with similar bear presence, to investigate the socio-political drivers that result in different levels of acceptance of bears among resource users. In doing so, it looks at the ways in which narratives over bear recovery, protected area management and land tenure resonate with each other and serve to reinforce one another.

Impact statement

Large carnivores are among the most endangered animals worldwide . However, following their legal protection and the ban on poison in the 1970s, some of their populations in Europe and North America are slowly recovering. As large carnivores are expanding beyond their former ranges and causing damages to local livelihoods, conservation efforts are being directed towards creating more positive experiences of coexistence between humans and carnivores.

In this context, there is an increasing need to understand and value the experience of places where humans and large carnivores have successfully coexisted for centuries. Examples of long established and sustainable human animal relations can shed light on the conditions and coping strategies that foster coexistence. These surely include ecological and habitat components, but are also likely to encompass a variety of cultural, social, behavioural and livelihood strategies that enable humans to live alongside potentially dangerous or damaging wildlife. Understanding these factors has important implications for how we understand coexistence between people and wildlife, and for how we strive to achieve it elsewhere

The overall aim of my thesis was to understand the factors that promote coexistence in an area of historical carnivore presence. To do this, I conducted research in four study sites across the Cantabrian Mountains in the north west of Spain, where local communities have lived along wolves and brown bears for centuries. My main goal was to understand how coexistence is defined and experienced on the ground, but also to explore how it has been shaped by past and present management and conservation approaches. To find out, I conducted over 300 interviews with local farmers hunters, beekeepers and member of the community

My results show that local communities valued above all else a productive landscape and a kind of nature that is produced and maintained by human activity and stewardship. In the case of bears, local communities experience coexistence relatively positively. The emotional connection they developed with the species

over centuries of interactions was strengthened by policies that promoted tourism and that turned bears into symbols of ecological and cultural significance. In the case of wolves, on the other hand, coexistence appeared much more delicate. Because wolves cause significant damage to livestock, most community members wanted greater freedom to control and reduce their populations. This however, did not mean they were completely opposed to wolf conservation, as most people believed that wolves belonged in the landscape. My results show that conflict does not preclude the possibility of functional coexistence. In fact, certain kinds of conflict might be positive, when they are a sign of cultural diversity.

My results point to the importance of developing place-based conservation approaches. These are a kind of conservation approach that foregrounds local voices, that is sensitive to the needs and interest of different societies, and is open to different ways through which they define their relations with nature. My findings have important implications for how conservation is understood and carried out, and they may be put to use to positively impact communities and wildlife that live alongside each other.

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List of abbreviations

CAP: Common Agricultural Policy

Cangas: Cangas del Narcea

LGDs: livestock guarding dogs

PHGs of León: Private Hunting grounds of León

RHR of Riaño: Regional Hunting Reserve of Riaño

List of flora and fauna (when the Latin name is not given the intext)

Bear: *Ursus arctos*

Beech: *Fagus sylvatica*

Boar: *Sus scrofa*

Capercaillie: *Tetrao urogallus cantabricus*

Chestunt: *Castanea sativa*

Deer: refers both to red deer (*Cervus elaphus*) and roe deer (*Capreolus capreolus)*

Iberian ibex: *Capra pyrenaica*

Oak: *Quecus*

Wolves: *Canis lupus signatus*

List of Spanish words

Brañas: ancient thatched roof herder shelters

Cortines: ancient structures to protected bee hives

Comuña: feudal type of tenure of livestock and beehives, which were owned by the monasteries or nobility and cared for by local residents

Chorcos: ancient structures to capture and kill wolves

Foros: Feudal systems of land tenure

Juntas vecinales: The term translates to “neighbourhood association” and represents sub-municipal districts within each municipality, which exclude urban spaces. The administrative board is elected by local residents and the institution has ancient roots that date back to the feudal period.

Montes comunales: type of public land tenure, where local neighbours hold use rights

Montes de Utilidad Publica (MUPs): a category of land tenure and land protection created in 1901, following the Spanish Land reform of 1855, through a process in which communal land was claimed as public. The term translates directly into: “forests of public use/utility”.

Montes pro-indivisos: type of private land tenure where owners share, inherit and can sell land quotas

Montes vecinales en man comun: type of private, communal land tenure where ownership is shared by neighbours who currently live on the land

Parroquias: “parishes”, or sub-municipal entities in Asturias, similar to juntas vecinales

Polas or pueblas: early townships established as public spaces

Vaqueiros de alzada: a group of cattle transhumant herders present in western Asturias

Vecera: traditional collectivized herding system

Vozdevilla: a type of representative system under feudal rule that ensured residents’ right to “voice and vote”

1. CHAPTER 1 Introduction

1.1. Context

Large carnivores are among the most endangered animals worldwide and recent studies have shown that their local and global extinction has had cascading effects on ecosystem functioning and resilience (Estes *et al.*, 2011; Boitani and Powel, 2012; Ripple *et al.*, 2016). Through their impacts on prey abundance and behaviour, large carnivores are thought to affect a whole range of other ecological processes, from vegetation regeneration through to small vertebrate biodiversity and the spread of disease (Berger *et al.*, 2001; Estes *et al.*, 2011; Ripple *et al.*, 2016). Moreover, the existence of numerous popular narratives and metaphors about carnivores speaks to the important role they play in the collective imagination of humans (Clark and Slocombe, 2009; Goldman *et al.*, 2010; Marvin, 2012; Jalais, 2014). Increasingly, they have been used as a flagship species, as among certain audiences they are capable of leveraging support for the conservation of entire ecosystems (Dempsey, 2010). However this is not always the case and it appears not to have been so in the past, at least in many parts of the world.

During the eighteenth and nineteenth centuries large carnivores experienced serious population declines, local and global extinctions, due to intensive land conversion, prey depletion and government sponsored eradication programs (Woodroffe *et al.*, 2005). Until the 1950s men known as “wolfers” in the United States, “lupari” in Italy and “louvetiers” in France hunted wolves in return of state bounties and gifts from town residents (Boitani, 2003). Such intensive management and eradication campaigns resulted in the widespread decline of large carnivores, which, after the Second World War, survived only in Europe’s more remote and forested areas. Following their legal protection and the ban on poison in the 1970s, some of their populations recovered and nowadays are expanding into human dominated landscapes (Chapron *et al.*, 2014).

The recovery and expansion of large carnivores in Europe and elsewhere has paralleled a change in conservation thinking, as focus has shifted away from protected areas towards the management of wildlife in mixed use landscapes (Mace, 2014; Pettorelli *et al.*, 2018). Over the past two decades carnivores have defied many man made barriers and constructs, crossing national borders, bridging isolated populations and re-colonizing human dominated and even densely populated territories (Chapron *et al.*, 2014; López-Bao, Kaczensky, *et al.*, 2015). Some have come to view carnivore recovery as a blurring of the lines between the "wild" and the "domestic" and as evidence of the need to reframe the relationship between the two (Descola, 2013; Linnell *et al.*, 2015). To others, the carnivore recovery symbolizes a push back of the barrier between human and natural landscapes. The rise of the coexistence paradigm, therefore, has not been met without considerable resistance. Opposition has come both from those who bear the greatest costs of sharing a landscape with carnivores, for example farmers who may suffer livestock depredations, and from those who believe carnivores should be completely shielded from humans.

In this context, there is an increasing need to understand and value the experience of places where humans and large carnivores have coexisted for centuries. Examples of long established and sustainable human animal relations can shed light on the conditions and coping strategies that foster positive coexistence. These surely include ecological and habitat components, but are also likely to encompass a variety of cultural, social, behavioural and livelihood strategies that enable humans to live alongside potentially dangerous or damaging wildlife. Understanding how communities and resource users relate to carnivores and the strategies they have developed over many years to adapt to their presence has important implications for how we understand coexistence, and for how we strive to achieve it elsewhere. At the same time communities that have a tradition of sharing their landscape with carnivores must be understood as constantly evolving, increasingly so as they are being incorporated in the global economy and becoming exposed to new institutional, political and cultural systems. In this way, although uncovering the details of traditional coexistence mechanisms can shed light on what long-term and sustainable coexistence looks like on the ground, the concept of tradition must also be critically evaluated, to

enable an understanding of how tradition interacts and is shaped by multilevel governance and wider social changes.

1.2. Aim and objectives

The overall aim of this thesis is to understand the factors that affect coexistence in an area of historical carnivore presence. To do this, I conducted research in four study sites across the Cantabrian Mountains in the north west of Spain, where local communities have lived along wolves (*Canis lupus signatus*) and brown bears (*Ursus arctos*) for centuries. My main goal is to understand how coexistence is defined and experienced on the ground, but also to explore how it has been shaped by past and present governance systems. I based my research on quantitative and qualitative data that I collected, with help of my research assistants, from a sample of famers, hunters, beekeepers and various key informants from the local communities I visited and spent time with, over the course of about one year. My research aims have been strongly influenced by the knowledge, ideas and paths that emerged during the course of my fieldwork. In addition, the thesis also relies on historical and ethnographic texts, as well as an analysis of the legislation regulating land, nature and carnivore management in my study sites. The overall aim is to provide insights regarding the interplay between: a) local history and tradition; b) the various policies and institutions that directly or indirectly govern local relations with carnivores; and c) informants' subjective experience and understanding of coexistence.

Spain holds the largest wolf and bear populations in western Europe (Chapron *et al.*, 2014). Signs of the historical coexistence between these large carnivores and the local communities of my study sites, are evident from the existence of a local breed of livestock guarding dogs ("*mastines Leónesnes"*) and of traditional stone enclosures to protect beehives ("*corines"*), both of which are still in use today. Moreover, the remains of ancient structures once used to capture and kill wolves ("*chorcos*") are now popular tourism attractions. I chose my study sites on the basis of their historical coexistence with carnivores and because of the different carnivore governance systems in place in each one of them. Although the qualitative results of the thesis include information collected from various sectors

of the local community, the quantitative data is focussed on local resource users (farmers, hunters and beekeepers) because they are the groups most likely to come into contact with carnivores and for whom coexistence is most likely to represent a challenge.

To address the overarching aim of my thesis, which is to understand the factors that affect coexistence with large carnivores in the north west of Spain, I follow four broad objectives:

1. Explore local resource users' narratives and traditional mechanisms of coexistence with wolves and bears, and how they have been impacted by the Common Agricultural Policy.
2. Analyse the structure and ideology behind wolf governance approaches in each study site.
3. Understand the effects of the different wolf governance approaches in each site on local resource users' narratives of coexistence.
4. Explore how conflicts over land tenure, protected area governance and bear recovery, influence each other and reinforce one another, by unpacking the local history of land territorialisation through which the government and local actors have negotiated control over natural resources.

I used these four steps to build an understanding of what coexistence with carnivores looks like on the ground and how various policies and management approaches interact with and shape local narratives of coexistence. My research is informed by the theory of environmentality, which facilitates an understanding of governance as being guided by overlapping yet distinct approaches, namely: top-down "sovereign" governance approaches; centralized "disciplinary" governance approaches which nonetheless manage to engage productively with local narratives; "neoliberal, market or incentive" driven approaches which see individuals as rational agents acting in order to optimize economic gain; "community" driven approaches that emphasize self-determination and equitable governance; and "truth or cultural" systems through which individuals and communities understand, value and build attachments with nature (Fletcher,

2010; Cavanagh, 2018). I use this framework to look at ways in which large scale agricultural policy, local carnivore governance, local land tenure institutions and protected area governance interact with and shape local narratives of coexistence. Together, these governance approaches represent different processes of land territorialisation, through which local actors, national and supra-national institutions negotiate control over natural resources.

1.3. Thesis structure

Before addressing each separate objective, in *Chapter 2* I first give a brief background on how coexistence between people and wildlife has been conceptualized in the literature. I then examine the epistemological and theoretical perspectives that underlie research practices on coexistence between humans and large carnivores and then I trace these approaches across different research disciplines. Finally, I discuss the theoretical perspectives and research disciplines that inform my thesis, and each of its objectives. *Chapter 3* presents an overview of the geography of the Cantabrian Mountains, its history, and the main political institutions governing land, agriculture and nature. The chapter then gives a brief introduction to each of the study sites and to the populations of brown bears and wolves present across the Cantabrian Mountains and in each site. *Chapter 4* gives an overview of the data collection methods used, the sampling strategy, the theoretical approach adopted to collect and analyse the qualitative data, and some reflections on positionality and ethics.

In *Chapter 5* I explore local resource users' perceptions of the environment and of their role within it, in order to uncover the different ways through which they perceive and relate to large carnivores. I then give an overview of the evolution of the livestock breeding sector through the main changes introduced by the Common Agricultural Policy, and how overall these have impacted on local livelihoods and human-carnivore relations. The chapter serves to contextualize coexistence with carnivores within broader perceptions of change in the landscape and in livestock breeding practices.

Chapter 6 begins with an overview of the literature on carnivore management and governance, and then looks at the structure and ideology behind the management systems being implemented in each study site to enhance coexistence between people and wolves. These are analysed through the theory of multiple environmentalities, by identifying governance approaches that are top-down, that attempt to change local values and norms, that are market or incentive driven, community driven or culturally driven (Fletcher, 2010, 2017). In *Chapter 7*, I trace the effects of the different wolf governance approaches that I identified, on local resource users' attitudes, narratives, and coexistence practices. I begin by presenting the literature on how attitudes, norms and behaviours are formed, and then discuss the contributions and critiques of environmentality theories (Agrawal, 2005b; Singh, 2013; Cortés-Vázquez and Ruiz-Ballesteros, 2018). I then move on to look at how the different governance approaches interact with each other and with individuals and communities on the ground.

Finally, in *Chapter 8* I explore how local narratives of land tenure conflict, protected area governance and bear recovery influence each other. The chapter takes a historical approach to illustrate the ideological influences and political struggles that have characterized the area over the past centuries, in order to explore the structural forces that underpin past and present land and conservation policies, and how these have affected local narratives of coexistence with bears.

The thesis conclusion, in *Chapter 9*, discusses how the definition of coexistence that emerges from my informants' narratives can inform academic debates and conservation initiatives aimed at addressing coexistence with wildlife. I discuss my key findings in each study site and then present a reflection on the methods that I used and the ethics of my topic of enquiry. I end by attempting to answer the thesis' main question, regarding what overall factors influence coexistence in my study sites. I do so by discussing how my results contribute an understanding of the interplay between history, cultural norms and policy.

2. CHAPTER 2 Theory

2.1. Coexistence theory

Coexistence is a term that is increasingly being adopted in conservation circles and literature, broadly but not exclusively to denote the conservation of species in mixed or human dominated landscapes. Whilst traditionally, the study of human-wildlife interactions has focussed on addressing conflict emerging from negative encounters and experiences with wildlife, some authors have called for doing away with conflict as the dominant framework through which encounters between humans and wildlife are understood. An emphasis on “coexistence” and “tolerance” has been advocated as a way to focus on the positive aspects of interactions between people and animals, in order to maximise conservation success (Frank, 2016). Others instead have suggested engaging with the more neutral term and field of enquiry of “human-animal relations”, to encompass the positive, negative, ambivalent, and infinitely varied ways through which individuals, societies and cultures perceive their relationship with wildlife (Marvin, 2012; Marvin and McHugh, 2014; Pooley *et al.*, 2017). A more neutral framing of human-wildlife relations is also advocated based on the possibility that value laden framings and the emphasis on “addressing conflict to achieve coexistence”, may be changing expectations and perceptions of damages caused by wildlife (Pooley *et al.*, 2017).

Despite the growing use of the term coexistence, several authors lament that a uniform understanding of the term does not exist and thus have provided their own definitions and deductive analytical frameworks to attempt to clarify its meaning. One of the main contentions regarding how the word is used may be traced back to semantics, regarding whether coexistence is attributed positive connotations, and therefore regarding how coexistence and conflict are understood in relation to each other. The Oxford English dictionary (2018) provides two definitions of coexistence: a) “Existence together or in conjunction” and b) “With special reference to peaceful existence side by side of states professing different ideologies”. Exemplifying these two definitions, is the

controversy that emerged over Carter *et al.*'s, (2012) claims that tigers and humans coexisted at fine scales outside a national park in Nepal, based on their findings that they overlapped spatially. In response to their paper, Sharma *et al.*, (2013) warned of the dangers of conflating coexistence with co-occurrence, highlighting that the increase in poaching and in tiger predation on humans in the area suggested that coexistence had not been achieved.

The idea that conflict and coexistence should be understood as opposites is suggested by the title of Woodroffe *et al.*'s, (2005) seminal book "People and wildlife: conflict or coexistence", Linnell's (2013) report to the European Commission "From conflict to coexistence? Insights from multi-disciplinary research into the relationships between people, large carnivores and institutions" and the recent book edited by Frank *et al.* (2019) "Human–Wildlife Interactions: Turning Conflict into Coexistence". Informed by a broad set of literature stemming from a research field often referred to as "the human dimension of wildlife" (Manfredo *et al.*, 2008), Frank *et al.* (2019) propose a scale of tolerance for wildlife which they call the "conflict-coexistence continuum". The continuum is conceptualized through a series of ordered categories: a) the conflict end of the scale, characterized by "retaliatory killing of wildlife, support for eradication policies, and/or the sabotage of species conservation"; b) less extreme conflicts, characterized by "support for wildlife management that welcomes lethal control or species population management through relocation and/or selective killing of problematic individuals" carried out by wildlife agencies; c) both neutral or mixed attitudes towards wildlife, which result in indifference and passive tolerance; and d) the coexistence end of the scale, characterized by "deep affiliation with nature and willingness to forgo one's own interests to further those of wildlife … (e.g. the development and maintenance of strict nature reserves and wilderness areas, donating for wildlife conservation and transforming (…) private land into covenants)" (Frank *et al.*, 2019, p. 11). Therefore, the scale developed by Frank and her co-authors classifies lethal control carried out by managers as indicative of a more positive coexistence than lethal control carried out by stakeholders. Deep affiliation with wildlife is viewed as incompatible with retaliatory killing, whilst support for strict enforcement of wilderness areas is viewed as indicative of coexistence.

Despite coexistence being attributed by many authors an implicitly "positive", goal-oriented connotation often inspired by conservationist perspectives (Adams and Mulligan, 2003; Brightman and Lewis, 2017), the same authors also often adopt a more neutral use of the concept. In several parts of Woodroffe *et al.*'s, (2005) and Frank *et al.* (2019) books, coexistence is actually used to denote conditions in which humans and wildlife simply co-habit within the same landscape, whilst Linnell (2013) specifically warns against naïve representations of coexistence that expect rural people to hold positive attitudes towards carnivores and to share a landscape with them without incurring in conflict. He defines coexistence as "a state where conflict exists but where interactions are kept within acceptable limits", often achieved through various forms of interaction and mutual adaptation (Linnell, 2013, p. 26). The notion of coexistence as a form of bounded conflict was then elaborated by Carter and Linnell (2016). They describe coexistence as a dynamic state in which interactions between people and carnivores are governed by institutions that ensure the sustainability of carnivore populations, social legitimacy and tolerable levels of risk. Such an approach focusses on the politics that govern both the interactions between people and carnivores and the relations between people with competing interests concerning carnivores (see also Redpath *et al.*, 2013).

Coming from a slightly different angle, the concept of co-adaption was explored by Chapron and López-Bao (2016), who approach coexistence from a community ecology perspective. They suggest that coexistence depends on: a) the competitive ability of humans being limited by culture, law, and politics (i.e. through taboos, hunting laws, and institutions that govern stakeholder relations) and b) a high niche differentiation limiting the frequency and impact of negative interactions (i.e. adapting carnivore activity patterns and behaviours, and adapting livestock practices). Through an ecological framing, coexistence is therefore defined as "the lasting persistence of self-sustaining large carnivore populations in human-dominated landscapes" (Chapron and López-Bao, 2016).

The above definitions of coexistence can be seen as attempts to provide it an all-encompassing meaning. Whether coexistence is treated as the end point on a linear scale based on a specific worldview of what conflict and coexistence look like (Frank *et al.*, 2019), whether it is understood as a dynamic system of bounded

and politically mediated conflict (Linnell, 2013; Redpath *et al.*, 2013; Carter and Linnell, 2016) or whether it is framed from a natural science perspective (Chapron and López-Bao, 2016), all of these definitions and frameworks constitute deductive approaches to developing a uniform understanding of coexistence. Inductive approaches, on the other hand, are offered by studies that have attempted to describe the multiple realities of coexistence from the point of view of local people, communities and resource users. Such studies are based on the premise that conflict and coexistence between humans and wildlife are frequently framed following western analytical categories which often ignore the manifold and often ambivalent ways in which humans relate to the natural world (Goldman *et al.*, 2010).

Although inductive approaches to understanding coexistence are comparatively more scant, several examples exist from the literature. Álvares *et al.*,(2011) adopt approaches from ethnozoology to give an overview of the traditional knowledge, practices and beliefs of communities that have traditionally coexisted with wolves in the Iberian Peninsula. Pooley (2016) provides a historical account of the nuanced and varied human relations with crocodiles across Africa. Others have used ethnography, unstructured and semi-structured interviews to portray local experiences of coexistence. Baynes-Rock (2013) describes the cultural beliefs that bring the Ormo people of Ethiopia to view hyenas as beneficial and reasonable beings. Goldman *et al.* (2010) use quantitative and qualitative data to show how the Maasai relate with lions. They show that the same individuals can hold both positive and negative attitudes towards lions, and that the tradition of lion killing known as *olamayio* is not only related to human-lion conflict but also has an important cultural significance which underlies feelings of respect and admiration for lions (Goldman *et al.*, 2010). Lescureux *et al.*, (2011) and Lescureux and Linnell (2010) report the beliefs of rural communities in Macedonia that appear to facilitate positive coexistence with large carnivores: only some, easily identifiable, bears are believed to be carnivorous, and certain evident qualities of bear behaviour such as intelligence, care for the young, and their ability to stand on their hind legs, render the species relatable and likable (Lescureux *et al.*, 2011). Dorresteijn *et al.*, (2016) used and inductive approach informed by a discourse-driven analysis, to identify different socially mediated mechanisms through which coexistence with bears is either facilitated or

hindered (people's perceptions and relationship the landscape, and their views of the institutions managing bears). What these studies have in common is their focus on understanding how coexistence is experienced on the ground, and how this experience is shaped by the local culture.

To understand how such disparate ways of framing coexistence between people and carnivores have developed, it is useful to look at the processes of knowledge production on which they rely and the sorts of truth claims they presuppose. To do this, I will first examine the epistemological and theoretical perspectives that underlie research practices on coexistence between humans and large carnivores and then I will trace these approaches across different disciplines. Finally, I will discuss the theoretical perspectives and disciplines that inform my thesis and each of its objectives.

2.2. Epistemological, etic and emic approaches to studying coexistence

The contrasts between deductive and inductive approaches can be understood as relating to etic and emic approaches to studying social behaviour. Etic approaches are broadly understood as accounts yielded by outsiders who have not integrated themselves in the community they study, and who apply concepts and categories that are considered meaningful by their own community of researchers (Lett, 1990). Following this approach, statements of local informants are reinterpreted according to external concepts and categories in order to reveal meaning and ideology (Lett, 1990). Such constructs can be applied across cultures, are comparative and therefore often rely on large surveys across many cultures (Morris *et al.*, 1999). Usually they attempt to link specific cultural practices to cross-cultural psychology or external structural variables such as economics or ecology (Morris *et al.*, 1999).They therefore offer a set of criteria to understand coexistence, which are used as a framework for its study across cultures.

Emic approaches, on the other hand, are accounts yielded by in-depth ethnographic engagements with communities (Lett, 1990). They attempt to provide insider perspectives that reveal the concepts and categories that are

considered meaningful to the members of a given society (Lett, 1990). Such accounts are usually collected over long time frames in one or a few sites, using interpretivist approaches (Geertz, 1973; Morris *et al.*, 1999). Emic studies focus on understanding the drivers of coexistence that are internal to the culture under study, and they assume that cultures are best understood as complex, aggregate systems (Morris *et al.*, 1999).

Etic and emic accounts of coexistence present respective strengths and weaknesses. Etic approaches can be helpful in creating links to phenomena that may not be apparent, self-evident or familiar to the local perspective (Kassam and Bashuna, 2004). However, they risk ignoring hidden meanings and concepts specific to the culture under study, and they often fail to recognize that externally developed constructs are themselves situated within a specific cultural and historical context (i.e. they are likely to reflect the values of conservationists and their preference for scientific knowledge). Emic approaches, on the other hand are better adept at reporting culture-specific meanings and concepts of coexistence. However, they have been critiqued for overestimating the extent it is possible for external observers to truly understand the meaning attributed to coexistence by a culture different from their own (Kassam and Bashuna, 2004). While most studies will normally either follow one approach or the other, some have called for more research aimed at forging an active and dialectical interplay between emic and etic insights (Morris *et al.*, 1999).

Attempts to understand coexistence will also vary depending on the epistemological approach that researchers adhere to (i.e. objectivism, constructionism or subjectivism), which influences the theoretical perspective (i.e. interpretivism, positivism and post-positivism, critical enquiry, postmodernism etc...), methodology (i.e. ethnography, survey research, grounded theory, discourse analysis, etc…) and methods (i.e. participant observation, questionnaires, semi-structured interviews, etc…) adopted (Crotty, 1998). An objectivist epistemology would assume that the experience of coexistence can be reduced to empirical indicators that represent its true meaining. It would assume that meanings of coexistence exist separate from human consciousness and are discovered upon enquiry (Crotty, 1998). Constructionist epistemology, on the other hand, would see the meaning of coexistence as emerging from life

experiences. It does not assume the existence of objective truths waiting to be discovered, but rather, it would view meaning as being constructed through social practice and therefore as inherently contingent on culture and history.

It is often the case that objectivist epistemologies inform positivist or post-positivist[1] theoretical perspectives, which focus on explanation and prediction and see the scientific method as the approach most capable of grasping objective meaning (Crotty, 1998). Positivism, in turn, favours survey methodologies carried out through questionnaires and statistical analysis. Similarly, it is often the case that constructionist epistemologies inform interpretivist theoretical perspectives, which focus on understanding rather than prediction, and which see scientific knowledge as just one among many types of constructed knowledge, each with their own strengths and weaknesses (Crotty, 1998). Interpretivism, in turn, lends itself ethnographic methodologies carried out through interviews or participant observation. However, quantitative methods may be used to inform constructionist approaches, and qualitative methods may be carried out under a positivist perspective. What gives a study a positivist or constructionist perspective is not the use of quantitative or qualitative methods, but rather, whether it assigns objectivity, validity and generalisability to the study findings (Crotty, 1998).

In the following section I will trace the ways that different disciplines have undertaken the study of coexistence between people and wildlife, and I will discuss the influence of etic, emic and epistemological approaches underlying each discipline.

[1] Post-positivism is an attenuated, more modest, version of positivism. Its claims are based on probability rather than certainty, it assumes some level of objectivity instead of absolute objectivity, and it relies on indicators that approximate the truth rather than aspiring to fully represent it (Crotty, 1998).

2.3. Disciplines that study coexistence

2.3.1. Conservation biology

Conservation biology was the first discipline to raise attention regarding the need to better understand the interactions between humans and wildlife. Within this field, conflicts over carnivore presence are understood as stemming from carnivore's impacts on humans, and human impacts on carnivores (Woodroffe *et al.*, 2005). In the case of bears these could be depredations on livestock, beehives, fruit trees and potentially dangerous encounters between humans and bears (Stowell and Willging, 1991; Ciucci and Boitani, 1998; Mech *et al.*, 2000; Can *et al.*, 2014). Encounters with humans usually occur as a result of human outdoor activities, but anthropogenic food sources may also attract bears into towns. Encounters that result in human injury or death are rare in Europe (Linnell *et al.*, 2002), and in Spain over the past 25 years there have been 5 attacks, none of which resulted in death. Finally, bears can impact humans by occupying land that could otherwise be commercially developed. Wolves on the other hand, mainly impact humans by depredating livestock (Fritts *et al.*, 2003), and by competing with hunters over wild prey. Encounters between humans and wolves are extremely rare, but in Spain there have been three episodes between the 1950s and 1970s where wolves attacked and killed three children (Linnell *et al.*, 2002).

Conservation biology studies material impacts of carnivores on humans by characterizing and quantifying their impacts (Ciucci and Boitani, 1998; Breitenmoser and Angst, 2001; Mattioli *et al.*, 2004; Naves *et al.*, 2010; Talegón and Gayol, 2010; Bosch, 2016; Bautista *et al.*, 2017), or by developing models that predict the risk of depredations based on a series of conditions (landscape and forest cover, carnivore abundance, livestock herding, previous damages etc.) (Treves *et al.*, 2004; Kaartinen *et al.*, 2009; Herrero-Morales, 2012; Abade *et al.*, 2014; Behdarvand *et al.*, 2014; Goswami *et al.*, 2015). Such approaches come from a (post-)positivist perspective, as they rely on the scientific method, predictive statistical analyses and the use of empirical indicators to approximate the truth. As an example, a study by Fernández-Gil *et al.* (2016) analysed

different indicators of conflict in Asturias, Spain, and concluded that perceived conflicts were misleading management interventions, as responses were not linked to actual depredations but rather to their media coverage.

2.3.2. Psychology, sociology and the "human dimension" of coexistence

Studies of perceptions and attitudes towards carnivores and their conservation have often focussed on identifying the opinions of different stakeholder groups (Bath and Buchanan, 1989) and on investigating the psychological and cognitive systems that map the way people's knowledge, experience, values and beliefs influence their attitudes and behaviours towards carnivores (Kellert and Berry, 1987; Fulton *et al.*, 1996; Zinn *et al.*, 1998, 2000; Bauer *et al.*, 2009). The studies I group into this category are quantitative in nature and mainly focus on extrapolating larger socio-demographic trends from cognitive structures measured at the individual level. They are often what conservation scientists refer to when they discuss studies pertaining to "the human dimensions of wildlife" (Manfredo *et al.*, 2008; Vaske, 2008; Frank *et al.*, 2019).

Data for such studies come from questionnaires, and data collection practices follow principles that are intended to ensure standardization and objectivity (Vaske, 2008). Answers to questions that are close ended or based on a Likert scale are treated as empirical indicators of attitudes or beliefs, and little to no space is dedicated towards exploring local or individual interpretations of meaning. Rather, questions are framed along analytical categories designed by the researchers and assembled into scales that describe the intrinsic, moral, aesthetic, spiritual, ecological and extractive values that humans are believed place on nature (Zinn *et al.*, 1998, 2000; Manfredo, 2008; Frank *et al.*, 2019). For example, research from this field has attempted to make sense of nature value orientations by placing them on an ecocentric–anthropocentric scale (Vaske and Donnelly, 1999) or an ecologistic – dominionistic continuum (Kellert, 1994; Vktersø *et al.*, 1999), to describe whether nature has intrinsic value or whether its value depends on how it benefits humans (Vucetich *et al.*, 2015; Woodroffe and Redpath, 2015).

Several of these studies fall within the discipline of cross-cultural psychology. Based on the theory of cognitive hierarchy, they posit a linear process of cognition, whereby a person's fundamental values will influence their beliefs, which in turn will influence their attitudes, their norms, and finally their behaviours (Fulton *et al.*, 1996; Zinn *et al.*, 1998, 2000; Glikman *et al.*, 2010, 2011; Dressel *et al.*, 2015; Eriksson *et al.*, 2015). In this way, a universal linear relationship is assumed to exist between experience, attitude and behaviour, irrespective of cultural, historical and political context. Emphasis is placed on the predictive potential of indices and on establishing causal relationships. Such approaches are inherently etic and often stem from a post-positivist theoretical perspective, which attributes objectivity, validity and generalisability to the study findings (Crotty, 1998). The etic, quantitative and often positivist nature of these studies may explain their appeal to the field of conservation science.

2.3.3. Anthropology

On the other hand, studies from the field of anthropology, take a more qualitative, less structured and varied approach to researching and describing different ways through which individuals relate to and value nature. Ethnographic studies focus on the social and cultural practices through which communities establish relationships with, and from within, their environment (Ingold, 2000). Many of these studies approach the construct of human nature dualism as being rooted in western, scientific culture (Adams and Mulligan, 2003). Through deep engagement with cultural norms and practices, ethnographic studies have uncovered ways of relating to the environment that are altogether different, in which clear divisions between wild and domestic realms and between intrinsic and use values, do not always apply (Goldman *et al.*, 2010; Descola, 2013). By demolishing constructs of wilderness and of separation between nature and culture, anthropology has shed light on the myriad of engagements, emotional and cultural connections through which communities shape their environment and its ecology (Peterson *et al.*, 2010; Singh, 2013). Studies from this field include those that research human-animal relations (Marvin, 2012; Marvin and McHugh, 2014; Pooley *et al.*, 2017) and that attempt to describe the realities of coexistence from the point of view of local people (Goldman *et al.*, 2010; Lescureux and Linnell, 2010; Álvares *et al.*, 2011; Baynes-Rock, 2013; Dorresteijn *et al.*, 2016).

Some of these studies use quantitative measures of attitudes and opinions in support of qualitative approaches that allow research participants to define their experiences in their own terms (Goldman *et al.*, 2010; Baynes-Rock, 2013; Dorresteijn *et al.*, 2016). These studies are inherently emic and stem from a constructionist perspective that emphasizes how meaning is socially produced and culturally contingent.

Within some spheres of conservationist thought, modernization is seen as a positive force, acting to physically separate humans from nature through processes of agricultural intensification and urbanization, and by promoting positive values towards nature conservation (Manfredo *et al.*, 2016; Bruskotter *et al.*, 2017). Some strands of anthropology offer a critique to these views by shedding light on the multiple ways through which local people and their traditions care for the environment they live in (Lewis, 2002, 2016; Goldman, 2007; Peterson *et al.*, 2010; Singh, 2013). The environmental practices of local and indigenous communities uncovered by ethnography don't always look the way outsiders would like them to, and may conflict with dominant conservation narratives. Anthropology can offer a view of conservation that is open to different meanings of what constitute "good relations with nature" (Sandbrook, 2015) and that furthermore emphasises "the active cultivation of cultural, economic, political and ecological plurality" (Brightman and Lewis, 2017, p. 17). It is an approach that calls for an analysis of the culture of conservation, and which challenges hegemonic narratives (Escobar, 1998; Adams and Mulligan, 2003; Brockington and Duffy, 2010; Homewood, 2017; Sandbrook, 2017). Its main contribution to the study of coexistence between humans and wildlife, therefore, is in shedding light over how strategies that ignore cultural differences can ignite conflict and resistance on the ground, and can fail to be sustainable in the long run.

2.3.4. Political ecology

The field of political ecology emerged in the 1980s out of critiques of "a-political" visions of the environment, which are heavily reliant on science and which assume that conservation decisions are effectively the unbiased result of scientific conclusions, drawn from impartial data (Adams and Mulligan, 2003; Robbins, 2012). Under an a-political ecological approach, questions over what

should be conserved are perceived as merely technical, to be answered by scientific experts, predictive models, and rational market-based solutions (Adams, 2015). Instead, a “political” ecology vision of the environment is based on the premise that conservation is a normative discipline that is informed by political choices and negotiations between people, over what should be conserved and over what conservation means (Adams, 2015). Through this lens, nature is seen as being materially and conceptually shaped by political processes. On one hand, natural events such as the migration of wildlife are seen as influenced by a series of institutions and processes, for example: land tenure arrangements, commodity markets that determine land use and activities; and the territorialisation of land into protected areas (Robbins, 2012). On the other, decisions about conservation are understood as decisions about the relations between people and nature. Political negotiations over how nature is defined are examined by paying particular attention to the power relations between social groups. Through such analyses, political ecologists seek to answer questions about whose version of nature counts and what power structures work to privilege one version above another (Adams and Mulligan, 2003). Most studies from the discipline of political ecology stem from a constructionist theoretical perspective, as they see meaning as socially constructed and negotiated.

Studies that have taken a political ecology approach to the topic of coexistence between people and carnivores in Europe, have explored the way in which tensions over the legitimacy of different knowledge and value systems reflect power struggles between different social sectors. Skogen and Thrane (2007) refer to these as struggles between “hegemonic and subordinate cultural forms”. This concept is best exemplified by several studies that have found that rural residents have more negative attitudes towards carnivores than urban residents (Bjerke *et al.*, 2002; Kleiven *et al.*, 2004). Although this has been largely attributed to the fact that rural residents are more often negatively impacted by carnivores, some literature has focused on how rural communities perceive carnivores as symbols of broader changes in the social fabric of their landscapes (Scarce, 1998; Skogen *et al.*, 2008; Linnell, 2013). In Europe and elsewhere, the expansion of carnivore populations has coincided with the abandonment of rural territories, as many people moved to the larger urban centres after the war. This process of economic and social modernization has contributed to the creation of

a “hegemonic” urban culture, much more likely to subscribe to a dichotomous view of wilderness and civilization and, as a result, to endorse protectionist approaches to nature conservation. At the same it has contributed to the creation of “subordinate” rural culture which, to some extent, maintains traditional ways of life and a more direct dependence on natural resources (Skogen and Thrane, 2007, Descola, 2013). In this context, rural communities have developed a sense of social disempowerment (Wilson, 1997) and have come to view carnivores as “lifestyle wreckers” imposed on them by external actors (Scarce, 1998). Through a focus on the relations between stakeholder groups, conflict between humans and wildlife has been re-conceptualized as conflict between groups of humans, and this has had important implications for how conservation conflicts are understood and addressed (Redpath *et al.*, 2013; S M Redpath *et al.*, 2015).

Due to its emphasis on power relations and the processes through which social groups assert their interests, political ecology is concerned with identifying the global structural systems which lead to environmental degradation (Perreault *et al.*, 2015). Similarly to anthropology, political ecology challenges narratives that place the blame of ecological destruction on local or indigenous communities, and instead focusses on examining the processes through which traditional, potentially low impact livelihood systems, are disrupted by global capitalist systems (Robbins, 2012). For this reason, political ecology may be seen as a discipline that brings emic and etic approaches into dialogue. On the one hand, it relies on emic accounts of local cultures, traditions and livelihoods, on the other, it relies on etic insights that link elements of local culture to larger structural forces.

2.3.4.1. Environmentality

A branch of political ecology that well exemplifies the kind of insights that can surface when emic and etic approaches are placed in dialogue is one that was developed out of Michel Foucault’s theory of governmentality (2007 and 2008). With his work, Foucault contributed a specific understanding of power, which views it as dispersed and pervasive to all human relations, as something that is embodied, performed and therefore constitutive of identities and practices (Burchell *et al.*, 1991; Gutting, 2005). Power according to Foucault is expressed

through accepted and dominant forms of knowledge and discourse, which act to discipline society. The activity of government is understood as a form of action intended to affect, shape, or guide communities or individuals (Burchell *et al.*, 1991), and government, therefore, is seen as extending into people's personal lives, beliefs and practices, to produce new identities and "subjectivities". Foucault's theory of governmentality is referred to as "environmentality" when applied to issues concerning environmental governance (Luke, 1995, 1999). Studies on environmentality focus on how people's practices and livelihoods influence how they view the environment and how they form their identity (Robbins, 2012). The theory has been used in the literature to understand how government or other actors can influence environmental practices and in doing so, can create new ways of viewing the environment (Agrawal, 2005b; Fletcher, 2010; Erb, 2012).

Fletcher (2010, 2017) applied and expanded Foucault's (2008) work, by defining the different environmentalities, or ideological approaches, that characterize conservation interventions. He describes the first approach, "sovereign environmentality", as a top-down, fortress conservation approach (Adams and Mulligan, 2003; Fletcher, 2010; Erb, 2012). "Disciplinary environmentality" refers to policies that compel subjects to internalize environmental values and ethics, and to self-regulate (Fletcher, 2010). "Neoliberal (market or incentive-driven) environmentality" refers to processes aimed at decentralizing, privatizing or commodifying nature, such could be ecotourism activities, trophy hunting, and voluntary payments for ecosystem services. Neoliberal environmentality approaches are concerned with promoting policies intended to regulate human behaviour through monetary market driven incentives (Fletcher, 2010; Fletcher and Breitling, 2012). "Truth (or cultural) environmentality" is associated with people's cultural, spiritual, religious and emotional attachment to nature, and with traditional ecological knowledge (Berkes, 2012). Finally, "community-driven environmentality", is a type of approach in which local people have a participatory or self-mobilizing role in environmental governance (Fletcher, 2010).

Studies on environmentality look at how mainstream conservation narratives interact with traditional ways of relating to the environment, and how these interactions can forge new identities. Individuals and local communities are seen

to either accept (Agrawal, 2005b, 2005a), resist (Scott, 1985; Cepek, 2011; Singh, 2013), or manipulate conservation regimes (Homewood, 2010; Forsyth and Walker, 2014; Cortés-Vázquez and Ruiz-Ballesteros, 2018), and in doing so they are thought to change or re-affirm how they think of themselves and of their role within nature.

2.4. Theoretical approaches in the thesis

In this thesis I adopt a multidisciplinary approach, and mainly draw from the disciplines of anthropology and political ecology, to understand how local communities in my study sites experience coexistence and, moreover, how their experience is shaped by governance approaches. My choice of methodology follows a constructionist epistemology. I draw on anthropology in trying to understand how local resource users view their environment and their role within it. Throughout the thesis I use a neutral framing of coexistence which simply denotes co-habitation. This is to allow local resource users to define the meaning and experience of coexistence in their own terms. I adopt a political ecology approach in trying to shed light over the past and present political processes and negotiations over how nature and coexistence are defined. To do this, I use the theory of environmentality to understand the interaction between local narratives of coexistence on one side, and agricultural policy and conservation governance approaches, on the other side. This dialectic between local interpretations of coexistence, governance approaches and political economy, builds on both emic and etic insights.

In chapter 5 I provide an overview of local resource user's cosmology, with regards to how they view their role in the landscape and how they perceive the experience of coexistence with wolves and bears. I explore historical adaptations to coexistence and then how these adaptations have been impacted by the Common Agricultural Policy, with particular attention to the interaction between the CAP's political economy, local cosmology and livelihood systems. In line with a constructionist view of meaning as something that is generated from the interplay between subject and object (Crotty, 1998), the chapter explores how local resource users' narratives of coexistence with wolves and their narratives of coexistence with bears, differ from each other.

In chapter 6 I provide an overview of the wolf conservation governance approaches across my study sites, employing Fletcher's (2010) framework of multiple environmentalities. Wolves are used here as a case study species, because their governance approaches change considerably across my study sites. In chapter 7 I trace the interaction between the different wolf governance approaches and local narratives of coexistence. Finally, chapter 8 takes an in-depth look at two adjacent study areas, to explore how conflicts over land tenure, protected area governance and bear recovery, influence each other and reinforce one another. I do this by unpacking the local history of land territorialisation through which the government and local actors have negotiated control over natural resources. Bears are used as a case study in this chapter because they are emblematic of the endangered fauna in the two study sites that the chapter focusses on. As a highly territorial species, they require vast areas of native and undisturbed forests and therefore their conservation is very much dependent on political negotiations over land use.

In chapters 7 and 8, I also draw on methodology from conservation biology and sociology, to support my qualitative findings. I use measures of the material impacts of carnivores on local resource users' activities, in order to account for carnivore damages when looking at the experience of coexistence across my study sites. Moreover, I use Likert scale measures of beliefs and attitudes determine the resonance of local coexistence narrative and to quantify the effects of different governance approaches across my study sites. This data contributes to the etic component of the research. The Likert scale data on beliefs and attitudes towards carnivores are used to complement my qualitative findings and ample space in the thesis is dedicated to discussing individual and contextual interpretations of meaning.

3. CHAPTER 3 Study area and species

3.1. Study area

3.1.1. Geography, climate, flora and fauna of the Cantabrian Mountains

The Cantabrian Mountains are found in the north west of Spain (fig. 3.1). Stretching over 300 km along the coast of the Cantabrian sea, they are bounded on the east by the Pyrenees, on the west by lower hills of Galicia and on the south by a plateau. The mountain range reaches its highest elevation at 2,650m in the Picos de Europa section of the mountain range, between Asturias and Castilla y León.

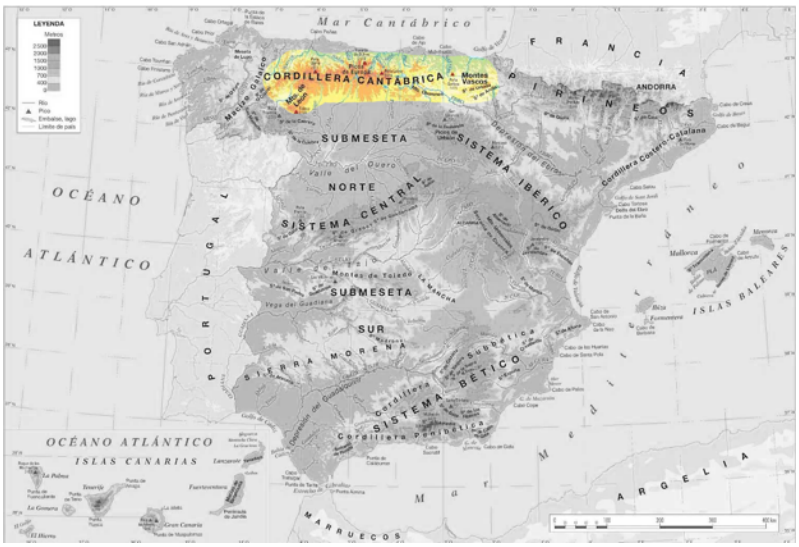

Figure 3-1Map of Spain and the Cantabrian Mountains

The climate of the area is humid and temperatures vary from an average minimum and maximum of 1°C and 6°C in January, to an average minimum and maximum of 12°C and 22°C in August. Depending on the altitude, snow cover can last between several weeks to 2 or 3 months per year. A mixed forest cover characterizes large parts of the landscape, composed of beech, birch, chestnut and various species of oak (*Quercus petraea , Quercus ilex, Quercus pyrenaica*).

Occasional stretches of land are covered by pine plantations (*Pinus pinaster*), whilst Eucalyptus plantations cover parts of the lower elevations of the mountain range through to the coast of the Cantabrian Sea (Fernández Benito and Mayor López, 2007). Several endemic and endangered plant species are found across the mountain ranges, such as the *Centaurium somedanum*, found only in Somiedo (Jiménez-Alfaro *et al.*, 2005). The area is furthermore home to a variety of animal species adapted to high altitudes (chamois *Rupicapra rupicapra,* golden eagle *Aquila chrysaetos,* alpine newt *Ichthyosaura alpestris* etc.) and requiring relatively intact forest cover (roe deer *Capreolus capreolus*, red deer *Cervus elaphus*, red squirrel *Sciurus vulgaris*, wild cat *Felis silvestris* etc…). The endangered wildlife of the area includes the brown bear (*Ursus arctos*), the capercaillie (*Tetrao urogallus*) and the bearded vulture (*Gypaetus barbatus*).

Other than forest cover, the typical Cantabrian Mountain landscape is composed of cleared meadows, high pastures, mountain peaks, lakes and marshes (figs. 3.2 and 3.3). The largest towns in the mountain range are those with a history of coal mining, like Cangas del Narcea, whose main town numbers around 7,000 residents. The majority of villages however, consist of small groups of houses, interspersed throughout the landscape, each surrounded by in-by land and fields (fig. 3.4 and 3.5). Chapter 4 details the main economic activities carried out in the study sites, and the historical evolution and current configuration of the livestock breeding sector.

Figure 3-2 Landscape in Somiedo, showing in-by land, an ancient herder shelter (cabaña), against a backdrop of oak covered mountains

Figure 3-3 A lake surrounded by mountains, found on land owned under the private pro-indiviso tenure system, in Cangas del Narcea.
Photo courtesy of Tania Pereira.

Figure 3-4 The entrance of Villar de Vildas, a village of cattle farmers in Somiedo.

Figure 3-5 Satellite image of the Boca de Huergano, in the RHR of Riaño, showing small villages scattered along the valley, surrounded by in-by land and communally owned forest and pastures.
Google Earth image, 20.09.2017, 42°58'53.98"N 4°54'33.07"W; elevation 1124

3.1.2. History and political configuration

Due to their remoteness and relative inaccessibility, each site has its own history and culture. However, broadly speaking, the history of the different towns in the Cantabrian Mountains can be said to have been marked by a few events that are common to all of them. The first signs of human presence in the area date back to the Inferior Palaeolithic period (about 100,000 years ago), and the mountains are well known for the prehistoric cave paintings of Altamira in Cantabria, and Tito Bustillo and El Pindal in Asturias. Iberian communities are thought to have settled across the Cantabrian Mountains surviving on subsistence hunting, livestock domestication and migratory agriculture (Manderscheid, 2003). Under the control of the Roman Empire (200 BC to 400 AD) livestock activities intensified and new systems of social differentiation were introduced under roman property law, which created large estates owned by elites and worked and used by labourers (Rodríguez-Vigil Rubio, 2005; Arango Fernández, 2011). This paved the way for a long period feudal land tenure, that lasted until the mid 19th century. The fall of the roman empire was followed by a period of Visigoth occupation, and then a long war between the Catholic kingdoms of Spain and the Islamic reign (700 to 1492). During this period, the Cantabrian Mountains remained a stronghold of the Catholic crown (Rodríguez-Vigil Rubio, 2005).

Throughout the 19th century, the Cantabrian Mountains served as a battle ground for the Carlista wars fought between conservative monarchists, that supported feudal tenure systems, and reformist monarchists. Up until this point, most land was still owned by church and nobility, but land tenure changed radically during Spain's reformist-driven disentailment in 1836 and 1855, when land that belong to the church or was used communally by local residents was either sold to small private owners or turned into public property (Manderscheid, 2003; Rodríguez-Vigil Rubio, 2005). In 1901, Spain created a catalogue of *Montes de Utilidad Publica*, ("forests of public use") destining large portions of land to forest conservation and timber extraction by the state (Manderscheid, 2003). The 20th century was marked by the Spanish Civil War between republicans and franquists (1936-1939), Franco's dictatorship (1939-1975), Spain's transition to a monarchist democracy in the second half of the 1970s, (when its Regional

Administrations or *Comunidades Autonomas* were created), and Spain's entry in the European Union in 1986.

The mountain range stretches across four Regional Administrations (Cantabria, Castilla y León, Asturias and Galicia) and is comprised of a variety of administrative systems. Chapter 6 details the different administrative entities and institutions involved in land and nature management, in each study site. Broadly speaking, these range from: *juntas vecinales* or "neighbourhood associations" in Castilla y León, representing sub-municipal districts within each municipality, which exclude urban spaces; *parroquias* or "parishes" in Asturias, which are similar to *juntas vecinales* but are far fewer and less organized; municipalities, which in Asturias may own or manage communal land; Regional Administrations, which hold competences over hunting and protected areas; the Ministry of Food, Agriculture Fishing and the Ministry of Environment; and multiple supranational institutions that influence national conservation laws and agricultural activities, such as the EU Habitats Directive 92/43/EEC and the EU Common Agricultural Policy.

3.1.3. Study sites

The study sites were initially selected based on the different carnivore governance and management systems in place (detailed in chapter 5; fig. 3.6). Because the chapters of the thesis present in-depth accounts of the socio-political structure and history of the study sites, only a very brief description of each site is given below.

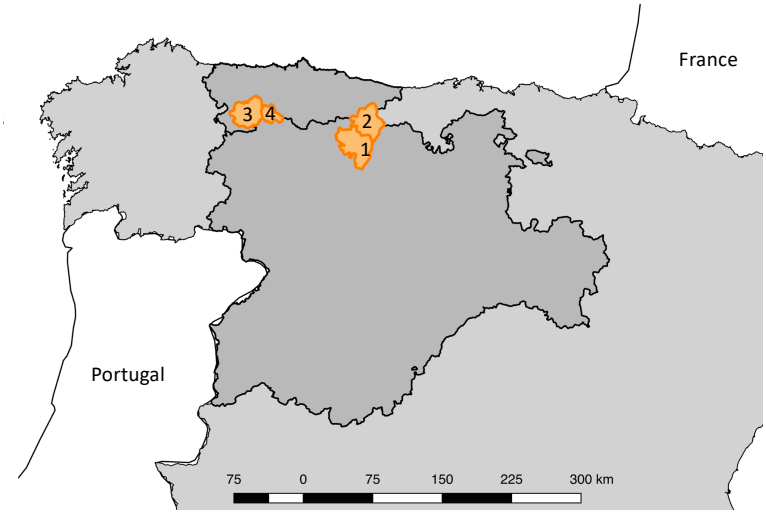

Figure 3-6 Map of study sites.
Private Hunting Grounds (PHGs) of León; 2. Regional Hunting Reserve (RHR) or Riaño; 3. Cangas del Narcea; 4. Somiedo. The areas in grey correspond to Spain and the two darker grey areas correspond to Asturias (to the north, and in including Cangas del Narcea and Somiedo) and Castilla y León (to the south, including the PHGs of León and the RHR of Riaño).

3.1.3.1. Private hunting grounds of León, Castilla y León (PHGs of León)

The PHGs of León are composed of 11 municipalities (1,053 km^2), spanning across mountainous and forested areas. In contrast to the other study areas, this site also includes agricultural lands in its lower elevation areas, given that it sits between the Cantabrian mountains and the southern plains. The area used to be an important site for coal mining, which began as an industrial activity in the second part of the 19th century and continued until the early 1990s, when it was closed down. During this period, the site was connected to the urban and industrial centres of País Vasco through a train, which is now no longer in use. The closure of the mines was followed by large scale depopulation, and human population density now averages 9 inhabitants / km^2 (table 3.1). Compared to other sites, livestock farmers the PHGs of León own a greater variety of livestock species, and larger herds (Appendix 3).

3.1.3.2. Regional hunting reserve of Riaño, Castilla y León (RHR of Riaño)

The RHR of Riaño is found directly north and adjacent to the study site of the PHGs of León. It is composed of 6 municipalities, stretching 835 km^2 through mountains, high pastures and valleys. Livestock breeding is the main economic activity of the area (table 3.1), together with some seasonal tourism. There is an eco-tourism company based in the town of Riaño, that offers wolf sightings within both in the RHR of Riaño and the PHR of León. The population density is the lowest out the four sites (2.61/km^2; table 3.1), having decreased significantly after the locally opposed creation of a dam in 1989 displaced entire towns. The Picos de Europa National Park found in the northern portion of the site is also a subject of controversy, especially considering that it overlaps with the regional hunting reserve. Moreover, a proposal to build a large ski resort in a portion of the study site considered to be important brown bear habitat, was rejected in 2015 on the grounds of its environmental impact. This created resentment among some residents that hoped the ski station would generate jobs and income, although the project was opposed by others. In its place, a much smaller ski resort with removable structures was built in the region adjacent to the original site.

3.1.3.3. Cangas del Narcea, Asturias (Cangas)

Cangas del Narcea is a relatively prosperous town, with considerable amenities and services including a hospital. The municipality stretches across 824 km^2 , and is the most densely populated out of the four sites (16 residents / km^2; table 3.1). Cangas had a booming coal mining industry that peaked in the 1970s and declined heavily in the 1990s, with many residents still living off mining pensions. Perhaps because of the pensions, many farmers appear to own livestock as a form of supplementary income. Out of the four sites, Cangas has the largest number of livestock farmers and head of cattle per km^2, but the smallest herd size owned per farmer (Appendix 3). Most of the land in Cangas is privately owned. The creation of the Nature Reserve Fuentes del Narcea in 2002, in the southern portion of the municipality, is contested by the private land owners who have advanced legal action against the park authorities. Cangas has also witnessed

various episodes of arson affecting large portions of the municipality, most recently in 2015 and 2017.

3.1.3.4. Somiedo, Asturias

Somiedo spans across 291 km^2 of forested mountains and grazing pastures, and borders to the east of Cangas. It is sparsely populated (4 residents/km^2) and has limited amenities. School facilities only reach year 8, after which children must go elsewhere to complete their studies. Many towns within the municipality were only connected by a network of roads in the late 1980s. Apart from livestock breeding, which employs the highest proportion of residents out of the four sites (table 3.1), its main other source of income is tourism. Bears and the ancient *teitos* serving as shepherd shelters in Somiedo's high pastures are its most emblematic attractions. Cangas and Somiedo differ in land tenure and management, as the majority of land in Somiedo is public and administered by the municipality or by sub-municipal parishes. Somiedo is a longstanding natural park which, when first established in 1988, brought considerable benefits to its residents. The municipal and park administrations function in relative synchrony, whereby projects and interventions seem to be jointly supported and brought forwards.

	PHGs of León	**RHR of Riaño**	**Cangas**	**Somiedo**
Km^2	1,052.85	835.20	823.57	291.38
Inhabitant	n=9,553 /km^2=9.07	n=2,181 /km^2=2.61	n=13,213 /km^2=16.04	n=1,190 /km^2=4.08
Mean age of inhabitants (±standard deviation)	52 (SD=23)	55 (SD=22)	48 (SD=23)	56 (SD=22)
% of male population	51.5%	58.9%	49.6%	58.2%
% of inhabitants that received Common Agricultural Policy Subsidies	3.25	6.83	6.68	13.95

Table 3-1 Socio-demographic statistics of study area.
Data taken from the Instituto Nacional de Estadística (date 01.2016) and the public registry of the Common Agricultural Policy for the year 2015, published by the Ministry of Food, Agriculture and Fishing.

3.2. Species

3.2.1. Brown bears

As in the rest of western Europe brown bears in Spain are strictly protected under the Bern Convention and the Habitats Directive 92/43/EEC (requiring the designation of Special Areas of Conservation and warranting strict protection) (Trouwborst, 2010; Chapron *et al.*, 2014). There are two completely isolated bear populations in Spain, one is found in the Cantabrian mountains and the other in the Pyrenees. Due to their small size, both are critically endangered (Kaczensky *et al.*, 2013) and have been protected at the national level since 1973. Bear damages are compensated following similar rules across Spain. Damage claims are certified by rangers and compensated to their full value. The larger bear population is found in the Cantabrian Mountains, where it has undergone a remarkable process of recovery. Numbering only 13 females with cubs in 1989-1900, the population has increased to numbering 80 females with cubs in the year 2015-2016, for a total estimated population of bout 330 bears, ranging across roughly 8,600 km2 (FOP, 2015; Gonzalez *et al.*, 2016; López-Bao *et al.*, 2018). In the Cantabrian Mountains the bear population occurs in two subpopulations that are separated by 50km of dense road networks, towns, mining operations and ski resorts (Garcia-Gaona and Roy, 2006; figure 3.7) but recently there has been increasing, albeit limited, movement between the two populations (Pérez *et al.*, 2010). Most bears, about 280, are found in the western sub-population where the study sites of Cangas del Narcea and Somiedo are found, whereas only about 50 are found in the eastern sub-population where the RHR of Riaño is found, whilst their presence in the PHR of León is sporadic and limited to only a few sites (FOP, 2015).

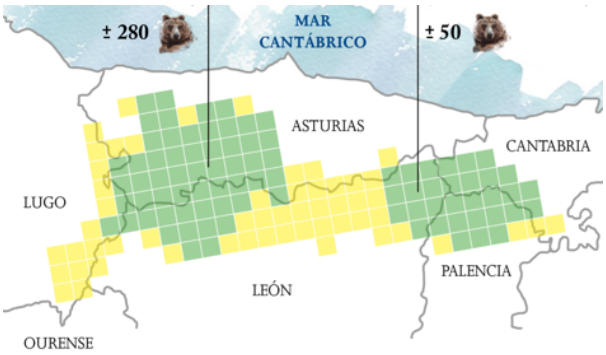

Figure 3-7 Brown bear range in the Cantabrian Mountains (FOP, 2015)

Bears in the Cantabrian Mountains have been threatened in the past by habitat loss and poaching (Wiegand *et al.*, 1998). Currently, limited habitat quality restricts range expansion, and various conservation efforts have been directed at restoring its habitat to facilitate movement and range expansion. Among the large carnivores of Europe, bears are considered to be the most sensitive to disturbance and, compared to wolves, they occupy less densely populated areas (table 3.2). Intrinsic factors also constrain the growth of the Spanish bear populations. Bears have relatively slow reproduction rates (table 3.2), and although the populations' structure and survival rates are not well known, sexually selective infanticide is likely to be exacerbated by the relatively limited availability of suitable habitat (Chapron *et al.*, 2009; Fernández-Gil *et al.*, 2010).

3.2.2. Wolves

The Cantabrian Mountains represent the historical heart of Spain's wolf population. Wolves are thought to have reached an all-time low in the 1970's, when they were limited to parts of the Cantabrian Mountains and a few other fragmented populations in the south of Spain (Blanco and Cortés, 2001). In the 1980s the population experienced a remarkable recovery, and proceeded to expand during the 1990s and 2000s, into less favourable habitats to the western, northern and eastern borders of the Cantabrian Mountains and into the southern plains of Castilla y León and contiguous regions (Blanco *et al.*, 1992; Blanco and Cortés, 2001). According to the national census carried out between 2012 and 2014, the Spanish wolf population is estimated at about 297 wolf packs (0.35 packs / 100 km^2 in Asturias, and 0.19 packs / 100 km^2 in Castilla y León)

(MAPAMA, 2014) . The wolf's protection status across Spain is rather complicated, but in the whole of the Cantabrian Mountains, wolves are protected under the Bern Convention and under the Habitats Directive, which permits their population to be hunted and subjected to population control (Trouwborst, 2014). At the national level, management approaches across the wolf's range vary considerably. For example, wolf hunting, population control, and damage compensation systems differ significantly both across and within regions of the Cantabrian Mountains. Details of wolf management and governance systems across the study sites are presented and analysed in chapter 5.

The wolf population faces threats similar to those faced by the bear population, but is significantly more resilient to them. Wolves range across a variety of landscapes, from dry lands to woodlands, to highly anthropogenic landscapes (Blanco and Cortés, 2001). Their principal habitat requirement is the availability of prey and where wild ungulates are sparse wolves are known to survive on domestic animals, carrion and garbage (Fuller *et al.*, 2003; Peterson and Ciucci, 2003). In this way wolves are less sensitive to human disturbance and habitat destruction than bears, and they exhibit higher reproduction rates (table 3.2). Several field studies have found that wolf populations are able to withstand high mortality rates and that, when given the chance, they can quickly recover (Boitani, 2003; Fuller *et al.*, 2003). Despite this, human related mortality is still considered a potential threat to wolf populations everywhere (Salvatori and Linnell, 2005; Liberg *et al.*, 2011; López-Bao, Blanco, *et al.*, 2015), and illegal hunting due to livestock conflicts has been reported frequently in Spain, including in areas where wolf population control is already implemented (Blanco *et al.*, 1992).

	Mean human density in areas of bear presence	**Females reach reproductive maturity (yrs.)**	**Average litter size**	**Reproductive interval (yrs.)**
Bear	19.0 ± 69.9 SD inhabitants/km^2, range= 0 to 1651 [a]	3.5-5 [b]	2 [b]	2 [b]
Wolf	36.7± 95.5 SD inhabitants/km^2, range= 0 to 3050 [a]	2 [c]	5-6 [c]	1 [c]

Table 3-2 Brown bear and wolf ecology and biology, taken from: a (Chapron et al., 2014), b (Chapron et al., 2003), and c (Fuller et al., 2003).

3.2.3. Bear and wolf presence in the study sites

There is a relatively homogenous presence of stable and reproducing wolf packs across all the study sites, whilst bears are present in higher densities in Somiedo than they are in Cangas (table 3.3).

	PHGs of León	**RHR of Riaño**	**Cangas**	**Somiedo**
Bear population estimates: n of females with cubs[1]	n/a	n/a	n=15 1.8/100 km^2	n=18 6.2/100 km^2
Wolf population estimates: n. of packs (+n. of non-reproducing packs) [2]	n=6 (2) in 1052.85 km^2	n=8 (1) in 835.20 km^2	n=5 (n/a) in 823.57 km^2	n=2 (n/a) in 291.38 km^2

Table 3-3 Brown bear and wolf population estimates across the study site.
[1]The estimate refers to the years 2016 and 2017 (FOP, 2018).
[2]The estimates for PHGs of León and RHR of Riaño were collected in the years 2012 and 2013 (Sáenz de Buruaga Tomillo et al., 2015), and the estimates for Cangas and Somiedo are relative the year 2016 (Palacios and González-Quirós, 2017)

4. CHAPTER 4 Methods

4.1. Overview of methods

The thesis is based on data I collected over the course of one year and one month in the field. I adopted a mixed method approach, which involved collecting both quantitative and qualitative data. I began my research with an initial scoping study in which I visited 7 sites of wolf or bear presence in Spain, and conducted qualitative interviews with key stakeholders, managers and local researchers. After returning from my scoping visit I designed a standardized questionnaire to administer to a representative sample of farmers and a snowball sample of hunters and beekeepers. However, in order not to lose the rich detail given by qualitative data, I included several open-ended questions in the questionnaire, and also recorded notes from unstructured conversations that arose before and after each interview, and any additional time I spent with informants and local residents. Throughout the main round of fieldwork, I continued to conduct qualitative semi-structured and unstructured interviews with various key informants and members of the local community. Other data I draw on in the thesis, includes my observations as I participated in community life, as well as the plethora of historical and ethnographic texts available about the area. Finally, I use some data given to me by the regional administration of Asturias and the Provincial Administration of León, regarding the composition of the livestock sectors, the population of carnivores and the official registry of carnivore damage claims.

4.2. Field scoping study

In the first phase of field research I travelled to seven different study sites across Spain (fig. 4.1) with the aim of establishing local contacts; determining what type of data were available regarding large carnivore distribution, their population size and dynamics, and the damages they cause; establishing collaborations and submitting formal requests to access the data. During this period, I carried out 66 qualitative interviews with experts and representatives of stakeholder groups in each study site (table 4.1). This information was used to inform the aims of the

thesis, the choice of the final study sites, the design of the questionnaire and subsequent interviews, and is also included in the results of the thesis.

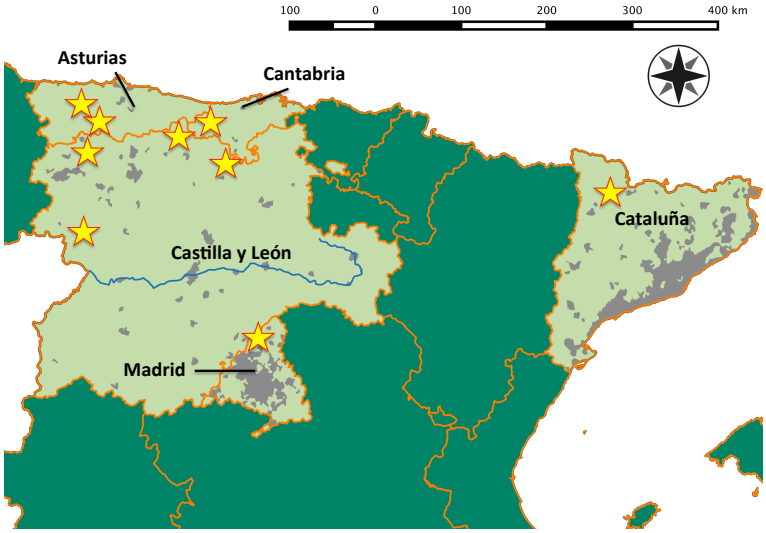

Figure 4-1 Map of field sites visited during the scoping study

Key informants	Number of interviews
Carnivore experts	8
Mayors & local politicians	14
Presidents of *juntas vecinales*	3
Livestock owners	19
Beekeepers	6
Hunters	8
Rangers	9
Tourism / hostelry owners	7

Table 4-1 Interviews carried out during the scoping study.

4.3. Local collaborators and assistants

My research was developed with the help of two local collaborators. One is a wolf biologist who also works for a local NGO dedicated to bear conservation; the other is a carnivore ecologist and Research Fellow based at the University of

Oviedo. Both assisted me in the initial phases of the research, helping me define research objectives, selecting study sites and facilitating local contacts and data. They provided important logistic, technical and advisory support. The local bear conservation NGO had permanent staff across the study sites, and they were my initial points of contact in the field.

My collaborator at the University of Oviedo secured funding for a research assistant, Anna Planella Bosch, who collected about 80 questionnaires in the Private Hunting Grounds of León. At the time, Anna was a recent graduate of a Masters program in Conservation, and was already very knowledgeable of the topic of coexistence with carnivores, having done her thesis on wolf depredations in Asturias. I spent two weeks training her in the field, and ensuring she had the right contacts and tools to continue the research independently. A second research assistant, Oriol Campi, conducted about 30 interviews in the Regional Hunting Reserve of Riaño and in Cangas del Narcea. He accompanied me for several weeks before conducting the questionnaires, and always worked under my supervision.

4.4. Quantitative data

4.4.1. Approach

In literature that is sometimes referred to as studying the “human dimensions of wildlife”, attitudes towards wildlife are often measured using Likert scales (for example on a scale of 1 to 5, from completely agree to completely disagree) to rank statements regarding the existence of large carnivores, the importance of conserving them, as well as a variety of different value orientations that may affect attitudes (Vaske, 2008). Some research has focused on “wildlife acceptance capacity” or “cultural carrying capacity”, defined as the maximum size of a population acceptable in an area (Decker and Purdy, 1988; Zinn *et al.*, 2000). Questions therefore have focused on opinions regarding the current population size, preferences for future population trends (Riley and Decker, 2000), or thresholds for tolerable levels of damage (Decker and Purdy, 1988; Vktersø *et al.*, 1999). These studies are carried out on representative samples of the population, or of certain stakeholder groups, often with the objective of comparing

results across samples. The challenge of quantitative measurement of attitudes and other social science data lies in ensuring both internal validity (the extent to which one is actually measuring what they are intending to measure) and external validity (the extent to which measures can be generalized to other contexts). Often, extensive piloting and previous collection of qualitative data is recommended to increase the validity of measures (Lauer, 1971; Vaske, 2008).

4.4.2. Questionnaire

I designed three sets of questionnaires for the different resource user groups I interviewed (farmers, hunters and beekeepers). These were based on information and qualitative data I collected in my scoping study, and some questions were based on attitude studies conducted in other parts of Europe (Majić and Bath, 2010; Glikman *et al.*, 2011; Majić *et al.*, 2011; Gangaas *et al.*, 2013). I piloted the questionnaire on 10 informants, but the validity of questions was continuously assessed over time and across study sites, by noting comments or responses that did not fit in the available choices, dropping some questions and adding new ones. Although I strived to maintain standardization across the sample, over time I sometimes realized that the questionnaire needed to be improved. There are instances, particularly in relation to questions on livestock herding practices, in which missing data in my results reflects these adjustments[2]. Appendix 1 presents a copy of the questionnaire, which, overall, addressed the following topics, through a mixture of open ended, multiple choice, and Likert scaled questions:

Questions for all informants:

- Background questions on the community, the landscape and the protected area (where relevant)
- Attitudes towards bears and their management
- Attitudes towards wolves and their management

[2] As a note, I found standardization of livestock herding practices particularly difficult, because each farm adapts their practices to different necessities and traditions. Longer periods of participant observation would be recommended before designing such a questionnaire, but in any case, a certain level of flexibility is required.

- Trust in information sources
- Socio-demographic data

Questions for farmers:

- Livestock ownership, livestock practices and questions relating to the Common Agricultural Policy
- Livestock depredations by carnivores, carnivore damage compensation and livestock damage prevention measures

Questions for beekeepers:

- Bee hive ownership and beekeeping practices
- Depredations to bee hives, damage compensation and damage prevention measures

Questions for hunters:

- Hunting practices

The questionnaire was administered by using software called Enketo (2016), which allows for multiple choice and open ended data to be directly entered and stored. The data were collected face to face using a laptop and notepad.

4.4.3. Sample

I based my sample of farmers on the Common Agricultural Policy (PAC) registry of 2015, which is publicly available online and which includes the names and municipality of residence of the farmers that received subsidies (above €1,500) in that year. When sampling in the larger municipalities, I would ask mayors or other key informants where farmers resided across the various villages, in order to sample them accordingly. In the case of Asturias, this information was provided by the Regional Administration. Therefore, sampling was stratified at the village level, and a random sample or farmers was selected from each village. I would approach farmers upon arrival in the villages and either conduct the interview on the same day or set a date. Table 4.2 shows the number of farmers present in the PAC registries in each site, and the number actually sampled. Several

farmers who were present in the registry were actually retired, and so were not included in my sample. The PHGs of León were the only site in which agricultural activities were conducted on a commercial scale, and so the CAP registry also included a minor but significant proportion of farmers who did not own livestock. Based on this, the farmers in the PHGs of León, the RHR of Riaño and Someido were sampled with a 5% sampling error, for a 95% confidence level, while the farmers in Cangas were sampled with a higher, 10% sampling error (Vaske, 2008).

I sampled hunters through the snowball technique (Rust *et al.*, 2017), and by meeting wild boar hunters before or during the social events they held after their hunt. Few beekeepers were present in the study sites and they were also sampled through the snowball technique. Caution should therefore be adopted in interpreting these results as quantitative, as they are not based on a representative sample.

	PHGs of León	**RHR of Riaño**	**Cangas**	**Somiedo**
Farmers	n=69	n=59	n=76	n=67
n farmers in PAC registry	n=310 /km^2=0.29	n=149 /km^2=0.18	n=882 /km^2=1.07	n=166 /km^2=0.57
% of interviewed farmers from PAC registry	22%	40%	9%	40%
Hunters	n=44	n=41	n=38	n=34
Beekeepers	n/a	n=10	n=27	n=13
Total interviews	n=100	n=94	n=113	n=93

Table 4-2 Number of questionnaire interviews conducted in each study site

The sample of livestock owners consisted mainly of males (85% in the PHGs of León; 82% in the RHR of Riaño; 64% in Cangas; and 84% in Somiedo), because they were the ones that volunteered expertise regarding the research topic when I visited the households. This does not mean that women do not participate in livestock activities or that they are not knowledgeable about the topic. However, the male heads of household featured more often in the CAP registry than the female heads of household. When it was clear that both males and females of the household participated in livestock activities, I would propose to carry out the

interview with the women, but they would often delegate their husbands or sons to speak. This is likely traceable to gender norms, a gendered division of labour resulting in some males having more experience in the livestock-wildlife interface, either because they are more often responsible for outdoor activities or because they are also hunters, and the fact that legal ownership of livestock made males the default point of reference for official tasks. The situation was somewhat different in Cangas, where the percentage of interviewed women is higher. There, livestock was often owned by women due to the fact that a large portion of the male population received early retirement mining pensions and could not officially earn other income. The predominantly male sample of hunters (over 99%) and beekeepers (88%) was instead driven by actual availability.

4.4.4. Analysis

The quantitative data I collected is presented descriptively, using percentages and figures produced in R (2017). The farmers', hunters' and beekeepers' data are presented separately, but 20% of the farmer sample were also hunters and 35% of the hunter sample were also farmers. Moreover, 28% of beekeepers were hunters and 44% were farmers. Informants who belonged to two or more groups are represented in each one of them.

The variables measured on a Likert scale are presented in the figures using their original 5 point scale. However, because many informants did not distinguish with ease between the options: "strongly agree" and "agree"; and the options "strongly disagree" and "disagree" (see also Vaerenbergh and Thomas, 2013), those categories were joined to form a 3-point scale, which I used in further statistical analyses. They remain visible in the figures, to represent respondents who spontaneously express strong views. To detect significant differences between each study site, the variables measured on a Likert scale were analysed using the Kruscal-Wallis chi-squared non-parametric test and post-hoc Wilcoxon tests. Chi-square tests were instead used to detect significant differences between the multiple-choice questions.

4.5. Depredation data

The data on wolf depredations that I present refers to self-declared depredations that I recorded throughout the interviews. I do not use the official wolf damage registries collated by the Regional Administrations because they depend on the different damage compensation systems in place, which differed across my sites. My data shows that in the PHGs of León, only a small portion of farmers that suffered depredations declared them to the regional administration (Marino *et al.*, 2018). I use two measures to summarize farmer's self-declared depredations by wolves. The first is whether farmers claimed to have suffered damages in the current or in the two full years previous to the interview (represented by a yes or no answer). The second is an estimate of the number of livestock that farmers claimed to have lost to wolves in the year 2015, the most recent year that most farmers could refer back to. Further details on how I analysed the relationship between depredations and resource user's attitudes towards wolves and perceptions of wolf damages, are included in Chapter 7.

The data on bear depredations to livestock, beehives and crops in Cangas and Somiedo, on the other hand, are based on the official registries collected by the Environment Department of the Regional Administration of Asturias. These refer to the years 2014 and 2016.

4.6. Qualitative data

4.6.1. Approach

Qualitative methods are often used to gain a deeper understanding of the knowledge, values, dilemmas emotions ad relations that underlie people's views and behaviours (Drury *et al.*, 2011). They are helpful in representing the diversity among individuals, social groups and minorities, and the relationships between them (see, for example, Bell *et al.*, 2007; Dandy *et al.*, 2012; Vitali, 2014; Rust *et al.*, 2016). Moreover, they are particularly suited to examining ambiguous, complex and contradictory concepts. The qualitative approach allows participants to lead the conversation giving them freedom to determine which topics deserve attention, and enabling them to set the discursive terms of the conservation.

Rather than aiming for a representative sample that allows results to be extrapolated, qualitative methods enable the emergence of themes that are specific to the context in which they were generated, but that may also be applicable to other contexts (Rust *et al.*, 2017).

4.6.2. Interviews

Including the qualitative interviews I collected in my scoping visit (table 4.1), I collected over 100 semi-structured and unstructured interviews with mayors and regional politicians, presidents of *juntas vecinales*, rangers, carnivore experts, livestock farmers, beekeepers, hunters, tourism and hostelry owners, and local residents. This enabled me to gain a broader understanding of how the views of local resource users were reflected in other sectors of the local community and furthermore it allowed me to triangulate some of the information that emerged from the questionnaires. Appendix 2 contains a guide of the interviews I conducted, which covered questions on the local community and its economic activities, carnivore presence, the impact of carnivores on various social sectors and on resource users, the illegal killing of carnivores, damage compensation, carnivore management and conservation. As time went by, my interviews became less structured and at times closer to a participant observation approach. After the first 25 interviews, I stopped recording as I found I was able to take detailed notes without losing track of the conversation, or to remember and note conversations and observations after they had taken place. This allowed conversations to flow more freely as responders were more comfortable when not recorded. Most recorded interviews were transcribed by me. In addition I employed two transcribers using my research grant, to transcribe 8 interviews word for word. I then listened to the recording to add notes on tone, sentiments etc.

In addition to the semi-structured and informal conversations I had with other key informants and community members, I collected qualitative data during every questionnaire interview, including answers to open ended questions, and informal conversation had before and after the questionnaires. Qualitative methods, therefore were used to inform the design of the questionnaires, record instances

when respondents' answers did not conform with the available response options, or when they challenged the relevance of the questions that were being asked.

4.6.3. Analysis

The qualitative data was coded using the NVivo11 (2015) software, through thematic analysis (Braun and Clarke, 2006). Thematic analysis is a method used to identify recurrent themes throughout texts and conversations. Coding is initially undertaken following an inductive approach, identifying the themes that emerge from the interview trying not to apply predefined categories or theories, and creating a new code for every theme that emerges from the data. The codes are then reorganized and aggregated in thematic clusters, based on how they are related to each other and also based on conceptual theory, literature, and research interests (Braun and Clarke, 2006).

4.7. Sensitive information

Collection of sensitive data regarding illegal behaviour through social surveys is challenging, but can provide interesting insights when ecological data is lacking, but especially as a way to understand the drivers and motivations behind people's decisions. Questions regarding the acceptability of poaching or inclinations to poach have been suggested as non-incriminatory ways to approach the issue, because they refer to hypothetical situations (Browne-Nuñez and Jonker, 2008; Gangaas *et al.*, 2013; Browne-Nuñez *et al.*, 2015). Other researchers have proposed the use of randomized response techniques (Gavin *et al.*, 2009; St. John *et al.*, 2010; Cross *et al.*, 2013), estimates of peer behaviour or anonymous, self-administered questionnaires (Tourangeau and Yan, 2007; Gavin *et al.*, 2009; St. John *et al.*, 2010; Kahler *et al.*, 2012; Cross *et al.*, 2013; Nuno and St John, 2015).

I chose to adopt a close-ended question in which informants could agree or disagree regarding the acceptability of poaching under different scenarios of damage and threat. Moreover, I also included an open-ended question on whether illegal killing of carnivores occurred in the area and why. I found that the

open-ended question was better suited at putting respondents at ease and creating a less threatening environment for informants (see also Drury *et al.*, 2011).

4.8. Participant observation

Throughout my stay I engaged in various social activities with the communities I stayed in, which allowed me to gain a rich understanding of local culture and everyday life. The data I build on therefore, is not just a collection of what my informants said, but rather it also draws on my observations regarding what they did and how they lived. Moreover, it enabled me to build a greater level of trust with some of my informants, as I became familiar with and complicit in everyday community life. My informants were extremely welcoming and most interviews were conducted in their homes. During the year of fieldwork, I shared meals and drinks with local residents, I spent time socializing in bars, going on walks with neighbours and informants, learning to cut wood, accompanying farmers and beekeepers to their grazing areas / beehives, assisting the birth of a calf, attending mining festivals, town parties and barbecues, working in a restaurant kitchen in exchange for accommodation for part of my stay, accompanying the bear monitoring team in their tracking and sighting of bears, and meeting hunting parties in the early mornings before they hunted or in their social meals after the hunt.

4.9. Positionality and ethics

Positionality refers to the personal stance of the researcher in relation to the social and political context of the study and the research participants. In the field of anthropology, awareness of one's positionality is essential in order to be able to reflect on how it may influence the research aims, process and outcomes. For me, being aware of my positionality meant considering how my nationality, class, education, age, and gender, determined how I was perceived by my informants, how this perception influenced their narratives and the information they shared

with me, and then how I understood and interpreted the information that I was given (Sultana, 2007; Neely and Nguse, 2015). In the context of my fieldwork, I quickly realized that my foreign nationality, age and gender meant that people were often kind and generous with their time. I speak Spanish relatively fluently but with a strong accent. My foreign nationality made my background and ideology more difficult to place, and together with my age, gender, and personality I believe this made my informants perceive my presence and questions as non-threatening. I think this made my informants more willing to open up and share sensitive information. However, it placed the responsibility on me to emphasize my intention to publish the research and also required me to think long and hard about how to treat the information I was being given, in order to reduce the impact of my research on the communities I studied. At the same time, my age and gender made certain contexts like hunting parties difficult to breach, and some relationships difficult to cultivate beyond the interview (Sultana, 2007).

Moreover, being aware of my positionality involved reflecting on my personal views about nature and conservation, and being aware of how they are a result of the cultural and social context in which I have grown and developed as an individual and as a researcher (Peterson *et al.*, 2010). My socio-economic background, my training in conservation, my life in a large city, my concern for animal welfare, my awe for wildlife and biodiversity, and my inexperience regarding livestock farming, hunting, and bee keeping, all meant that I entered the field with considerable baggage and several blind spots. It meant that I had to constantly reflect on the biases of my views and on the limits of my understanding. Through the process of reflexivity, researchers are meant to reflect on the partiality of their own perspective, as well as on the power structures that work to privilege one perspective above another (Adams and Mulligan, 2003). According to Sundberg (2015), reflexivity involves recognizing that as researchers we are situated in, and at times may even be beneficiaries of, the very same systems we are studying, whether directly or in a global or historical sense. This recognition of interdependency and entanglement between researcher and research participants exposes the shortcomings of approaches that assume distance and objectivity as ethical ideals. Instead it suggests the

need for a fuller understanding of and engagement between researcher, researched and research context (Rose, 1997; Sundberg, 2015).

Upon arrival in the field for my scoping visit, I discussed issues of consent with my local contacts and assessed different options as I began my interviews. I decided on obtaining verbal consent, instead of written consent, because it became evident that it was a more relaxed way of engaging people in conversation, whereas asking for a signature would have been interpreted as compromising. I obtained verbal consent three times throughout the interviews. Once after introducing myself, briefly explaining the aims of the study and asking potential informants whether they were willing to participate. The second time, once I had read the full statement of the research, the funders and my intention to publish (see Appendix 1 and 2), and finally at the end of the interview, when I asked informants whether they felt comfortable with the questions they had been asked. Before the interviews, informants were given the assurance of anonymity, I explained that their participation was voluntary and that they were free to interrupt the interview at any time. One informant did interrupt the interview as the questions on illegal behaviour were being asked, and this brought me to eliminate one my questions.

5. CHAPTER 5 Landscape, livestock breeding and the Common Agricultural Policy

5.1. Introduction

Within the field of large carnivore conservation science, significant emphasis has been placed on determining the success of management interventions aimed at changing local livestock practices, in order to reduce the impact of negative encounters and damages from carnivores (Álvares *et al.*, 2014; Eklund *et al.*, 2017; Stone *et al.*, 2017). However, studies that look at wider agricultural policy and its impact on rural livelihoods and livestock practices, are less common (but see Giannuzzi Savelli *et al.*, 1997; Antonelli *et al.*, 2005). Researching the effect of agricultural policy on traditional agricultural practices entails on the one side, understanding both the technical policy details and the wider political economy that drives large scale policy changes. On the other side, it requires knowledge of local livestock practices, the historical context in which they developed, and the cultural logics that determine livelihood choices (Jampel, 2016). Literature from the field of political ecology offers insights regarding the processes through which various, typically third world subsistence agricultural systems, have been integrated into global economies, and how this changed local relations with the environment (Watts, 1983; Blaikie, 1985). These studies explore how forces of modernization, neoliberal economics and globalization can work to constrain livelihood choices, and can thus have an impact on the resilience of small scale traditional agricultural communities and on the environmental sustainability of their practices.

Within frameworks that attempt to determine the factors that shape livelihood decisions, macro and micro economics are given primal importance (Scoones, 2009; Bennett, 2010). A critique to this approach has come from the anthropological literature that argues against the view of humans as rational agents that respond primality to economic incentives. Under this view, livelihoods represent not just a means of subsistence or of maximizing income, but they also give meaning to a person's identity and surroundings (Bebbington, 1999). Jampel

(2016) shows how the choice to remain in cattle-based livelihoods in Chile despite marginal profits reflected farmer's attachment to place and tradition, and their preference for a lifestyle that ensured tranquillity and autonomy above the economic gains offered by migration to urban centres. Livelihoods, the tasks carried out to sustain them, and the social relations on which they depend may be seen as constitutive of the places in which they are carried out (Ingold, 1993). They contribute to moulding landscapes both materially and conceptually, giving them shape, meaning and significance (Ingold, 1993).

Based on this view, research by (Ghosal *et al.*, 2015) has discussed how the landscape that local communities share with carnivores, and the type of activities and tasks that are carried out within it, are likely to have a significant impact on how coexistence with carnivores is experienced. They present a case study from Norway where a change in landscape resulted out of the transition from a resource economy based on agriculture and logging to a service economy based on tourism. The change in the local landscape was mainly driven by economic policy, but it was also coupled with a growing conservationist ethos and discourse. This resulted in local opposition to carnivore presence as the traditional lifestyle of the community was perceived to have come under threat by economic and conservationist interests. Other research has highlighted how livelihood choices and the human capital they rely on, can be a way through which individuals and communities challenge rules of dominance, change the relations that govern natural resources, and resist to external pressures (Bebbington, 1999; Escobar, 2001).

In the context of coexistence with carnivores, considerations of the economic, cultural, and political dimension of livelihood choices can shed light on the evolution of livestock practices that promote or hinder positive coexistence with carnivores. In this chapter I use the case study of livestock farming in the north west of Spain, and first trace how perceptions regarding livestock farming activities are grounded in local culture and cosmology. This section presents a description of local narratives of coexistence with large carnivores, and how they are influenced by livestock farming culture and tradition. I then explore how traditional livestock farming practices and mechanisms of coexistence with large carnivores evolved over time, and how they have been influenced by the

European Common Agricultural Policy (CAP). Finally, I discuss the political economy driving CAP reform, and trace its effects on local livestock breeding practices, on the ability of farmers to defend themselves from carnivore damages and to pursue their activities. In doing so I seek to uncover the influence of the CAP on local perceptions of the landscape, the wildlife that inhabits it and the activities carried out within it. Through this approach, the CAP may be understood as a system of territorialisation that acts to restructure the local landscape, its ecology and social organization (Adams *et al.*, 2014).

In recent years, literature on 'environmentality' has shed light on how governmental regimes can influence the environmental views and practices of local populations. Applications of the theory by Fletcher (2010, 2017) have identified five different environmentality approaches (i.e. sovereign, disciplinary, neoliberal, cultural and community-driven environmentality) and the ways these may be at times in conflict with each other, and other times may support one another. In this chapter I use the environmentality framework and its critiques to look at ways that the CAP influences coexistence subjectivities and practices. This facilitates an understanding of the ways in which the neoliberalization of agriculture brought about by the CAP is changing traditional livestock farming practices and redefining local people's relations with large carnivores.

5.2. Perceptions of the landscape and of resource users' role within it

5.2.1. Landscape change

Across all my study sites livestock breeding was considered the main economic activity in the area. It was viewed as the activity that gave shape and meaning to the local landscape, and made other activities like tourism possible: ("*the animals in the mountain exist because of farmers, just like the hiking trails and the transhumance shelters*"). Other traditional activities included small scale agriculture (in the Private Hunting Grounds (PHGs) of León) wine (in Cangas), and timber production (in the PHGs of León). Tourism was seen as an important and growing activity, although some informants were ambivalent about it, claiming that its importance is overestimated given that it is limited to only certain

seasons: "*you cannot live just with tourism, (or) villages will have to close over the winter*". Hunting tourism was mentioned by some (in the Regional Hunting Reserve (RHR) of Riaño), while other services like construction and hostelry and small commercial businesses were considered important in the bigger towns. Pensions were viewed as a main source of income everywhere, but especially in ex-mining towns (in Cangas and the private hunting grounds), where informants lamented lack of new industries and wondered what would come of the area after the mining generation had passed ("*pensions are the main industry here"… "and the supermarket*" (PHGs of León)). Across all sites, people spoke of an aging population and a lack of development prospects. Infrastructure was considered backwards and important public services like schools and hospitals were difficult to access for those living in more remote sites (RHR of Riaño and Somiedo). The lack of schools was a main reason that prompted families to leave, or to split into two households. Like many other rural areas in Spain, the widespread migration of women has exacerbated depopulation and the disintegration of rural social fabric (Herrera, 2014)[3]. Many informants looked to the future with uncertainty and hopelessness.

Depopulation was mentioned across all the study sites as the gravest issue facing the territory, eroding both the social cohesion and the environmental quality of the landscape. The landscape appeared to many informants as "*lonely", "abandoned", "deserted", "dying*" and "*without a future*". The disappearance of humans often conjured images of forest succession and an increase in wildlife. The mountain was "*growing*", the forest "*eating away*" and "*closing in*" on towns. "*Flocks of bears*" were replacing livestock, and nature reserves were supplanting once populated and productive landscapes. Depopulation was seen to be a consequence of bad management, lack of political interest in supporting rural development, and a generational shift towards more service based, urban lifestyles: "*absolutely nothing is being done to promote these areas*" (Cangas) … "*they always sold us the idea that life is better in the city… we used to think that in cities people were more intelligent and that their lives were more exciting* …" (Somiedo) … "*Nobody teaches their children to stay here, we teach them to be*

[3] The female population below the age of 40 reached 47% in the PHGs of León, 44% in the RHR of Riaño, 39% in Somiedo and 48% in Cangas (Instituto Nacional de Estadística 2016).

astronauts and (all kinds of things) but nobody says: 'stay … and take care of your cows'." (RHR of Riaño).

However, views about local development prospects were not all negative. Some informants pointed out that, while social life had grown poorer due to migration, disposable income and working conditions had significantly improved. Several informants were optimistic about the future, and saw potential in developing businesses for agricultural products, fruit, chestnut and mushroom picking, organic meat, local livestock breeds, artisanry and water sourcing. Honey production was also mentioned as a business that was profitable and had the potential to grow, as were sports and wildlife tourism. What was lacking, according to a younger and newly settled resident, were more young residents inspired to envision and seize new possibilities. Some informants claimed that although the number of livestock breeders was declining, there were some signs of young farmers carrying on their parent's activities, and of people returning back from the city. A few livestock farmers claimed that despite everything, they still loved their job and wanted to continue doing it. Endurance appeared as a characteristic forming part of the local collective memory and identity, and informants often referred to livestock breeders' perseverance through past and present hardships.

5.2.2. Narratives of coexistence between local livestock farmers and large carnivores

In discussing their perceptions of the local landscape, respondents expressed a strong sense of belonging and an attachment to their roots and traditions, which in some people provoked ambivalent feelings. On the one hand, the landscape was described as rugged, the nature as hard to tame, and the winter climate as harsh and unforgiving. Life and traditional livelihoods were said to be tough, tiring and enslaving. At the same time, the local landscape and lifestyle were also described as tranquil, peaceful and beautiful. Some farmers expressed a sense of pride and an appreciation for the landscape's uniqueness, associating it with imagery of mountains, flora and fauna, including mentions of endangered animals.

The natural environment was viewed as having been preserved in this state by centuries of human presence and activity. Informants pointed out how livestock grazing maintained a mosaic landscape that gave refuge to a variety of small mammals and birds, like the endangered capercaillie. Planted fruit trees and, until recently, livestock carcasses were believed to have enabled bears to survive in the area at a time when they were disappearing everywhere else "*the mountains are full of bears and capercaillie because we took care of them*" (RHR of Riaño). Human presence was seen as the most important element contributing to creating and maintaining a natural balance through a series of activities. By cutting trees and clearing forest undergrowth and shrubs, farmers conserved wildlife habitat, prevented the spread of fires, and promoted forest regeneration by increasing the strength and vigour of trees ("*if you don't cut trees the forest grows old, the same way that we (our towns) are growing old, without children*"). Even rivers were said to have been full of trout back when locals were allowed to clear trees from the river banks.

According to several informants, in the past livestock carcasses had provided an important food source for bears and wolves, enabling them to coexist with humans without causing too much damage. Bears were said to be scavengers by nature, and to have been forced into predatory behaviours only by regulations on carcass disposal imposed after the mad cow disease outbreak (López-Bao *et al.*, 2013; Mateo-Tomása *et al.*, 2018). Feeding wildlife was considered by several informants as a normal stewardship practice, as a possible solution to prevent carnivore depredations on livestock, and perhaps also as a way of taming carnivores; "*if they are in a state of wilderness (están salvajes), why don't they feed them?*" (PHGs of León). The failure of the government, conservationists and animal welfare advocates alike, to feed or provide for the wildlife they claimed to protect, served as evidence of their inadequacy as stewards. This view was furthermore evidenced by the fact that managers allowed wildlife to roam freely and unchecked, whilst farmers were expected to vaccinate, microchip and protect their animals from predators. At the same time, claims that wildlife had become too habituated to humans, and rumours that wolves had been artificially introduced or that they were being fed to enable wolf tourism, brought some informants to question those who conceptualized and experienced wildlife as wild. For one informant the line between wild and domestic animals was blurred

to the point that he referred to deer as "*wild livestock*", when describing the negative effects of wolf predation on game.

Hunting, like livestock breeding, was considered by many to serve an important social and ecological role (see also Fischer *et al.*, 2013). Hunters claimed to be driven by a passion for the outdoors and by the opportunity to socialize among friends and neighbours "*this area is dead in the winter, and hunting is the only thing that keeps it alive*" (PHGs of León), but they also saw themselves as carrying out a community service. By exerting pressure at the very top of the food chain and throughout it, hunting was used to maintain their vision of a natural balance, and vice versa. It was seen to prevent wildlife diseases, and to help the recovery of locally endangered birds, small mammals and ungulates by keeping small and large carnivores in check. Several informants claimed that bears and, to a greater extent, wolves, had no predators and therefore their population needed to be controlled by humans.

Human intervention was also considered as necessary to correct socially unacceptable behaviour in animals, such as infanticide in bears and consanguinity in many species including wolves (to keep the breeding pair from dominating the genetic make-up of the local population). Although hardly anyone advocated for bears to become a game species, a few respondents claimed that predatory bears should be selectively culled. The existence of carnivorous bears and scavenger/vegetarian bears, and the possibility to distinguish between the two, appeared to make coexistence more manageable (see Chapter 8, as well as (Lescureux and Linnell, 2010; Lescureux *et al.*, 2011). Wolves, on the other hand, were all prone to predatory behaviour and were largely seen as a significant threat to livestock farming (see Chapter 7). In this respect, hunters saw themselves as providing a service to their livestock farmer friends, family or neighbours, when given the opportunity to hunt wolves. Whereas bears were said to seldom attack livestock and when they did so, would take only one, the wolf's pack behaviour and surplus kill (when they kill more prey than they can immediately consume) spoke to the ferocity and wastefulness of wolves, and of their perceived transgression of social norms (Marvin, 2012) . This was used as evidence of wolves' unbalanced nature or rather of their disconformity with local conceptions of a natural balance. According to a priest from one of the study

sites, by virtue of their foresight, humans had the ability to hunt more sustainably than other predators.

Some informants viewed the protection of wolves, and to a lesser extent bears, as a subversion of their hierarchy of values. The focus on wildlife protection, in a context of a lack of development prospects, depopulation, and loss of traditional practices, brought many informants to conclude that the needs of wild animals were being prioritized above those of the local community: "*the life of a bear is worth more than the life of a Christian (meaning a human)*"… "*there is inequality between the fauna that the regional government claims as its own and the fauna of farmers. They will pay 30 or 40 euro for a sheep (as carnivore damage compensation) but a fine for illegal hunting of deer will amount to 600 euro, and yet they are similar animals. Their animals are worth more*" (Somiedo). In addition, wildlife protection and strict hunting regulations were seen to infringe on the right of local communities to enforce physical and cultural boundaries. As already described by others (Bobbé, 1993; Lescureux and Linnell, 2010; Descola, 2013), since antiquity, resource users of Southern Europe have tended to divide the space they inhabit into concentric spheres that range from domestic to increasingly wild spaces. The home and garden (*domus* and *hortus*) extend into in-by land used for agriculture and fodder collection (*ager*), which are followed by pastures for livestock grazing (*saltus*) and finally forested areas (*silva*). These boundaries are permeable (Bobbé, 1993): humans will predominantly inhabit the home and in-by land but they also access pastures with their livestock in the summer, and the forest to gather, hunt or for recreational purposes. Carnivores, on the other hand, belong in the forest and must be held accountable when they transgress boundaries and cause damage: "*I like animals but I am an orderly person. The farmer (belongs) here and wildlife belongs (…) up (in the mountain)… I like bears so long as they don't come down to bother us*" (Cangas).

Lescureux and Linnell (2010) refer to the ability to respond to intrusions and to control the outcome of interactions with wildlife, as "reciprocity". In their case study, such an ability appeared to be as much influenced by conservation laws as by the characteristics and behaviours of the species in question. Many informants from my sites believed conservation laws had produced the observed increase in carnivore populations, and viewed them as an impediment to manage

carnivores as they had been managed in the past. Some even argued that wildlife was being forced closer to towns because forests were growing denser and less accessible. In this way, reduced human presence and activity was seen to have destabilizing effects even within the wilder spheres of the landscape.

Local resource user's views of the landscape and their role within it closely resemble Ingold's notion of "taskscape", whereby the landscape is symbolically and physically constituted through activities carried out within it by human and non-human beings (Ingold, 2000). In his words, the landscape stands as "an enduring record of - and testimony to - the lives and works of past generations who have dwelt within it" (Ingold, 2000, p.189). Humans are not seen as separate from nature in the sense that they are embedded in it through a web of interactions. The boundaries between domestic and wilder spaces are permeable, and human involvement spans across them to varying degrees. Through familiarity, everyday engagements and labour oriented towards the care and stewardship of other beings and of the environment, conceptual dichotomies that distinguish between gathering and cultivating, hunting and breeding, and between forest and garden, become blurred (Ingold, 2000; Descola, 2013). The traces of human activity are no better or worse than traces of other beings, so long as they contribute to shaping a functional landscape (Figari and Skogen, 2011). This is not to say that wildlife is expected to behave according to local cultural rules, but rather that human intervention can be beneficial to restoring order, function and balance: "*it's not the fault of the wolf, he needs to eat just like any other animal, it's our fault that we don't manage him, and the fault of the administration that doesn't let us*" (RHR of Riaño). Narratives of landscape stewardship were apparent in the discourse of most informants, but they often manifested themselves differently. Indeed, opinions regarding the need to feed wildlife or to correct disagreeable behaviour were not necessarily shared by the majority of the sample. What was clear, however, was that any vison of a balanced environment included a vibrant local community, with employment opportunities for the younger generation and the chance, for those who wanted it, to continue practices that preserve a landscape in which the traces of past generations are recognizable.

5.2.3. Power relations affecting the construction of local identity and tradition

Informant's accounts of how they viewed their own role within the landscape they inhabited were very clearly influenced by how they felt their role was perceived by other groups. The government was often portrayed as having been co-opted by urban "environmentalist" ideologies, and was seen to largely disregard the interests of local communities. In this way, government, biologists, conservationists, animal welfare groups and foreign tourists often became grouped under the umbrella of alterity "*the only species that wasn't here before are ecologists and animal welfare advocates. They are a colonizing species. Since they arrived there are fewer animals… they are the only redundant species*" (Cangas) (see also Lute, Bump, & Gore, 2014). Uniting them was the assumption that they shared a dualistic vision of human-nature relations, that resulted in the promotion of conservation approaches that tended to exclude local communities (Adams and Mulligan, 2003; Brockington and Igoe, 2006; Peterson *et al.*, 2010). This was evident from claims that depopulation and landscape change were the intentional outcomes of policy decisions: "*the government is changing residents for wild beasts*" (Cangas). These findings are in line with social identity theory, which describes how conflicts borne out of perceived power inequalities, can result in in-groups seeking to increase their own positive characteristics, while critiquing the characteristics of out-groups and assuming homogeneity within them (Lute *et al.*, 2014). Overall, informants felt that their role as landscape creators and stewards went unacknowledged, and furthermore that their livestock farming and hunting practices were being criminalized (Caro *et al.*, 2017; Von Essen and Allen, 2017). These tensions were compounded by epistemic conflict (Clark and Murdoch, 1997; Skogen and Krange, 2003; Skogen and Thrane, 2007). Local residents often challenged the knowledge systems of biologists and government officials who lived and worked remotely, and relied on theory, models, satellite images and brief field visits to understand the local environment: "*you can't learn everything from books"… "nature is understood by living here"* (Somiedo*)*.

These findings suggest that local resource user's identities and traditions are created through a relational process (Pellis *et al.*, 2015). Resource users' image

of themselves is likely as much as product of the narratives and practices that they inherited from previous generations, as it is a reaction to external pressures. In responding to their image of alterity, informants seemed to adopt a strategy of both resistance and assimilation. On the one hand, their vision of a foreign and colonizing conservationist power brought them to affirm the role of traditional practices and stewardship with renewed strength. On the other hand, informants also moulded conservationist narratives to support their interests, using the presence of endangered species as evidence of the sustainable nature of local practices (Homewood, 2010; Vázquez Cortés *et al.*, 2011). Beyond that, it is likely that informants' sense of pride for the landscape's beauty and biodiversity were also produced through interactions with foreign tourists and the outside world at large, in a relational process that has turned the ordinary into something unique (Vázquez Cortés *et al.*, 2011). The way that local resource users situate themselves in the landscape represents, most of all, a political statement which enables them to assert their own aspirations and interests (Homewood, 2010).

5.3. Livestock breeding

5.3.1. A history of livestock herding systems and coexistence mechanisms

Livestock breeding has ancient roots across the four study sites, as well as in the rest of the country. Spain's main source of richness during the middle ages was its merino sheep wool (Manderscheid, 2003). The wool industry was controlled by wealthy elites through an association called *La Mesta* (1276 – 1900s). The association had a great deal of political and economic influence, and was able to outcompete smaller livestock holders and impose grazing rights on other land uses (Manderscheid, 2003; Gómez Gómez, 2006; Herrera, 2014). Its sheep flocks were very large and were seasonally herded across long distances, adopting a practice known as transhumance. A study by Gómez Gómez (2006) conducted in Prioro, a town found just between the study sites of Riaño and the Private Hunting grounds of León, reports that a large portion of the local population of male labourers were hired as sheep herders by *La Mesta* up until the 1900s. The herders would spend the winter in Extremadura, in the south of

Spain, and then make their way back to the Cantabrian Mountains over the summer, bringing with them thousands of sheep. Gómez Gómez (2006) claims that sheep transhumance was such an important livelihood that it enabled the population of Prioro and its neighbouring towns to be much larger than the local environment could sustain. Transhumance provided, in this sense, a form of seasonal migrant labour that contrasts to more permanent labour migration to urban centres. Sheep herders of La Mesta practiced constant vigilance over the sheep flocks, in order to prevent losses to disease, theft and other causes of death including depredations from carnivores. They did so with the help of livestock guarding dogs (*mastines Leónenses* are a local breed of livestock guarding dogs that is still used throughout western Iberia).

A different form of transhumance was practiced in the central and western portions of Asturias, where the study sites of Somiedo and Cangas are found. There, *Vaqueiros de alzada* are a group of transhumant herders that emerged in the 14th century, originally employed by landlords to herd cattle and other livestock from the mountains in the summer, to the plains of the Cantabrian coast in the winter. Due to their seasonal movements and the discrimination that they were subjected to by the settled communities, *vaqueiros* lived in relative isolation and developed distinct traditions and cultural practices (Fernández Rodríguez, 2017). Unlike the herders of La Mesta, who would leave their families behind, *vaqueiros* moved in family groups and formed communities in their winter and summer residences (Fernández Rodríguez, 2017). Although the practice has been largely abandoned, some *vaqueiros* still make the journey today using vans.

Both of the above are forms of long distance transhumance, but in parallel to them, traditional livestock breeding across the four study sites was, and is still today, practiced through a short distance form of transhumance (Gómez Gómez, 2006). Cattle are herded to higher elevation grazing areas in the warmer seasons and lower elevation grazing areas, fields or stables in the colder seasons. The lower elevation pastures and fields that are vacated in the summer are destined to fodder collection (Arango Fernández, 2011). Up until recently, livestock was guarded through a collectivized system of *veceras*, which allowed for increased efficiency and reduced labour costs. All livestock within a community was joined together and re-divided into groups according to their vulnerability and use, and

grazed on common land. Younger and smaller livestock were kept progressively closer to the villages, while adult cattle and horses were kept in farther grazing areas. Communities would either pay a herder or take turns to watch over the livestock groups (Gómez Gómez, 2006).

Such arrangements ensured constant vigilance from carnivore depredations. In addition, local communities adopted a variety of lethal control measure against large carnivores. Local villagers or professional *alimañeros* would trap wolves, bears and other animals considered 'vermin'. Moreover, in the areas of Riaño and the private hunting grounds of León, wolves were hunted using structures called *chorcos*. Baits would be placed in between a long v shaped wooden fence and the wolves would be channelled through the fence into a hole in the ground leading to a stone chamber (Álvares *et al.*, 2011). Lethal control measures were of course made more effective by the advent of strychnine in 1880 and later shotguns (Fernández and de Azua, 2010).

5.3.2. Modernization of the farming sector and the CAP

Until very recently, livestock owners across the study sites were subsistence farmers who cultivated barley and maize as staples, as well as other crops (Gómez Gómez, 2006; Fernández Rodríguez, 2017). They owned a small number of livestock heads of different species used for both meat and dairy (cattle, sheep, goats, horses and pigs). The size of the herds was proportional to ownership of in-by land and stables, which usually consisted of a small chamber in the household[4] (Gómez Gómez, 2006). During the 20th century, livestock breeding went from being a complementary activity to the main source of income at the household level (Rodríguez-Vigil Rubio, 2005; Gómez Gómez, 2006). The change from a self-sufficient system to one highly specialized in livestock keeping was slow and dragged out by the Spanish Civil War (1936-1939) and later Franquist dictatorship (1939-1975) (Gómez Gómez, 2006). It began in the 1960s, when farmers first specialized in meat and dairy cattle production, and then

[4] A cadastre from the 18th century reports that the average household in Prioro (in the Private hunting grounds of León) owned a total of 36 livestock heads of various species, but that considerable variation existed among owners, with several owning far fewer (Gomez 2006).

accelerated following Spain's entry in the European Union in 1986. The restructuring of the livestock sector in the Cantabrian mountains followed a similar path as other marginal mountainous areas of Europe, having been greatly affected by the European Common Agricultural Policy (CAP). The evolution of CAP measures and its political economy are fundamental to understanding the social and economic structure of my study sites, and for this reason it is worth exploring the CAP's history and its recent changes.

In the past 50 years since its creation, the CAP has reflected wider political economy debates and paradigm shifts, from Keynesian to neoliberal economics. In doing so it has also ignited a debate over the economic and social significance of agriculture in Europe. According to Moreira (2015), the evolution of the CAP can be broken down into four main phases. During phase 1 (1962 - 1992) the policy was largely aimed at increasing agricultural productivity and the income of farmers, ensuring the availability of food supplies at an accessible price, and stabilizing the market (Potter and Tilzey, 2007; Moreira, 2015). To support itself the CAP relied on a heavily interventionist economic system[5]. Premiums were paid per livestock head, incentivizing an increase in herd size, and promoting an intensification of livestock keeping in the lowlands (where livestock feed is easier to grow) while still allowing for the creation of a strong livestock sector in the highlands (Hodge *et al.*, 2015). However, by the late 1980s the CAP had grown too expensive and increasingly unpopular abroad, as it disadvantaged other, often economically vulnerable countries. Phase 2 of the CAP (1992- 2003) marks the first influences of trade liberalization in the European agricultural system, implemented through budgetary constraints (Moreira, 2015). The reforms were prompted by the architect institutions of global neoliberal trade (General Agreement on Tariffs and Trade and the World Trade Organization). These established a traffic light system to determine the degree of trade distortion caused by different economic measures. CAP measures that were "decoupled" from production, such as rural development and environmental payments were deemed least trade distorting, and therefore more compatible with free trade

[5] which included production subsidies and payments to complement income, withdrawal of surpluses, price regulation, and a trade regime composed by import levies and export subsidies (Moreira, 2015)

principles (Dibden *et al.*, 2009). Other pressures for reform came from campaigns against the environmental and animal welfare impacts of intensified agricultural production, consumers' movements, and other sectors of the economy that could not claim equal access to benefits (Donald *et al.*, 2002; Henle *et al.*, 2008; Moreira, 2015).

It was around this time that the notion of agricultural multifunctionality was developed and used internationally to negotiate the continuation of Europe's agricultural support system. The notion consisted in claiming the "unique" historical role that agriculture has played in supporting rural life and shaping Europe's natural landscape (Potter and Tilzey, 2007; Dibden *et al.*, 2009). Through this discourse, agricultural land and practice was constructed as a public good, without which the ecological and social structure of rural Europe would collapse (Potter and Tilzey, 2007; Swinnen, 2015). Underlying this discourse, is a rejection of dualistic notions of humans and nature, because the concept of multifunctionality portrays farming activities as being constitutive of the natural landscape, promoting the conservation of certain species assemblages, preventing fires and serving other nature stewardship purposes (Potter and Tilzey, 2007; Linnell *et al.*, 2015). Policy wise, it justified the creation of payments for Least Favour Areas, to maintain agricultural activities and human presence in areas where farming would otherwise be outcompeted by more productive lands. Based on these arguments, the CAP is considered by its supporters as a tool of resistance against the neoliberalization of agriculture (Potter and Tilzey, 2007; Dibden *et al.*, 2009).

Reflecting a distinction between the productionist and multifunctional character of agriculture, in 2000 the CAP was split into Pillar 1, concerned with subsidies and direct payments to farmers and Pillar 2, concerned with rural development and environmental protection (including agri-environmental schemes, subsidies for local livestock species and for non-productive investments). Phase 3 of the CAP (2003-2013) saw a further decoupling of payments from production, with the introduction of a single payment scheme based on the area farmed rather than the amount produced (Potter and Tilzey, 2007; Moreira, 2015). For livestock farmers, this moved emphasis away from the number of livestock heads owned, and onto securing the availability of sufficient eligible grazing land, through

ownership or rent[6]. A series of conditionality clauses were stipulated for payments, which included safeguarding grazing areas against soil degradation and shrub growth. Although a significant reallocation of funding was made from Pillar 1 to Pillar 2[7], this phase also introduced greater decentralization and flexibility for member states to decide how to structure support and how to allocate funding between pillars. In Spain, this resulted in the maintenance of direct payments per head of meat cattle (was well as sheep and goats, but with significant reductions) (Asociación Pastores, 2013).

Finally phase 4 of the PAC (2013-now) represents a continuation of the neoliberalization process[8] (Moreira, 2015). Most importantly for farmers in my study sites, payments per hectare were reduced in land considered less productive, due to steep slope, shrubs or trees. Even though direct payments for meat cattle continued to be in place, new "greening" payments were included in Pillar 1, for livestock farmers to maintain permanent grasslands, whilst young farmers and least favoured area payments were continued (Pe'er *et al.*, 2014). This phase also introduced a series of redistributive measures to reduce inequality between large holders and smallholders[9] (as well as between Member States). Especially relevant for carnivore coexistence, has been the use of pillar 2 payments to promote damage prevention measures and participatory processes aimed at involving stakeholders in carnivore management (Marsden *et al.*, 2016). The changes in the CAP have paralleled the creation of the EU Habitats Directive in 1992, which regards biodiversity as a public good, and hence provides an impetus for CAP to be used to promote biodiversity protection.

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[6] The amount paid per hectare was calculated with a reference to the number of livestock and hectares claimed in the previous CAP period (Bardají, 2014).

[7] subject to national co-funding.

[8] With uncoupled, land based "single payments" turning into "basic payments".

[9] By simplifying bureaucracy and requirements for smallholder and by paying more per hectare for the first hectares up to a limit, and less per hectare above that limit (Moreira, 2015)

5.3.3. Effects of modernization on local livestock herding practices and coexistence with carnivores

Farmers across my study sites recognized that the CAP has been essential to the survival of their practice. However, the complexity of the CAP, its frequent reforms and the general lack of clear stated objectives, has led to significant confusion and lack of awareness regarding the motives behind the policy changes. This general lack of understanding and control over CAP reforms, left farmers with an unsettling feeling of uncertainty regarding the future. To complicate matters further, CAP regulations were often confused with other regional and protected area legislation, all becoming mixed up into a bundle of laws that as a whole were perceived to have been imposed onto them by foreign actors.

The main perception across all study sites and all livestock farmers involved in the study, was that CAP payments had been significantly reduced. This was often attributed to the decline in payments for rugged or shrub covered terrains: "*This is a mountainous area, all terrain is rugged and covered in shrub!".* The percentage of farmers that reported declines in the surface area for which they received CAP payments ranged from 18-24 % in the private hunting grounds of León and the regional hunting reserve of Riaño, to 56-70% in Cangas and Somiedo (Appendix 4). This particular measure was contested especially because it was coupled with regulations that banned or limited prescriptive burns, and with reduced municipal funding to clear common grazing land. The conjunction of these two policies was perceived as an intentional limitation to livestock activities in mountainous areas, constructing a contested division between productive land and nature, and facilitating an expansion of the latter at the cost of the former. Most of all, farmers felt there was a complete disconnect between policy and practice. According to them, land that was discounted due to shrubs and steep slope consisted of perfect grazing land, and had always been used as such *"The CAP hasn't (affected my livestock herding). My livestock keeps grazing where it always has, I'm just not able to claim as many subsidies*" (Somiedo)… "*They make these decisions sitting at their desks in Oviedo, Madrid and Brussels, using photographs from satellites and planes. You can't see it from up there, but there is good grass under the shrub*"(Somiedo). The use of modern

technology (aerial photographs) was perceived to further alienate faraway decision makers from the local reality, creating a classification process that disregarded and oversimplified local practices (see also Adams & Hutton, 2019). Most interesting of all, are the strategies employed to overcome these impediments. In large common grazing areas, eligible land was redistributed among livestock owners that held access rights, regardless of whether their livestock actually grazed within the eligible area. Private landowners without sufficient eligible land would sometimes rent cheap land elsewhere. Finally, when permits for prescriptive burns were denied, arson was used to clear grazing areas of shrub (see Chapter 8). Overall, some farmers lamented that payments that were once intended to help the farming sector were now directed at environmental protection. This opinion was voiced by the representatives of the main Spanish farming associations, who described decoupling and the transfer of funds from Pillar 1 to Pillar 2, as “theft” (Thurston, 2009).

The main problem reported by livestock farmers was the small profit margin they claimed to make from livestock activities. This was a function of the price at which they sold cattle, which they claim had remained stable for various decades, vis a vis the increasing cost of fodder, veterinary assistance, labour and general living costs. Most interviewed farmers sold calves around the age of 5 months, while a few primed them in enclosures until around the age of 10 months, to sell them at a higher price. Several farmers claimed that they had abandoned the practice of priming because the price of fodder had increased. Attitudes regarding the impact of the CAP on profit margins varied. Several claimed that the CAP provided “*good money*”, which enabled them to carry on with dignity. Along these lines, some farmers claimed that despite the challenges, livestock farming was relatively profitable, and that overall, disposable income and working conditions had greatly improved over time. Others instead claimed that the CAP kept prices low, especially for high quality free-range meat products, and believed they would be better off without it. Several preferred subsidies to be tied to production, as they took pride in considering themselves professionals (Appendix 4). In this respect, farmers often criticized subsidies spent, on the one hand, on non-professionals and retired farmers, and on the other, on large landholders who were seen to be the real beneficiaries of the CAP. In addition, although some livestock farmers had successfully opted for organic meat production and

received subsidies for it, several claimed that due to the increased herd size, they lacked sufficient in-by land to collect their own organic fodder for supplementary winter feeding, whilst they deemed buying organic fodder too expensive.

An important effect of the CAP has been, in fact, that of increasing the size of herds and flocks, changing several aspects of livestock herding practices. In Somiedo, for example, between 1998 and 2016, while the number of cattle farmers declined by 34%, the numbers of cattle increased by 15%, resulting in a 75% increase in the average numbers of cattle owned per farmer[10]. Farmers claimed that even as direct subsidies to production had been abandoned, large herd sizes were still needed to provide an acceptable income. The increase in the average herd size, together with an increase in labour costs, was claimed to complicate both livestock herding and the use of winter stables, especially in protected areas with tight regulations on new or renovated buildings. Therefore, larger herds sometimes resulted in cattle being kept outside even in the winter season (although some farmers also mentioned climate change and new evidence showing year-round open-range herding reduced the occurrence of disease). In other cases, the increase in herd size and consequent lack of stable space and in-by land to grow winter feed motivated *vaqueiros* to continue traditional transhumance using vans, and even initiated a few new farmers to the practice. Twenty-one percent of the interviewed cattle herders practiced transhumance in Somiedo; 16% did so in Cangas and 14% did so the RHR of Riaño, where some cattle herders began practicing transhumance after a dam was built in 1989 in a valley formerly used for livestock activities (Appendix 4).

Famers claimed that reduced vigilance had also been an outcome of improved labour conditions, increased bureaucracy (requiring farmers to carry out several other tasks in addition to vigilance), and a move away from collectivized *veceras*,

[10] In Somiedo in 1998 there were: 269 cattle farmers with a total of 6,175 head of cattle; and 7 sheep and 9 goat farmers with a total of 748 head of sheep and goats (Arango Fernández, 2011). In 2016 there were: 177 cattle farmers with a total of 7,135 head of cattle; 12 sheep and 10 goat farmers with a total of 693 head of sheep and goats (data from the Department of Rural Development and Environment, Principado de Asturias).

towards a livestock farming system that is carried out independently, by one or two household members. In dissecting the ideology behind the origins of the CAP in the 1960s, in the shadow of the Marshall Plan and in midst of the cold war, Moreira (2015) proposes that family farm support measures were designed, among other things, to counter agricultural collectivization. Although this topic was not explored in the interviews, farmers did express some of the setbacks produced by the "individualization" of livestock farming. These consisted mainly of social impacts, and also related to the wider impoverishment of social life caused by depopulation. A few farmers mentioned that collaboration between fellow farmers and family members was hindered by labour regulations and in Somiedo, by restricted access areas in which only certain livestock owners were allowed to enter. Despite this, fellow farmers did collaborate on many tasks, including checking on each other's livestock in higher grazing areas and taking turns helping each other during the fodder collection season. Several farmers also belonged to a meat co-op which they claimed ensured better sale prices. Finally, farmers described the livestock farming sector as weak and divided "*Everyone worries about their own, we are not like the miners who know how to come together*" (Cangas). The labour unions were often viewed with scepticism for being more concerned with "petty politics", and with defending the interests of large agricultural holders. These views partly contrast with more birdseye analyses of the CAP, which see the fact that it survived the neoliberalization process (even if changed), as evidence of the existence of a powerful farming lobby at the European level (Potter and Tilzey, 2007).

Other effects of the CAP concern the cattle herding practices and choice of livestock species and type of production. A few farmers claimed that subsidies to maintain permanent grasslands, requiring cattle to graze in high altitude grasslands for several months per year, provided a disincentive to keep young calves (and their mothers) close by where they would be safer from depredations, as was traditionally done. The near total abandonment of cattle dairy production in mountainous areas (Rodríguez-Vigil Rubio, 2005), has significantly affected livestock herding practices. While dairy cattle production incentivizes a much closer vigilance of livestock, by requiring cattle to be kept in nearby pastures to enable milking, meat cattle are grazed in farther and less accessible grazing areas. Farmers often mentioned difficulties in reaching higher pastures, which a

few do on foot or horseback. CAP subsidies have directed farmers in mountainous areas towards cattle, rather than sheep, goats and horses. According to local farmers, cattle are more profitable and less labour intensive. This is likely to have had several significant effects on the impact of carnivore depredations and on the landscape as a whole. Cattle are less vulnerable to depredation than smaller livestock and foal, yet more valuable than them, meaning that the loss of a calf is more impactful than the loss of a sheep (López-Bao *et al.*, 2013). Moreover, the decline of sheep and goats is said by farmers to have contributed to an increase in shrub growth, resulting in an increase in land not eligible for CAP payments, as well as an increase in the use and intensity of fires to clear land.

Finally, the modernization of the farming sector has also introduced health and safety regulations affecting farming practices and structures. Significant CAP subsidies are directed at modernizing the farming sector, financing stables, machinery, structures for dairy production, and helping young farmers, yet my informants still claimed that the subsidies are not enough to start from scratch and many, particularly the elderly, struggled to keep up with renovations and other requirements. Several informants claimed that these regulations were causing a significant loss of traditional practices, local culture and authenticity, causing what others have coined as the cultural "sterilization" of European agriculture (Duteurtre, 2006). Home-made cheese (made without complying to regulations) is banned from being sold to neighbours and tourists, livestock must be brought to far-away slaughterhouses due to animal welfare regulations, and stables are being banned from ancient livestock owner towns. Some of these practices are only still in place because of temporary derogations obtained to EU laws, for example where environmental regulations prohibit building new stables, but the future appears uncertain. A few farmers from one of the more isolated towns I visited kept the ceilings of their stables covered in spider webs to catch flies, they told me that although the practice would not pass a health inspection they preferred it to chemical alternatives.

CAP environmental requirements were sometimes confused with other environmental rules, and often also related to an overall increase in bureaucratic and veterinary requirements. In the regional hunting reserve of Riaño livestock

tuberculosis was considered the main problem facing the sector. Transmission of the disease was attributed to wildlife, usually ungulates although a few also mentioned badgers. Some interviewed farmers had to wipe out their entire herd and many lived in fear that they would be next: "*from one day to the next you might find yourself completely empty handed*" (PHR of Riaño). Farmers lamented the unchecked proliferation of wildlife in general, and of wolves and bears specifically. On several occasions, wolves were mentioned spontaneously as one of the main threats facing local livestock breeders, and differentiating them from more advantaged livestock breeders elsewhere.

Currently, livestock farmers from the study sites use a combination of strategies to prevent carnivore depredations, which they implement with flexibility. The measures may be applied only in given seasons, or only to some livestock groups and not others. Phrases like "*I usually… but sometimes…*" were common. These strategies are dictated by farmers' environmental surroundings, distance and accessibility of pastures, land tenure arrangement, availability of enclosures and in-by land, employment constraints, family tradition, livestock species and age etc…, making each farming reality different. Furthermore, given the history of coexistence with predators, even though many established livestock herding practices probably originated as carnivore damage prevention strategies, they are sometimes not readily recognized as such. This may be the case when damage prevention strategies coincide with other needs. For example, farmers that afforded more attention and protection to livestock during the birthing season sometimes claimed that they did so because they always had, or because depredations were just one among many other risks encountered during the birthing season. Similarly, some farmers claimed they now sold calves at a younger age, therefore grazing them in high pastures for a briefer amount of time, because the price of an older calf was not worth the time and effort.

Given that meat cattle farmers represent the majority of interviewed farmers (81%), I will focus on them (but see Appendix 5 for information on the damage prevention measures employed for meat sheep, goats and horses). Fig. 5.1 gives a general overview of the type of damage prevention measures employed. The majority of cattle farmers graze cattle in high pastures during the warmer season. During this period cattle are checked, on average, between 4 and 7 times per

week, depending on the study site (fig. 5.2). No one who grazed cattle in high pasture practiced constant vigilance over them, and no one used night-time predator-proof enclosures throughout the year, as cattle remained in high pastures over night during the summer. Instead, some farmers took special care of their young cattle. Although there was significant variability in the age at which calves are brought to higher pastures, on average it ranged between 7.2 months in Cangas and 0.43 months in the PHGs of León (fig. 5.3). However, the extent to which keeping calves in in-by land was safe was considered very variable. Livestock guarding dogs (LGDs) were used by a minority but still significant portion of farmers, ranging between 25% in the RHR of Riaño and 34% in Somiedo. Among those who own LGDs, the ratio of adult cattle heads per LGD ranged between 23 cattle per LGD in the PHGs of León and 53 cattle per LGD in the RHR of Riaño (fig. 5.4).

Furthermore, livestock farmers claimed to adopt a series of other prevention measures that, to various degrees, may reduce the vulnerability of livestock to depredations. Some mentioned re-grouping livestock before nightfall in open areas to enable the livestock to fend for itself. Over 80% across all sites claimed they disposed of livestock carcasses[11] . A small portion claimed that they changed grazing areas after they experienced damages, although several others claimed that there was no other easily available land. Some claimed they had begun checking on their livestock more often, a few claimed to sell or to begin priming the calves destined for slaughter (therefore not all the calves) sooner. Some mentioned adopting prevention measures only in certain periods of the year, usually in the spring/summer, when it is thought that depredations are more frequent. Similarly, claims of adopting livestock protection measures at night or during the birthing season were often accompanied by a disclaimer ("*sometimes they wander about and I only find them the next day*" or "*a few might give birth in the high pastures if I don't catch them in time*"). Some claimed to use (non predator-proof) electric fences in in-by land, which mainly restrain livestock movement.

[11] as required by European regulation EC 1774/2002, even though it was partly amended by EC 1069/2009 and EC 142/2011

Despite being a sector that has undergone many changes in the past century, cattle breeding remains very strongly rooted in tradition. There was a sense that herding practices had developed over many years, and that some farmers were reticent to change them when faced with a larger population of carnivores *("I won't change grazing area (because) I've always grazed my livestock there*"… "*I've been checking my herd twice a week for my whole life*" "*we don't have LGDs because we've never had them before, and the cows are not used to them*".

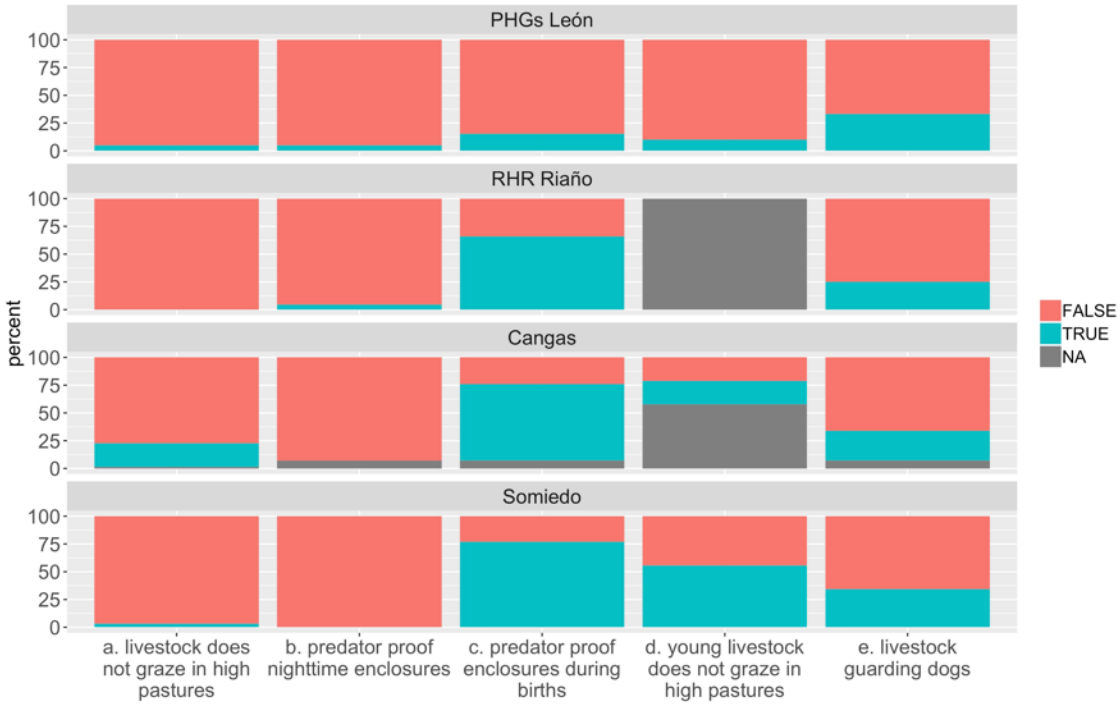

Figure 5-1 Measures employed to protect meat cattle from carnivore damages Livestock is not grazed in higher pastures but instead is kept in in-by land, where it is theoretically safer; b) Cattle are kept in predator-proof night-time enclosures year-round; c) Cattle are kept in predator-proof enclosures when giving birth (as a general rule but exceptions allowed); d) Young cattle do not graze in high pastures (but what constitutes as "young" was determined by the livestock farmers themselves; this variable contains several missing values because it was added after the survey had begun); e) The farmer owns livestock guarding dogs.
N= 41 in PHGs of León; 46 in RHR of Riaño; 71 in Cangas; 61 in Somiedo.

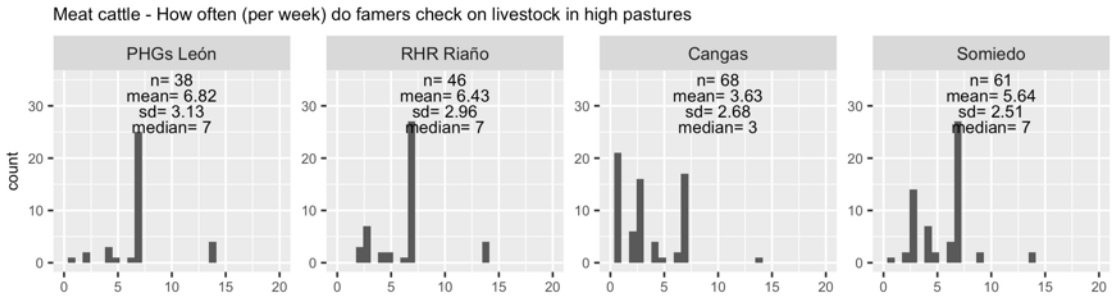

Figure 5-2 Number of times (per week) farmers check on meat cattle in high pastures (and in in-by land for those who do not graze cattle in high pastures). (NA= 3 in PHGs of León; 3 in Cangas)

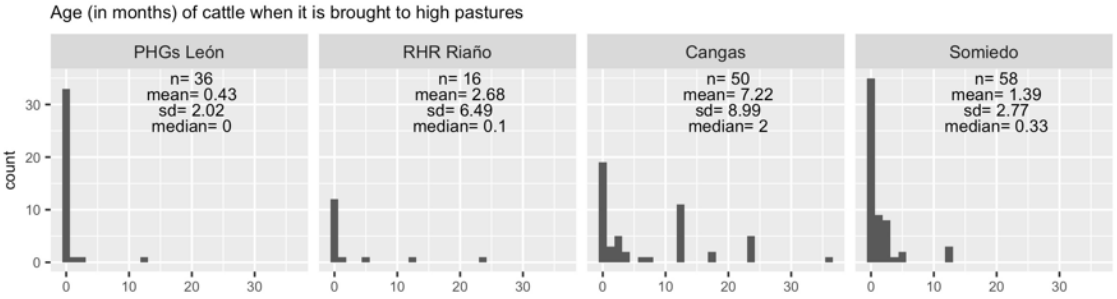

Figure 5-3 Age in of meat cattle (in months) when it is brought to higher pastures. The number of observations included in this estimate is lower than the number of interviews carried out with farmers because this question was added once the survey had already begun (NA= 5 in PHGs of León; 30 in RHR of Riaño; 21 in Cangas; 3 in Somiedo)

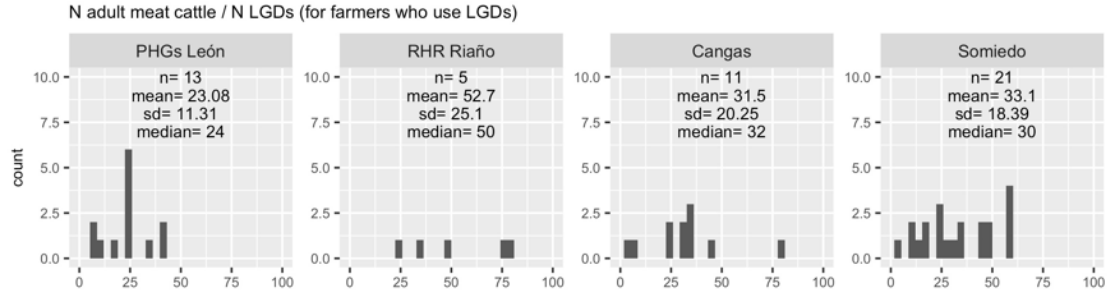

Figure 5-4 Number of adult meat cattle per livestock guarding dog (LGD), among farmers who own at least one LGD.
The number of observations included in this estimate is lower than the number of interviews carried out with farmers (NA= 6 in RHR of Riaño; 8 in Cangas).

5.4. Discussion

A better understanding of the economic, cultural, and political dimension of livelihood choices can shed light on the evolution of local views and practices that promote a positive experience of coexistence with carnivores. Few studies have looked at the way that the European Common Agricultural Policy has shaped traditional livestock herding practices, and yet there is no doubt that, along with history, tradition and local adaptations to the environment, the CAP has been the main force shaping livestock farming practices in recent years, driving the modernization of the livestock sector. In this chapter I have attempted to trace the political economic changes in the CAP that are resulting in the a neoliberalization of European agriculture, and the effects this is having on traditional extensive livestock herding systems in marginal, mountainous areas. I used the case study of the north west of Spain to look at ways in which the CAP may be influencing traditional herding practices, the ability of farmers to defend themselves from carnivore damages and to pursue their activities. Based on the idea that livelihoods are not just a means of subsistence or of maximizing income, but that they contribute to moulding landscapes both materially and conceptually (Ingold, 1993), I looked at how changes in the CAP may be affecting local resource user's views of the landscape, their role within it, and the wildlife they share it with.

Livestock farming was considered by informants as the most important activity in my study sites. It was seen to have moulded the landscape over centuries, giving it meaning and purpose. The practices of farming and hunting were seen as performing control over the environment but also as acts of care for its living beings, contributing to maintain a balance in which many species flourished. Several of my informants used similar vocabulary when speaking of wild and domestic animals and systems, and the decline of human presence and influence was seen to be destabilizing even in the wilder spheres of the landscape. Carnivores were considered much the same, and had to be kept in check and brought to order when they transgressed (Bobbé, 1993). Conservation policies that interfered with resource user's ability to reciprocate carnivore attacks and shape the landscape they inhabited, restricted their ability to pursue their

activities (Lescureux and Linnell, 2010), but also prevented them from fulfilling their social role of landscape managers and stewards.

The CAP's principle of multifunctionality, referring to the idea that agriculture provides multiple services to rural environments, closely mirrors local resource users' vision of a natural and social landscape that is constituted through their practices. However, the gradual reduction in payments and the introduction of environmental requirements has had negative effects on livestock activities in my study areas. Particularly relevant has been the reduction in payments for grazing land that is rugged and covered in shrub. Coupled with regulations that limit the use of fire to clear grazing land, these policies are seen to promote land abandonment and to favour forest regeneration. Farmers drew a clear link between the neoliberalization of agriculture and conservation policies, as both were perceived as attacks on their ability to maintain a productive and inhabited landscape. The image of forest and wildlife gradually taking over once productive lands is very powerful for local resource users, and carnivores had come to symbolize this process. The increase in carnivore populations was seen as resulting from the abandonment of the landscape and of human's influence over it, but it was also experienced as an additional pressure in what was already a critical context. Finally, the CAP's shift from payments previously directed at increasing the productivity of the livestock sector, towards payments conditional to environmental practices contributed to strengthen the link between market driven territorialisation, conservation and depopulation. These perceptions reflect academic work that discusses conservation as a process of claiming spatial demarcation and control over nature (Adams *et al.*, 2014). Many farmers resisted these changes, and above everything, contested the idea that a bureaucratic machine such is the CAP, involved in promoting the intensification of agriculture, could dictate local environmental and herding practices.

The struggle between the structural changes imposed by the CAP and local resource users' environmental views and practices may be seen as representing tensions between neoliberal and culturally-driven environmentalities. On one side are structural changes driving farm abandonment in marginal mountainous areas, on the other are a set of culturally mediated subjectivities which see human activity as central in maintaining a functional and natural balance. Therefore, the

political economy driving the changes in the CAP has had important repercussions on how local resource users experience their environment. While the local landscape has been shaped by the history, practices and knowledge of those who live in it, they in turn are bound by external policy forces (Ingold, 1993; Sjölander-Lindqvist *et al.*, 2015). Some changes in the CAP have affected livestock breeding practices and the ability of farmers to guard their livestock, particularly as herds have grown in size and as labour conditions have changed (and improved), possibly adding a strain on human-carnivore relations. These results echo research by Ghosal, Skogen, & Krishnan (2015), who have emphasized the importance of understanding perceptions of carnivores in the context of landscape change and the meanings that local communities attach to such change. Finally, farmers' sense of powerlessness derived from their inability to influence the direction the CAP and the uncertainty they expressed regarding the future helps to partly explain the narrative of marginalization that is so often interwoven in farmer's accounts of carnivore coexistence.

6. CHAPTER 6 Wolf governance

6.1. Introduction

Coexistence with wolves is often framed as a management challenge (Mech, 1995; Lute *et al.*, 2018). Historically, in landscapes dedicated to domestic livestock rearing, coexistence between people and wolves involved elaborate systems of livestock vigilance and a high level of wolf population control, usually carried out by local communities or professional trappers paid in money or gifts by local farmers. State intervention was generally limited, yet in parts of Europe and North America the state promoted wolf population control through sanctioned bounties whilst in the case of France, it dedicated a branch of the military to wolf culling (Marvin, 2012). These arrangements resulted in the eradication of wolves throughout most of their range, and their survival only in mountainous or sparsely populated areas (Fritts *et al.*, 2003). The growth of the environmental movement on a global scale during the second half of the 20th century gave birth to national, sub- and supranational institutions that now govern the relations between people and wildlife to various extents. In this way, communities that have traditionally coexisted with wolves, and communities where wolves had been eradicated and have only recently come back, have had to negotiate new ways of relating to the predator, faced with the growing influence of foreign and evolving interests.

The field of political ecology is concerned precisely with uncovering the power relations between environmental actors, and the politics through which different interests over nature are negotiated (Perreault *et al.*, 2015). Within this tradition, there has been a recent upsurge in interest in looking at how Michel Foucault's theory of governmentality (2007, 2008) may apply to the governance of people and nature. Seminal work by Luke (Luke, 1995), Agrawal (2005a) and Fletcher (2010) has laid the groundwork on which many other studies have explored the relationships between environmental governance, social change and the "creation of environmental subjects". Although the theory of governmentality (or "environmentality", as applied to the environment) is much debated and critiqued (Singh, 2013; Forsyth and Walker, 2014; Cortés-Vázquez and Ruiz-Ballesteros, 2018), it has nonetheless inspired several studies that look at the ways in which

conservation policies and governance have influenced how individuals and communities understand and relate to the environment (Agrawal, 2005b; Erb, 2012; Bluwstein, 2017; Cortés-Vázquez and Ruiz-Ballesteros, 2018). In this and the following chapter, I use theories on environmentality to identify the main ideologies guiding wolf governance approaches across my four study sites, and then trace the effects of governance on local resource users' beliefs and attitudes towards coexistence.

Before doing so, I will first give a brief overview of the various approaches taken in the literature to analyse wolf management strategies and wolf governance. I will look at literature that focusses on specific management strategies or policies (i.e. damage compensation systems, lethal control etc…) and then at literature on wolf governance, that ties together the role of various actors, management strategies and institutional structures. I will then explain theories of environmentality in greater depth, and use them as a framework through which to unpack the wolf governance approaches employed across my four study sites.

6.2. Wolf management strategies and wolf goverance in the literature

6.2.1. Wolf management strategies

A large body of literature on conflict management focusses on examining the efficacy of specific state policies and technical fixes aimed at fostering positive coexistence. These are directed towards addressing the material impacts of coexistence (Young *et al.*, 2010; Redpath and Sutherland, 2015). Negative interactions that manifest themselves in tangible ways are often referred to as "material impacts". These depend on aspects of wolf and human ecology that determining the type, frequency and impact of interactions (Carter and Linnell, 2016; Chapron and López-Bao, 2016). Efforts to understand them involve identifying either instances of competition over natural prey and habitat, behaviours that provoke negative encounters, or agricultural practices that can exacerbate carnivore depredations of livestock and crops. To address the material impacts of coexistence, managers have typically relied on: a) legislating the protection of carnivores and their habitat; b) carrying out awareness raising

and behaviour change campaigns; c) promoting technical fixes to prevent damages to crops and livestock d) offering economic compensation to those that incur damages from carnivores; and e) adopting lethal control or translocation methods to manage carnivore populations (Boitani, 2003; Boitani and Powel, 2012). Below is a brief literature review on the main management strategies adopted to mitigate conflicts.

Damage compensation programs are widely adopted as a means to distribute the cost of coexisting with wildlife more evenly across society. In doing so they are expected to increase local tolerance towards large carnivores and reduce retaliatory killings (Fourli, 1999; Nyhus *et al.*, 2005). Different compensation systems have been adopted and there is debate over which systems are more effective in reducing conflict (Blanco, 2003; Naughton-Treves *et al.*, 2003; Bulte and Rondeau, 2005; Nyhus *et al.*, 2005; Treves, 2009; Agarwala *et al.*, 2010; Dickman *et al.*, 2011). Ex-post or "after the fact" damage compensation is the most widely used, yet its functionality is known to be challenged by fraudulent claims and high transaction costs. Moreover, ex-post compensation is thought to create a "moral hazard", by creating a disincentive to adopt damage prevention measures and therefore promoting farmers' reliance on damage compensation (Bulte and Rondeau, 2005; Zabel and Holm-Muller, 2008; Marino *et al.*, 2016). Moreover, as large carnivores populations recover, the economic cost of ex post compensation increases (Boitani *et al.*, 2010). Other types of damage compensation include periodic, ex-ante payments which farmers may either use to account for eventual livestock losses, or may invest in damage prevention measures and practices (Hötte and Bereznuk, 2001; Schwerdtner and Gruber, 2007; Zabel and Holm-Muller, 2008). Insurance for carnivore damages is yet another type of compensation thought to increase the accountability of farmers, when the insurance premium increases as depredations increase, and when farmers are made liable for all or part of the premium's cost (Blanco, 2003; Hussain, 2003; Madhusudan, 2003; Nyhus *et al.*, 2003; Miquelle *et al.*, 2005; Psaroudas, 2007; Marino *et al.*, 2016, 2018). Compensation may be conditional to specific conservation outcomes (Hötte and Bereznuk, 2001; Mishra *et al.*, 2003; Zabel and Holm-Muller, 2008; Maclennan *et al.*, 2009; Nelson, 2009; Dickman *et al.*, 2011), or to the use of damage prevention measures (Boitani *et al.*, 2010; Rigg *et al.*, 2011). Moreover, some schemes source their funds in ways

that might be expected to raise the existence value of the targeted species or improve relations between stakeholder groups, by using revenue generated through eco-tourism (Hussain, 2003), hunting (Majić *et al.*, 2011), or private donations made to conservation associations (Agarwala *et al.*, 2010). In many parts of Europe and North America farmers have come to expect compensation for coexisting with carnivores, even though some studies have shown that it does not necessarily improve their attitudes towards predators and that dysfunctional compensation systems can actually exacerbate conflicts (Naughton-Treves *et al.*, 2003; Gusset *et al.*, 2009; Agarwala *et al.*, 2010; Marino *et al.*, 2016).

Lethal control of large carnivores is another strategy widely adopted to mitigate conflicts, whose efficacy is expected to vary according to the species, context and methods employed. Culling programs aimed at eradicating large carnivores from certain areas or keeping their populations below set numbers, are generally carried out by government agents, sometimes with the involvement of hunters (Loveridge *et al.*, 2006). The removal of problem animals is also employed in cases where a small proportion of the large carnivores population is responsible for most of the damages (but see Linnell *et al.*, 1999 for some of the complexities involved). Finally, sport hunting can also serve as a means of population control (Loveridge *et al.*, 2006). The impact of the above methods on the occurrence of damages depends on the complex interplay between the behavioural and ecological dynamics of the species involved and the offtake pressure applied. This is more so for highly social species, and in the case of wolves some studies have suggested that hunting may actually increase damages by disrupting pack structure and cohesion, thus rendering wolves less able to hunt wild prey and more prone to disperse, form new breeding packs and consequently increase in number (Peterson *et al.*, 1984; Harper *et al.*, 2008; Wielgus and Peebles, 2014; and see specifically Fernández-Gil *et al.*, 2016 presenting similar evidence in the north west of Spain). Moreover, some studies suggest that the removal of carnivores tends to produce only a temporary reduction of damages if the targeted species exhibits high reproduction rates or if immigrants are able to recolonize the area (Treves and Naughton-Treves, 2005). Regardless of its actual impact on damages, some form of lethal control is thought to improve the acceptance of carnivores by giving local communities a feeling of ownership, control and self-determination (Treves and Naughton-Treves, 2005; Redpath *et*

al., 2013; Woodroffe and Redpath, 2015), representing in some cases a traditional and culturally accepted way of managing coexistence (Bobbé, 1993; Lescureux and Linnell, 2010; Lescureux *et al.*, 2011). In this way public hunts may increase tolerance of large carnivores by allowing residents to participate actively in their management, especially where large carnivore hunting has always been practiced (Majić *et al.*, 2011). Similarly, government sponsored hunts may transmit a political message of commitment towards community interests. Finally, by generating revenue, sport hunting is expected to raise the existence value of the target species (Loveridge *et al.*, 2006). Evidence in support of these hypothesis comes from studies that have found higher tolerance of game species than of protected species, despite the fact that the former can cause more damages than the latter (Treves and Naughton-Treves, 2005). However, recent studies have shown that wolf hunting in the US has failed to improve attitudes towards wolves, and that it may in fact result in higher levels of illegal hunting (Bulte and Rondeau, 2005; Browne-Nuñez *et al.*, 2015; Olson *et al.*, 2015; Chapron and Treves, 2016).

The promotion of wildlife tourism activities, on the other hand, is a strategy that is meant to enhance the positive impact of coexisting with carnivores, transforming them into a resource. The tourism sector for sighting large carnivores in Europe is not very developed. Some successful cases exist (WWF UK, 2000) but their impact on local attitudes towards large carnivores has never been explored. Tourism is expected to improve attitudes towards large carnivores mainly by generating income. It is considered to have fewer undesirable conservation outcomes than large carnivore hunting, and to be more economically sustainable than large carnivore damage compensation, generating private income (Walpole and Thouless, 2005). While some examples show that tourism is capable of raising significant funds, the extent to which these benefit local communities is often limited (Kiss, 2004; Hemson *et al.*, 2009), and this has brought many to argue that an equitable benefit distribution must specifically target those community members that are most affected by large carnivore presence, if the aim is that of promoting positive experiences of coexistence (Walpole and Thouless, 2005). In this way, the degree to which ecotourism activities influence public attitudes is said to depend on the type of tourism structure in place (Loveridge *et al.*, 2006).

6.2.2. Wolf governance

Negative aspects of coexistence that are experienced on a more “intangible” or perceptive level are instead often referred to as social or conservation conflicts (Redpath *et al.*, 2013; Madden and McQuinn, 2015; Stephen Mark Redpath *et al.*, 2015). Efforts to understand social conflicts involve exploring the different ways in which individuals value and come to know carnivores and their impacts (Young *et al.*, 2010). Research in the field of political ecology has advanced the understanding of how power inequalities between stakeholder groups create social and cultural tensions, and how these in turn fuel conflicts (Skogen *et al.*, 2008; Adams, 2015; Perreault *et al.*, 2015). In this way, coexistence has come to be understood not just as that between people and wildlife, but as that between people with different worldviews and competing interests concerning wildlife (Redpath *et al.*, 2013). To address social conflicts, efforts have been directed at facilitating dialogue and building trust between various interest groups, management authorities and the public at large (Sjölander-Lindqvist *et al.*, 2015; Young *et al.*, 2016). Furthermore, some have created opportunities for participation and co-management though which power and responsibility can theoretically be shared more equitably across various social groups (Todd, 2002; Lundmark *et al.*, 2014; Hallgren and Westberg, 2015; Lundmark and Matti, 2015; Sjölander-Lindqvist *et al.*, 2015; Von Essen and Hansen, 2015).

In this regard, some studies have looked at the governance of coexistence, to explore how power is shared across interest groups as well as across geographic and institutional scales (Cash *et al.*, 2006; Linnell, 2015). Typically, the term environmental governance refers to the set of actors, institutions, management strategies and policies that together determine how power and responsibilities over natural resources are exercised (Lemos and Agrawal, 2009; Evans, 2012). For example, Sandström *et al.* (2009) analyse different carnivore governance approaches in Scandinavia, by applying theoretical frameworks developed by Agrawal and Ribot (1999), and others. These combine an analysis of the actors involved, the powers they hold, and the groups they are accountable to, in order to determine the general degree of decentralization that characterizes different

governance approaches. Another study on carnivore governance in Scandinavia by Hansson-Forman *et al* (2018) adopts a framework developed by Driessen *et al.* (2012) to analyse the actors, institutions and policies involved in governance. This allows them to identify different modes of governance characterized by different relationships between the state, civil society, and the market (i.e. centralized, decentralized, public–private, interactive, and self-governance).

6.3. From goverance to environmentality

Based on studies that document conflicting interests over carnivore conservation and the political processes through which they are managed, power has become central to new and deeper understandings of coexistence between people and carnivores. Foucault's theory of governmentality (Foucault, 2007, 2008; Cavanagh, 2018) contributes a specific understanding of power, which views it as dispersed and pervasive to all human relations, as something that is embodied, performed and therefore constitutive of identities and practices (Burchell *et al.*, 1991; Gutting, 2005). Power according to Foucault is expressed through accepted and dominant forms of knowledge and discourse, which act to discipline society. In his words, the activity of government refers to 'the conduct of conduct', or rather a form of action intended to affect, shape, or guide communities or individuals (Burchell *et al.*, 1991). Government therefore transcends the politics of governance, and extends into people's personal lives, beliefs and practices, to produce a kind of "intimate government" (Agrawal, 2005b; Lemos and Agrawal, 2009). Within this framework, the activity of government works through two sets of processes: "technologies of power" and "technologies of the self" (Lemos and Agrawal, 2009). Technologies of power refer to the rules and forms of knowledge that govern individuals (i.e. social norms, regulations, institutions etc..). This chapter mainly focusses on analysing this set of processes in relation to wolf governance in my study sites. Technologies of the self, on the other hand, pertain to the set of processes through which individuals react to and enact power, by either internalizing or resisting dominant norms and regulations, thus transforming themselves and their everyday practices. The next chapter will look at the influence of wolf governance on local resource users' coexistence narratives and practices.

Central to Foucault's conception is the idea that power, even in its more sovereign forms, may act as a positive force in shaping individuals and society (Lemos and Agrawal, 2009).

Given that environmental governance is mainly concerned with governing human conduct, activities and relations to the environment, the theory of governmentality has been widely applied to describe the effects of environmental governance on social norms and practices. Luke (Luke, 1995, 1999) was the first to apply the theory of governmentality to the environment, describing how a global environmental discourse and ethic emerged from the 1992 Rio Summit. Subsequently, Agrawal (2005a) used the theory of environmentality to describe how a community in India, which was previously opposed to forest conservation under colonial and post-colonial rule, became engaged in conservation efforts when it was allowed to participate in a decentralized form of community forest management. Agrawal (2005b, 2005a) uses the theory of environmentality to shed light on how, in his case study, government practices created "environmental subjects", or "people who care about the environment".

In his second set of lectures on governmentality Foucault (2008) further developed the concept of "technologies of power", by describing four types of governmentality: sovereign, disciplinary, neoliberal, and governmentality according to truth. These describe the different philosophies, approaches or "ways of governing" that guide governance approaches. Fletcher (2010, 2017) applied this expanded approach, to define the different environmentalities, or ideological approaches, that characterize conservation interventions. He describes the first approach, "sovereign environmentality", as a top-down, fortress conservation approach (Adams and Mulligan, 2003; Fletcher, 2010; Erb, 2012). "Disciplinary environmentality" refers to policies that compel subjects to internalize environmental values and ethics, and to self-regulate (Fletcher, 2010). This could be promoted through awareness raising campaigns, or forms of participation in environmental management that aim to infuse environmental consciousness into people's every day practices, as the case study reported by Agrawal (2005b). "Neoliberal, market or incentive-driven environmentality" refers to processes aimed at decentralizing, privatizing or commodifying nature, such could be ecotourism activities, trophy hunting, and voluntary payments for

ecosystem services. The common understanding of neoliberalization implies a withdrawal of government intervention from the regulation of markets, and therefore sees government price regulation mechanisms, subsidies and taxation as direct infractions of neoliberal principles. Instead, neoliberal governmentality is primarily based on the neoliberal vision of humans as inherently self-interested and rational actors, that behave to maximise their economic opportunities, by responding to incentives and penalties before anything else (Büscher *et al.*, 2012). Therefore, neoliberal environmentality approaches are less concerned with advancing free markets in which nature is traded, but rather with promoting policies intended to regulate human behaviour through monetary or other types of incentives (Fletcher, 2010; Fletcher and Breitling, 2012). "Truth or cultural environmentality" is associated with people's spiritual, religious and emotional attachment to nature, and with traditional ecological knowledge (Berkes, 2012). Finally, Fletcher (2010) develops a fifth approach which would be akin to a "community-driven environmentality" (which he names "liberation environmentality"). This is based on critiques to governmentality which view it as an excessively top-down framework that leaves little space for resistance and that ignores evidence showing that individuals can successfully mobilize and cooperate in resource management without or in spite of external interference (Peet and Watts, 1996; Ostrom, 2015). In this community-driven environmentality, local people have a participatory or self-mobilizing role in environmental governance.

Multiple environmentalities may be at play within any given conservation initiative (Fletcher, 2017). They may be in competition with each other, creating tensions on the ground, or they may be in collaboration, enhancing one another (Mansfield, 2007; Lemos and Agrawal, 2009; Erb, 2012). For example, ecotourism initiatives have been described as containing a mixture of: a) neoliberal approaches, by providing economic incentives to conserve nature; b) disciplinary approaches, by changing attitudes towards the importance of conserving nature and c) spiritual approaches, by enhancing people's connection to nature. At the same time, ecotourism activities may be in tension with other forms of environmentality, for example with more community driven approaches, when ecotourism benefits are not distributed equitably among a community, or

with spiritual approaches, when ecotourism disrupts traditional ways of relating to nature (Erb, 2012).

6.4. Aims and approach

The remainder of the chapter is based on an analysis of legislation on wolf governance across my four study sites, though the theory of environmentality. The framework facilitates an understanding of environmental governance as being defined by the interplay between different actors and ideological approaches, namely: centralized, market, community and culturally driven governance approaches. Most of all, unlike other frameworks, it involves considering the reactions and subjectivities of those who are exposed to the governance approaches, as central elements in the act of government. Therefore I first adopt the framework to analyse wolf governance in my study sites in the following section, and then I adopt it to trace the effect of wolf governance on local attitudes and narratives of coexistence in the next chapter. My case studies are based on a very fine scale, and each hosts unique interactions between context and the different governance approaches. However, given that wolf governance in Spain varies considerably, identifying the various environmentality approaches at play in my study sites may contribute a deeper understanding of wolf governance approaches in general.

6.5. Wolf environmentality in the north west of Spain

All of Spain's formal wolf governance approaches and management policies have their roots in the country's transition to a democracy in the late 1970s, and its accession into the European Union in 1986. The main supranational regulations protecting wolves in Spain are the Bern Convention and the EU Habitats Directive (Directive 92/43/EEC). Under the latter, wolves are afforded different levels of protection, depending on their location within Spain. To the north of the river Duero, where the study sites are found, wolves are listed under Annex V of the Habitats Directive and can be hunted, provided the population remains within favourable conservation status. Their status under Appendix III of the Bern Convention also allows for their populations to be exploited, albeit under slightly

more restrictive provisions (Trouwborst, 2014). Spain's national strategy for wolf conservation mentions two national conservation laws (Ley 42/2007, de 13 de diciembre, del Patrimonio Natural y la Diversidad; Real Decreto 1997/1995, de 7 de diciembre) that allow for wolf hunting and management in the north west of Spain to be regulated at the regional level. Both the region of Castilla y León (where the Private Hunting Grounds -PHGs- of León and the Regional Hunting Reserve -RHR- of Riaño are found) and the region of Asturias (where Cangas del Narcea and Somiedo are found), have their own Hunting Law and Wolf Management Plan (Appendix 6[1]). Details of wolf governance in each site are included in table 6.1, and their synthesis and analysis using the environmentality framework, is provided in the sections below and in table 6.2.

6.5.1. Private Hunting Grounds (PHGs) of León, Castilla y León

The Hunting Law (1996) of Castilla y León, frames hunting primarily as a leisure activity whose social significance must be promoted while also guaranteeing the conservation of the resources it relies on. The law emphasizes hunting as an activity that increasingly generates significant employment and revenue in rural areas. It provides for the division of hunting spaces into Private Hunting Grounds (such are the PHGs of León), and Regional Hunting Reserves (such are is the RHR of Riaño). In the PHGs of León, most land is public and hunting rights belong to the Neighbourhood Associations, who either lease them to local hunters or auction them out to private holders. Hunting represents a significant source of revenue for the Neighbourhood Associations, who normally invest it in public works and habitat/hunting management. Wolves are listed as a game species in the regional hunting law, and the private hunting grounds that include (and pay for) the wolf in their hunting plan automatically hold a wolf hunting permit, which they may use until quotas for the year are reached. The quotas are assigned at the regional level and distributed among districts on the basis of wolf damages. Compensation for wolf damages largely functions through a private, voluntary, insurance and even though regional funds are theoretically available to compensate part of the damage incurred by the farmers who are insured, in reality few farmers in the PHGs of León claim the regional compensation. Stakeholder participation in wolf management was only officially instituted after I carried out the fieldwork. The Wolf Working Group that is now in place is mainly

an arena for discussion and consultation, and shows elements of corporativism as the elected members are nominated by the main stakeholder associations.

Wolf governance in the PHGs of León is decentralized and appears to be strongly influenced by a market driven environmentality approach. Wolf hunting permits can be bought and sold just like any other hunting permit. Hunting Plans are subject to regulations and approval from the Regional Administration, but their management is devolved to the license holders. Private rangers are hired by the license holders and carry out most checks on hunting parties, whilst the presence of rangers employed by the Regional Administration is limited. Despite the strong neoliberal element to this hunting system, the role played by the Neighbourhood Associations as holders and beneficiaries of hunting rights in public lands, shows elements of a community driven environmentality approach. Neighbourhood Associations are in fact an ancient community level institution that dates back to the feudal period, and the representatives are elected by the local residents. The damage compensation system shows a strong tendency towards market driven environmentality, as public funds are only provided to farmers who are already privately insured, thus acting as an incentive to promote the insurance system. However, wolf hunting quotas are still decided by the regional government, which must comply with national and supra-national regulations, reflecting elements of a sovereign environmentality approach. The recently instituted Wolf Working Group presents limited elements of both community engagement and neoliberal environmentality, given the prevalence of interest groups in its committee.

6.5.2. Regional Hunting Reserve (RHR) of Riaño , Castilla y León

The RHR of Riaño is subject to the same Hunting Law and Wolf Management plan as the PHGs of León, but the Regional Administration is much more closely involved in hunting management. Although hunting revenue still reverts back to the reserve, and represents an important source of income, most of it is administered by the Regional Administration. Wolf permits are sometimes auctioned but usually, wolves are hunted by wild boar hunters without paying unless they wish to keep the trophy. In addition, given that the Regional Administration is responsible for hunting matters and given that wolves are a game species, the Regional Administration compensates wolf damages. Finally,

an eco-tourism company based in the site attracts national and foreign tourists, many of whom travel there specifically for wolf sightings.

Compared to the hunting system in the PHGs of León, hunting in the RHR of Riaño shows a more moderate influence of market driven environmentality, mixed with community and sovereign environmentality (given the role played by the Neighbourhood Associations and the even more present role of the Regional Administration). The compensation system might be interpreted as a mixture of disciplinary and neoliberal driven environmentality, intended to promote greater tolerance of wolf presence through economic incentives. The presence of wolf ecotourism, and the fact that it is promoted within the Wolf Management Plan, signals elements of disciplinary and neoliberal governmentality, meant to promote the image wolves as a resource.

6.5.3. Cangas del Narcea, Asturias

The Regional Hunting Law (2/1989, of June 6) of Asturias frames hunting as subordinate to nature conservation regulations, thus adapting traditional hunting practices to conservation goals. Hunted species are considered public property and therefore as a resource to be managed by the regional administration (in contrast to the consideration of wildlife as “res nullius” – property of no one, previous to the law). As such, the law established the Regional Administration as guarantor of nature conservation, of equal rights and opportunities for all hunters, and as the entity responsible for the compensation of damages caused by all wildlife, except species that are hunted under concession rights. Wolves are not a game species, but their population is controlled by rangers, and their damages are compensated by the Regional Administration. Quotas for population control are set by the Wolf Consultation Committee, which includes members of the regional administration, representatives of municipalities and interest groups etc. The municipality is split between a regional hunting reserve, managed by the administration, and a regional hunting ground, managed by an association of hunters. Ranger presence is said to be higher in the regional hunting reserve. Part of Cangas falls within a protected area that is being contested by private landowners. Land tenure is mostly private, but parts of the municipality are public and others owned at the neighbourhood level (Chapter 8).

Conflicts over land tenure and the protected area reflect fundamental tension between neoliberal, community, and sovereign environmentality approaches (i.e. between private land owners, community land tenure arrangements, and the protected area instituted by the Regional Administration). Like the RHR of Riaño, wolf damage compensation shows elements of disciplinary and incentive driven environmentality. Wolf culling shows elements of sovereign environmentality as it is decided at the regional level, although it is debated by representative of stakeholder groups and local administrators.

6.5.4. Somiedo, Asturias

Somiedo is subject to the same Hunting Law and Wolf Management Plan as Cangas, and therefore wolf management does not vary. The main difference from Cangas is marked by the fact that the whole municipality of Somiedo falls within a long-established protected area, which has based much of its development prospects on the protection of natural and cultural heritage, through promotion of traditional livestock breeding and tourism. The park is a known destination for bear sightings. The majority of land is public, and the park is patrolled by several rangers who accompany hunting parties (as they do inside the protected area of Cangas).

Compared to Cangas, therefore, land tenure and protected area governance appear to be more oriented towards a sovereign environmentality approach, whilst the emphasis on eco-tourism development appears to reflect a mixture of market driven and disciplinary environmentality, meant to promote the image of a “wilder” nature as a resource, thereby increasing local acceptance of conservation regulations. Similarly, subsidies handed out to farmers who carry out their activities in the protected area also reflect a mixture of an incentive driven and a disciplinary environmentality approach.

6.6. Summary of wolf governmentalities in the north west of Spain

Identifying the environmentality approach behind some coexistence policies is not always straight forward, especially when the goal of policies is not stated or when multiple approaches are at play. Nonetheless, the environmentality framework does highlight certain governance tendencies that mark differences between the study sites (see tables 6.1 and 6.2 for a summary). Wolf governance in the PHGs of León is characterized by strong neoliberal approach. Hunting of wolves and other species follows a privatized hunting model. Market driven governance approaches coincide with community driven approaches, as hunting has become an important source of revenue at the community level. Damage compensation is also tied to a private insurance. On the other hand, wolf governance in Somiedo, for example, appears to be driven primarily by sovereign and disciplinary approaches, aimed at protecting nature whilst also attempting to mould local beliefs and practices towards nature protection ends. Still, differences are not clear cut, and elements of sovereign environmentality are evident in how wolf hunting quotas in the PHGs of León are set by the Regional Administration and supra-national laws, whilst elements of neoliberal environmentality are evident in Somiedo's emphasis on ecotourism development. Most importantly, the environmentality theory relies on a two-process approach, which requires an understanding of how governance is experienced at the level of individuals and communities. The next chapter is dedicated precisely to this.

Management strategies	PHGs of León	RHR of Riaño	Cangas del Narcea	Somiedo
Hunting system	private	regional administration	in-between	regional administration
Ranger presence	low	medium/high	medium/high	high
Damage compensation system	private insurance	regional administration	regional administration	regional administration
Wolf protection status	game species	game species	culling by rangers	culling by rangers
Wolves hunted or culled /year	2.5*	12.5*	0**	0.33**
Stakeholder participation	None (at time of interviews)		Committee with stakeholder representatives	

Table 6-1- Summary of wolf governance in each study site.
**Average number of wolves hunted / year, calculated using data from the hunting seasons 2014-2015 and 2015-2016 (provided by the Territorial Service of the Environment of the Administration of León)*
***Average number of wolves hunted/ year, calculated using data from the years 2014-2016*

Types of environmentality approaches	PHGs of León	RHR of Riaño	Cangas del Narcea	Somiedo
Sovereign Top-down (or fortress) conservation approach	Bern Convention, Habitats Directive and Regional Management Plans that set wolf culling or hunting quotas	Presence of a PA*… …in one part of the territory where hunting is banned; in remaining territory RA** plays large role in managing hunting	…in one part of the territory where hunting is managed by the RA	…in the whole territory where hunting is managed by the RA; Public communal land tenure
Disciplinary Top-down policies that compel subjects to internalize environmental values and ethics, and to self-regulate		Public wolf damage compensation system Presence of wolf ecotourism		Presence of ecotourism and of subsidies to farmers from the PA
Neoliberal / market / incentive-driven Processes aimed at decentralizing, privatizing or commodifying nature	Wolf working groups involve representatives of interest groups Private insurance-based wolf damage compensation; private hunting system of wolves and other species; limited hunting rule enforcement	Public wolf damage compensation system Wolf hunting sometimes sold in auctions; presence of wolf ecotourism	Large proportion of communal private land; limited hunting rule enforcement	Presence of ecotourism; subsidies to farmers from the PA
Truth / cultural Spiritual, religious and emotional attachment to nature, and with traditional ecological knowledge	***			
Community-driven Local people have a participatory or self-mobilizing role in environmental governance	Neighborhood associations directly benefit from hunting (and sometimes manage it)	Neighborhood associations indirectly benefit from hunting	Wolf culling debated by representative of stakeholder groups and local administrators Communal private and public land tenure	Communal public land tenure

*Table 6-2Summary of wolf environmentality approaches in each study site. Darker greys represent a stronger prevalence of the respective environmentality approaches. Underlined text represents shared features across two or more study sites *PA: Protected Area; **RA: Regional Administration; *** the section on Truth/ Cultural environmentality is empty because it is addressed in the next chapter.*

7. CHAPTER 7 Wolf environmentalities

7.1. Introduction

In the face of drastic global and local declines in the word's megafauna and an exponential growth in human population, an important question in conservation research regards the efficacy of management policies and governance approaches in promoting attitudes and behaviours that favour coexistence (Ripple *et al.*, 2016; Pooley *et al.*, 2017; Mace *et al.*, 2018). This requires exploring how the different governance approaches actually play out on the ground, and therefore how local communities react to the governance approaches being implemented. Several previously mentioned studies have sought to examine whether management policies like damage compensation and licensed hunting have improved attitudes towards carnivores (see Chapter 6 for a more detailed literature review). They have done so by measuring attitudes during (or before and after) the implementation of a specific policy (Agarwala *et al.*, 2010; Majić *et al.*, 2011; Treves *et al.*, 2013; Browne-Nuñez *et al.*, 2015); by modelling carnivore populations to estimate the level of illegal hunting (Chapron and Treves, 2016); or by examining the level of uptake and adherence to management policies (Marino *et al.*, 2016).

This chapter seeks to explore how different approaches to carnivore governance impact on the way that local resource users relate to their environment and to wolves specifically. Here I look at how the multiple environmentality approaches that I identified in the previous chapter interact with each other and with individuals and communities on the ground. The aim is to understand how groups of resource users that are being targeted by wolf governance approaches, end up negotiating the narratives that they are being exposed to (Fletcher, 2017). This part of the analysis therefore, pertains to what Foucault (2007) called "technologies of the self", regarding the set of processes through which individuals assimilate, contest, manipulate or co-produce norms and regulations (Scott, 1985; Agrawal, 2005b; Lemos and Agrawal, 2009; Cepek, 2011; Cortés-Vázquez and Ruiz-Ballesteros, 2018). To explore this, I use data I collected

measuring resource users' attitudes towards wolves and wolf management, their opinions on illegal hunting, and the narratives they adopted to discuss coexistence and other related subjects. This approach is novel as it focusses on the ideologies behind different governance approaches, and traces their impact on local views and practices. Before turning to my data, I will first give an overview of the different theories used in the literature to look at the formation of attitudes, knowledge, norms, social constructions, behaviours, and practices, or what governmentality scholars refer to as "subjectivities".

7.2. Literature on attitudes, the theory of environmentality and its critiques.

Studies that quantitatively measure attitudes and behaviours are often based on the psychological theory of cognitive hierarchy or the theory of planned behaviour (Glikman *et al.*, 2010, 2011; Dressel *et al.*, 2015; Eriksson *et al.*, 2015). This approach posits a linear process of cognition, whereby a person's fundamental values will influence their beliefs, which in turn will influence their attitudes, their norms, and finally their behaviours (Fulton *et al.*, 1996; Zinn *et al.*, 1998, 2000). Attitudes towards carnivores and coexistence, therefore often represent the primary object of enquiry in quantitative research because of the central role they are believed to play in determining behaviours (Dressel *et al.*, 2015). Studies have explored the role that various factors may have in shaping beliefs, attitudes, and behaviours including, for example, a subject's socio-demographic background, their experience and their knowledge of carnivores. Experience has been examined in quantitative empirical studies by accounting for the length of time humans and carnivores have coexisted, the subject's proximity to carnivore populations, and their experience seeing or suffering damages from carnivores (Kaltenborn *et al.*, 1999; Ericsson and Heberlein, 2003; Kleiven *et al.*, 2004; Glikman *et al.*, 2010; Treves *et al.*, 2013; Dressel *et al.*, 2015; Eriksson *et al.*, 2015). Knowledge, on the other hand, is often more narrowly defined in quantitative studies as the level of factual knowledge subjects may hold regarding carnivore behaviour and ecology (Ericsson and Heberlein, 2003; Glikman *et al.*, 2011; Majić *et al.*, 2011; Morales-Reyes *et al.*, 2019). Within the cognitive

hierarchy framework, experience and knowledge are hypothesized to moderate between values and beliefs, and values and attitudes.

The anthropological literature on people-wildlife relations, on the other hand, is oriented towards exploring the social and cultural practices through which communities establish relationships with, and from within, their environment (Ingold, 2000). Categories tend to be understood as being more fluid and engaged in relational processes, whereby identities, perceptions and practices are seen to shape one another. The theory of environmentality explores how narratives and different forms of knowledge interact with each other, and the role that power differentials play in determining those interactions (Luke, 1995; Agrawal, 2005b; Fletcher, 2017). However, the processes through which individuals negotiate between their own truths and the truths promoted by society or by various modes of government are not well understood, and scholars have adopted different perspectives.

Agrawal (2005b, 2005a) looked at how a community that was enrolled by the central government into participatory management of forests, changed its attitude towards forest conservation by engaging in every-day practices of forest care and protection. According to Agrawal, therefore, attitudes are influenced by everyday behaviours (rather than the other way around) and furthermore, socio-demographic variables are relevant primarily in as far as they constrain or enable social practice (Agrawal, 2005b). Agrawal observed that variations in how people related to the forest depended on how engaged they were in forest management, and not on caste or gender. He concludes that actions have a strong influence on people's sense of themselves and on their identity, enabling new beliefs and interests to emerge. Agrawal emphasizes the positive role of government and institutional change in engineering social change: by promoting decentralized government, narratives of forest protection became scattered at the level of communities and individuals, and thus "government at a distance" became and was sustained by "intimate government" (Agrawal, 2005b). Fletcher (2010) adopts a similar theoretical perspective in discussing how neoliberal governmentality might change how individuals and communities come to value and interpret nature. Through the hegemonic influence of neoliberal governmentality, principles of rationality and economic optimization become

infused in various aspects of governance as well as in social relations and people-nature relations, representing “a whole way of thinking and being” (Foucault, 2008).

Agrawal’s work has been critiqued for giving too little scope to people’s agency, history and biography, and for being too focussed on the government side of how subjectivities develop (Cepek, 2011; Singh, 2013; Cortés-Vázquez and Ruiz-Ballesteros, 2018). In looking at a similar case study where a community developed attitudes and behaviours favourable to forest conservation, Singh (2013) explores the role of emotional attachment and affect in shaping environmental practices, and vice versa. She observes a community that began forest restoration activities out of necessity and that over time, through experiencing and caring for the forest, came to embody the role of forest protector, thus changing its view of itself. Singh (2013) bases her theory of affect on Ingold’s (2000) understanding that perceptions and practices are inextricable, and that subjectivity is shaped through continuous material, sensory and perceptual engagements with one’s environment. Thus, forest conservation and participation in forest management cannot only be seen as economic and political choices, because they are also driven and reinforced by intimate and emotional experiences (Singh, 2013). This understanding of how subjectivities are developed appears to resonate with the “truth governmentality” described by Foucault (2008) and Fletcher (2010 and 2017).

The theory of environmentality has also been critiqued for portraying government and society as antagonistic parties, that must always negotiate conflicting knowledge systems and realities (Forsyth and Walker, 2014). Forsyth and Walker (2014) present a case study where a certain framing of the environment is accepted by both the central government and a local community, and harnessed to develop a productive relationship from which both can benefit. In this example both parties agree on a form of authoritative knowledge regarding forest ecology, which they employ to achieve different objectives (Forsyth and Walker, 2014). Finally, Cortés-Vázquez and Ruiz-Ballesteros (2018) note the complexity of extricating the impact of different elements engaged in and produced through social exchange. In their view, conservation regulations can be at once be incorporated, contested, manipulated and co-produced by individuals and

communities. Such a process will always be mediated by local interests, past engagements as well as affective and material connections with the environment. Most importantly, Cortés-Vázquez and Ruiz-Ballesteros (2018) argue that people can comply with certain regulations and adopt certain narratives, whilst still maintaining their own views and practices (Scott, 1985).

7.3. Aims and approach

In this chapter, I set out to analyse local attitudes and narratives of coexistence through the theory of environmentality, by tracing the effect of different wolf governance approaches I identified in Chapter 6, on how local resource users experience coexistence. This analysis is based on both quantitative and qualitative data I collected with a representative sample of farmers, a snowball sample of hunters and bee keepers, and several other key informants (see chapter 4) .

In this chapter I attempt to bringing both emic and etic approaches into dialogue. On the one hand, the chapter relies on emic accounts of local understandings of coexistence, on the other, it relies on etic insights drawn from linking elements of local culture to the different governance approaches present in the study sites. I base my study on a qualitative analysis of local subjectivities that builds on the environmentality literature and its critiques. In addition, I also draw on methodology from conservation biology and sociology/psychology, to support my qualitative findings. I use measures of wolf damages on local farmers, in order to account for the material impact of wolves when looking at how the experience of coexistence varies across my study sites. Moreover, I use Likert scale measures of beliefs and attitudes to determine resonance of different coexistence narratives, and quantify the effects of the different governance approaches across my study sites. The Likert scale data on beliefs and attitudes towards wolves are used to complement my qualitative findings, but my approach provides ample space to discuss individual and contextual interpretations of meaning.

7.3.1. Methods to measure wolf depredations

The results section begins with a brief summary of the data I collected on the damages that farmers suffered from wolves. Official data on depredations is recorded by the respective regional administrations, yet it relies on declarations made to the administration in order to claim damage compensation. As noted in chapter 6, the PHGs of León have a different compensation system from the other sites, which limits compensation to insured farmers. My data shows that only 38% of farmers were insured and therefore had the possibility to claim damages to the administration. Even though in 2015 and 2016, an average of 38% of all sampled famers claimed to had suffered damages, only 36% of them said that they had claimed compensation to the insurance, and only 2 % said that they had claimed and not yet received compensation from the regional administration. These findings are matched by the official registry that shows that only one depredation was compensated in the area between 2013 and 2015 (Marino *et al.*, 2018). Official data from the PHGs of León, therefore, largely underestimates the occurrence of damages, and for this reason, I focus my analysis on a comparison of self-declared depredations by the interviewed farmers from each site.

Two measures are used to summarize damages in this analysis. The first is whether farmers claimed to have suffered damages in the current or in the two full years previous to the interview (represented by a yes or no answer). The second is an estimate of the number of livestock heads farmers claim to have lost to wolves in the year 2015. This was the year immediately prior to my fieldwork, which most farmers could easily refer back to. This estimate only includes livestock that farmers claimed to have found dead or injured, and therefore leaves out missing livestock, which farmers could often not attribute to wolf depredations with certainty. Data on the number of depredated livestock heads in 2015 is available from all but 16 farmers, whose memory or accounts of depredations were too confused to calculate an estimate.

7.3.2. Methods to measure attitudes and beliefs

The results section then follows with a description of how attitudes and beliefs regarding wolf presence and management vary across the study sites. Study site

is used as a proxy for the different wolf governance approaches identified in the previous chapter. Attitudes and beliefs were measured on a 5-point likert scale, but the categories “agree” and “strongly agree” and the categories “disagree” and “strongly disagree” were merged in the analysis to form a 3-point Likert scale (see chapter 4). Significant differences between the sites were calculated using Kruskal-Wallis tests and additional Wilcoxon post hoc tests, with Bonferroni adjustments, to identify which study sites differ from each other. To gauge the respective influence of wolf damages and study site on respondent’s attitudes and beliefs toward wolves, linear regression analyses were carried out, using a set of 5 key attitude and belief items as response variables, and damages and study area as predictors. The impact of damages on the key set of selected variables was furthermore explored in each site independently.

Finally, having accounted for the influence of wolf depredations on attitudes, I turn my attention to exploring the effects of wolf governance approaches in shaping the different attitudes, beliefs and narratives of wolf coexistence recorded in each site.

7.4. Results

7.4.1. Wolf depredations on livestock

Estimating the material impacts of carnivores on local communities and their livelihoods is essential in order to understand what drives conflict (Henle *et al.*, 2008; Redpath and Sutherland, 2015), and the experience of livestock depredations has been shown to impact farmers’ attitudes towards the species, even if only moderately (Vktersø *et al.*, 1999). Although this chapter is not intended to provide an in-depth analysis of depredation data, accounting for damages allowed an estimation of the extent to which attitudes and beliefs about wolves also depend on other factors. Wolf depredations varied considerably across the study sites. 38% suffered damages in the PHGs of León; 66% did in the RHR of Riaño, 51% did in Cangas, and 71% did in Somiedo (table 7.2). On average, in 2015 livestock owners lost between 0.31 and 1.89 livestock heads,

and between 0.13 and 1.53 meat cattle heads, in each site (fig. 7.1 and 7.2). Damages per livestock holder were highest in Somiedo, followed by the RHR of Riaño, the PHGs of León, and Cangas.

Results show that damages were significant predictors of certain attitudes and beliefs about wolves, but did not explain the totality of variation occurring across the study sites (table 7.1). Both study area and the experience of wolf damages were significant predictors of farmers' beliefs regarding whether there are too many wolves in the area, whether wolves are compatible with livestock breeding, and whether they cause a lot of damage to livestock. Only study area was a significant predictor of whether wolves enriched farmers' experience of nature, whilst neither study area nor damages were significant predictors regarding whether farmers thought that it is important to conserve wolves. This means that even when the level of damages is accounted for, there are still several significant differences in attitudes and beliefs across the study sites.

Moreover, the experience of damage did not influence farmers' attitudes and beliefs about wolves in the same way across all study sites (table 7.2). Whilst the experience of damage did influence farmers' beliefs regarding whether there are too wolves in the area, whether wolves are compatible with livestock breeding, and whether they cause a lot of damages to livestock in both the PHGs of León and in Somiedo, opinions in the RHR of Riaño and Cangas appear to be less dependent on whether farmers had experienced damages or not. Out of the set of 5 key variables that were selected for this analysis, only the belief regarding whether there are too many wolves in area was influenced by the experience of damages in the RHR of Riaño, and only respondent's feeling as to whether wolves enrich their experience of nature was influenced by the experience of damages in Cangas.

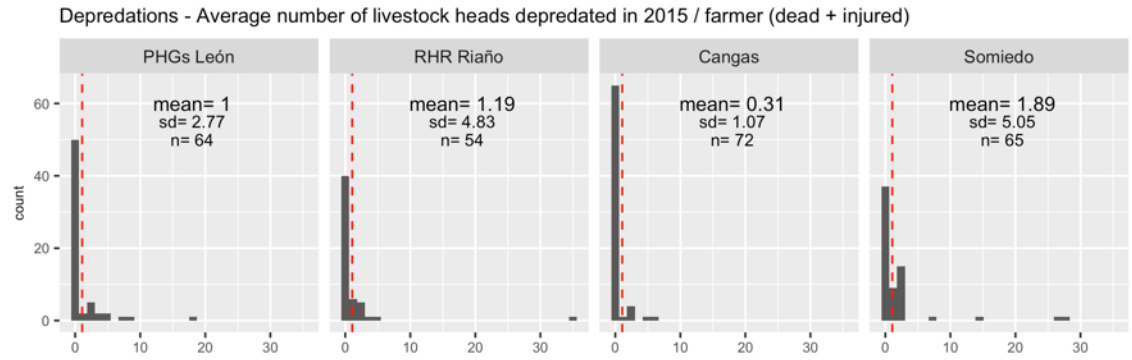

Figure 7-1 Average number of livestock heads depredated by wolves in 2015 per farmer, in each site. Representing only cattle, sheep, goats and horses that were claimed to have been found dead or injured (not missing).
A significant difference was detected between the sites (Kruskal-Wallis chi-squared = 18.63, df = 3, p-value = 0.0003). Pairwise comparisons using Wilcoxon rank sum test showed there was a significant difference between : the PHGs of León and Cangas (p-value= 0.048); the PHGs of León and Somiedo (p-value= 0.029); the RHR of Riaño and Cangas (p-value = 0.021); and Cangas and Somiedo (p-value= 1.9e-05).

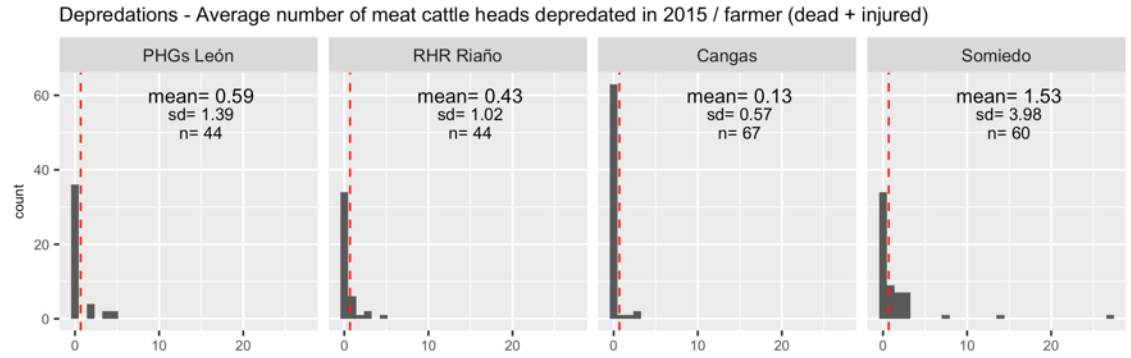

Figure 7-2 Average number of meat cattle heads depredated by wolves in 2015 per farmer, in each site, representing only cattle that was claimed to have been found dead or injured (not missing).
A significant difference was detected between the sites (Kruskal-Wallis chi-squared = 24.833, df = 3, p-value = 1.673e-05). Pairwise comparisons using Wilcoxon rank sum test showed there was a significant difference between : the PHGs of León and Cangas (p-value= 0.038); the PHGs of León and Somiedo (p-value= 0.020); the RHR of Riaño and Cangas (p-value= 0.012); the RHR of Riaño and Somiedo (p-value= 0.020); Cangas and Somiedo (p-value= 1.3e-06).

Key variables (y):	study area anova p-value	damages anova p-value	lm (y ~ study area + has had damages)
It is important to conserve wolves in my area	0.156	0.118	Res. SE: 0.9508; R2: 0.029, F-stat: 1.93, 260 DF, p-value: 0.1057
Wolves enrich my experience of nature	1.35E-05 ***	0.052	Res. SE: 0.8846; R2: 0.104; F-stat: 7.58, 261 DF, p-value: 8.66e-06 ***
There are too many wolves in my area	1.85E-06 ***	1.7E-04 ***	Res. SE: 0.6947; R2: 0.149; F-stat: 11.40, 261 DF, p-value: 1.53e-08 ***
Wolves are compatible with the livestock breeding world	3.28E-06 ***	0.003 **	Res. SE: 0.7925; R2: 0.129; F-stat: 9.68, 261 DF, p-value: 2.57e-07 ***
Wolves cause a lot of damages to livestock	6.03E-08 ***	2.94E-06 ***	Res. SE: 0.7349; R2: 0.192; F-stat: 15.47, 261 DF, p-value: 2.28e-11 ***

Table 7-1 Summary results of linear regressions carried out to test the significance of a) study area and b) damages, on a selection of key variables measuring attitudes and beliefs about wolves.
The key variables are measured on a Likert scale (1=disagree; 2=neutral; 3=agree). The study area variable includes the four study sites. The damages variable measures whether or not respondents claimed to have suffered livestock depredations from wolves in the current and two full years since the interview. A measure of the number of depredated livestock per farmer, in 2015, was initially included but dropped as it was not found to be significant.

	All		PHGSs of León		RHR of Riaño		Cangas		Somiedo	
	damages (yes= 56%)	*n preyed livestock (2015)*	*damages (yes= 38%)*	*n preyed livestock (2015)*	*damages (yes= 66%)*	*n preyed livestock (2015*	*damages (yes= 51%)*	*n preyed livestock (2015*	*damages (yes= 71%)*	*n preyed livestock (2015*
It is important to conserve wolves in my area	0.183	0.448	0.908	0.390	0.506	0.373	0.079	0.620	0.037	0.125
Wolves enrich my experience of nature	**(-0.32) 0.005**	**(-0.03) 0.023**	0.578	0.147	0.976	0.276	**(-0.64) 0.002**	0.453	0.150	0.163
There are too many wolves in my area	**(0.43) 2.58E-06**	**(0.03) 0.022**	**(0.55) 0.011**	**(0.10) 0.012**	**(0.22) 0.0415**	0.634	0.444	0.214	**(0.46) 9.9E-03**	0.283
Wolves are compatible with the livestock breeding world	**(-0.38) 2.17E-04**	**(-0.03) 0.029**	0.126	**(-0.10) 0.020**	0.196	0.380	0.381	0.260	**(-0.44) 0.018**	0.387
Wolves cause a lot of damages to livestock	(**0.54) 4.04E-08**	0.126	**(0.61) 0.009**	0.322	0.058	0.598	0.135	0.295	**(0.623) 5.0E-04**	0.246

Table 7-2 Summary of p-values and effect sizes resulting from ANOVAs carried out separately, to test the influence of a) whether respondents experienced damages and b) how many livestock they lost to wolf depredations in 2015, on a selection of key variables measuring attitudes and beliefs towards wolves

The key variables are measured on a Likert scale (1=disagree; 2=neutral; 3=agree). The damages variable measures whether or not respondents claimed to have suffered livestock depredations from wolves in the current and two full years since the interview. The table represents p-values. Significant values are signalled in bold with their effect sizes in parentheses.

7.4.2. Attitudes and beliefs about wolves

7.4.2.1. Wolf conservation

Across all study sites, the sampled farmers overwhelmingly believe that wolves belong to the nature of their area (mean=94 %, sd=3) but are divided regarding the importance of having and conserving them (fig 7.3). Those that do not believe it is important to have and conserve wolves are in slight majority (mean=58 and 55%, sd= 9 and 10, respectively), as are those who do not feel that wolves contribute to maintain nature's equilibrium (mean=56%, sd=8), with no significant differences across the study sites (fig. 7.3). On the other hand, there were significant differences between the responses of farmers in the PHGs of León and in all the other sites, regarding whether wolves enrich their experience of nature (Wilcoxon p-values for the PHGs of León: the RHR of Riaño =0.0091; for the PHGs of León: Cangas= 0.0002 and for the PHGs of León: Somiedo= 9.20E-06). A slight majority of respondents in the PHGs of León claim wolves enrich their experience of nature (54%), whereas only a fraction of respondents in the other study areas claims this (mean=25%, sd=8) (fig. 7.3).

Hunter attitudes towards wolf conservation were predominantly positive and did not vary significantly across the study sites (fig. 7.4). Most respondents either agreed or were neutral regarding the importance of conserving wolves (mean=66%, sd=6) and felt that wolves enrich their experience of nature (mean=57, sd=7).

7.4.2.2. Wolves as a threat or opportunity

I detected significant differences between farmers' perceptions of wolves as a threat to livestock, with respondents in the PHGs of León having consistently lower perceptions of threat compared to the other study sites (fig. 7.3). While the majority of farmers in the PHGs of León believes wolves are compatible with livestock breeding activities or are neutral as to their compatibility (53%) only a minority of respondents from the other study sites believe this (mean=22% sd=5; Wilcoxon p-values for the PHGs of León : the RHR of Riaño = 0.011; for the

PHGs of León :Cangas=2.60E-05 and for the PHGs of León: Somiedo = 2.30E-05). When asked whether, through improved management, wolves could be compatible with livestock breeding activities responses varied but were overall positive (those who agree or are neutral reached 87% in the PHGs of León , 77% in the RHR of Riaño , 50% in Cangas and 61% in Somiedo). Responses regarding the potential for wolves to be compatible with livestock breeding activities were significantly more positive in the PHGs of León than in Cangas and Somiedo (Wilcoxon p-values= 3.70E-07 and 0.001, respectively), and also significantly more positive in the RHR of Riaño than in Cangas (Wilcoxon p-values= 0.018). Less than half of the respondents in the PHGs of León believe that wolves cause a lot of damage to livestock (47%) whereas most respondents from the other study sites perceive wolves as a threat to livestock (mean=82%, sd=4; Wilcoxon p-values for the PHGs of León : the RHR of Riaño = 1.30E-05; for the PHGs of León: Cangas = 1.80E-05 and for the PHGs of León: Somiedo = 8.10E-05) (fig. 7.3).

Most farmers across all the study sites believe wolves are a significant threat to hunting activities (mean=63%, sd=7) but not to human safety (97% in the PHGs of León, 92% in the RHR of Riaño , 69% in Cangas and 87% in Somiedo). Nonetheless, respondents in Cangas were more likely to see wolves as a threat to human safety than respondents in all other sites (Wilcoxon p-values for Cangas : the PHGs of León = 1.60E-05; Cangas : the RHR of Riaño = 0.003; Cangas: Somiedo = 0.021), as were respondents in Somiedo compared to respondents in the PHGs of León (Wilcoxon p-value= 0.025). Finally, most respondents in the RHR of Riaño believe wolves increase tourism in the area (53%), whereas only a fraction believe this in the other sites (mean=10%, sd=2; Wilcoxon p-values for the RHR of Riaño: the PHGs of León =2.80E-09; for the RHR of Riaño : Cangas =1.70E-07 and for the RHR of Riaño : Somiedo =4.20E-07; fig. 7.3). Respondents who agreed or were neutral as to whether wolves should be used more to increase tourism remain a minority across all study sites (35% in the PHGs of León , 39% in the RHR of Riaño, 15% in Cangas and 22% in Somiedo), with respondents being significantly more favourable in the RHR of Riaño compared to Cangas and Somiedo (Wilcoxon p-values= 0.002 and 0.026, respectively), and also significantly more favourable in the PHGs of León compared to Cangas (Wilcoxon p-value= 0.007) (fig. 7.3).

Hunters in the PHGs of León and the RHR of Riaño were significantly more likely to view wolves as being compatible with livestock production or to be neutral as to their compatibility, than respondents in Cangas and S (61% in the PHGs of León , 46% in the RHR of Riaño, 22% in Cangas and 24% in). Instead the majority of hunters viewed wolves as a threat to hunting activities, with no significant difference across the study sites (mean=73, sd=8) (fig. 7.4).

7.4.2.3. Wolf damage compensation

Most respondents claimed their tolerance would increase with improved compensation, although to varying degrees across the different sites (60% in the PHGs of León, 58% in the RHR of Riaño, 71% in Cangas, and 78% in Somiedo). Respondents in the PHGs of León and the RHR of Riaño were less likely to claim their tolerance would increase with improved compensation than respondents in Somiedo (Wilcoxon p-values= 0.027 and 0.013, respectively).

7.4.2.4. Wolf population management

Finally, the majority of farmers believe that the wolf population has increased over the past 10 years and that there are too many wolves in their area, although to varying degrees across the different sites (53% and 65% in the PHGs of León; 93% and 100% in the RHR of Riaño, 76% and 85% in Cangas and 82% and 90% in S) (fig. 7.3). Consistent with respondents in the PHGs of León having lower perceptions of wolves as a threat to livestock, respondents in the PHGs of León are also less likely to perceive the wolf population as increasing and less likely to believe there are too many wolves, compared to respondents in the other study sites (Wilcoxon p-values for the PHGs of León: the RHR of Riaño = 5.10E-07 and 6.20E-07; for the PHGs of León: Cangas= 0.003 and 0.006 ; for the PHGs of León: Somiedo= 0.0003 and 0.0005). Conversely, out of all the study sites, responders in the RHR of Riaño were the most likely to believe that the wolf population is increasing (Wilcoxon p-values for the RHR of Riaño: the PHGs of León = 5.10E-07; the RHR of Riaño: Cangas= 0.0018; and the RHR of Riaño: Somiedo= 0.012) and that there are too many wolves (Wilcoxon p-values for the

RHR of Riaño: the PHGs of León = 6.20E-07; the RHR of Riaño: Cangas= 0.008) (fig. 7.3).

Respondents across all sites overwhelmingly believe that the wolf population will keep increasing unless it is kept under control (mean=95%, sd=4) and claimed their tolerance for wolves would increase with greater population control (mean=80%, sd=6), with the exception of respondents in the PHGs of León (28%; Wilcoxon p-values for the PHGs of León: the RHR of Riaño = 1.30E-09; the PHGs of León: Cangas= 1.80E-08; the PHGs of León: Somiedo= 6.10E-12).

Farmers in the PHGs of León are split between those who thought that hunting quotas were too low (40%) and those who did not know (45%), and a small portion who think quotas are set at the right level (12%). By contrast, respondents in all other sites predominantly felt that quotas were too low (mean=77%, sd=3.5; Wilcoxon p-values for the PHGs of León: the RHR of Riaño = 0.019 ; the PHGs of León: Cangas=0.0003; the PHGs of León: Somiedo=0.0002). Farmers feel that wolf population control is acceptable mainly in order to reduce damages (mean=98%, sd=2.7), although a minority also feel it could be used to decrease competition with hunters (mean=38%, sd=1.7) and to sell trophies (mean=33, sd=9.4). The majority are in favour of banning the use of traps and poison baits (mean=82, sd=8.8), and a small but significant portion are in favour of culling the wolf population only when there are a lot of certified damages (6% in the PHGs of León, 23% in the RHR of Riaño , 25% in Cangas, 27% in Somiedo). Respondents in the PHGs of León are significantly less likely to agree that wolves should only be culled when there are a lot of damages, compared to respondents in Cangas and Somiedo (the PHGs of León: Cangas= 0.037; the PHGs of León: Somiedo= 0.016). The majority of respondents thought wolf population control should be carried out by rangers (mean=69%, sd=6.7%), or hunters with (mean=68%, sd=7.3) or without (mean=67%, sd=14.6) a paid permit[12]. Farmers in the PHGs of León were less likely to think that that culling should be carried out by hunters without a paid permit, compared to farmers in other sites (the PHGs of León: the RHR of Riaño = 0.008; the PHGs of León: Cangas= 0.011; the PHGs of León: Somiedo= 0.005).

[12] Respondents has the possibility of agreeing with both options

As with farmers, the majority of hunters reported that there are too many wolves in their area (59% in the PHGs of León, 90% in the RHR of Riaño, 84% in Cangas, 82% in Somiedo), and hunters in the PHGs of León were less likely to believe so than hunters in other areas (the PHGs of León: the RHR of Riaño =0.0007; the PHGs of León: Cangas=0.018; the PHGs of León: Somiedo=0.018) (fig. 7.4).

7.4.2.5. Illegal killing

The majority of farmers in the PHGs of León claim wolves are killed illegally (61%) and that illegal killing is acceptable when there are a lot of damages (79%), while only a small fraction claim that it is never acceptable to kill wolves illegally (21%). The portion of respondents that claim that wolves are killed illegally in the RHR of Riaño , Cangas and Somiedo is considerably lower (17%, 13% and 6%; Wilcoxon p-values for the PHGs of León: the RHR of Riaño = 1.74E-05; the PHGs of León: Cangas= 1.26E-07; and the PHGs of León: Somiedo= 5.97E-10), and respondents in these sites are more or less split between those that claim it is acceptable to kill wolves illegally when there are many damages (54% in the RHR of Riaño ; 39% in Cangas and 58% in Somiedo), and those that claim it is never acceptable (52% in the RHR of Riaño; 60% in Cangas and 44% in Somiedo).

Hunters were more likely than farmers to admit illegal hunting takes place. Once again, similarly to the farmer sample, hunters in the PHGs of León were more likely to claim that wolves are killed illegally in their area (70% in the PHGs of León, 22% in the RHR of Riaño; 30% in Cangas and 32% in Somiedo). The majority of hunters in the PHGs of León and Somiedo expressed acceptance of illegal killing of wolves under certain circumstances: most claimed it was acceptable to kill wolves illegally when there are a lot of damages (73% in the PHGs of León and 65% in Somiedo) and only a fraction said it was never acceptable to kill wolves illegally (27% in the PHGs of León and 35% in Somiedo). The opposite is true for hunters in the RHR of Riaño and Cangas, where 34% and 44% claimed it is acceptable to kill wolves illegally when there are a lot of damages, and where 66% and 65% claimed it is never acceptable to kill wolves

Figure 7-3 Descriptive plots of the items measuring farmers' attitudes towards wolves on a 5-point Likert scale.
Significance stars (=p<0.05; **=p<0.01; ***=p<0.001) are added: a) to the title of each plot to represent significant p values of Kruskal-Wallis tests, carried out to detect differences between study sites; and b) on top of each figure to represent significant p values of additional Wilcoxon post hoc tests, with Bonferroni adjustments, to identify which study site differ from each other. The tests were carried out on items that were re-coded with dummy variables on a 3-point Likert scale (where "strongly agree/agree" and "strongly disagree/ disagree" were joined together).*

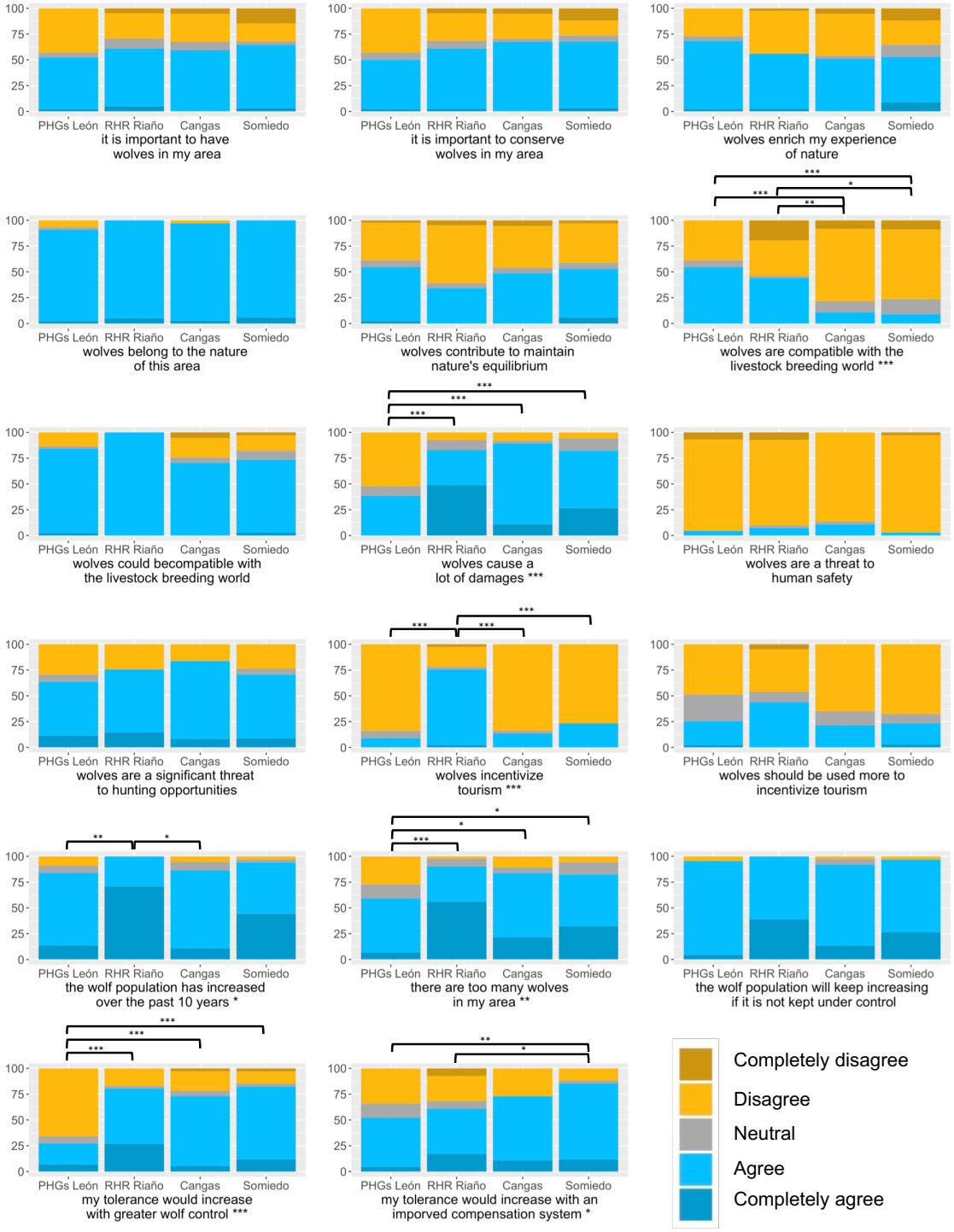

Figure 7-4 Descriptive plots of the items measuring hunters' attitudes towards wolves on a 5-point Likert scale.
Significance stars (=p<0.05; **=p<0.01; ***=p<0.001) are added: a) to the title of each plot to represent significant p values of Kruskal-Wallis tests, carried out to detect differences between study sites; and b) on top of each figure to represent significant p values of additional Wilcoxon post hoc tests, with Bonferroni adjustments, to identify which study site differ from each other. The tests were carried out on items that were re-coded with dummy variables on a 3-point Likert scale (where "strongly agree/agree" and "strongly disagree/ disagree" were joined together). These results should be interpreted with caution because they were collected through snow ball sampling.*

7.4.3. Wolf coexistence subjectivities

Attitudes and beliefs about carnivores are known to vary across geographic and temporal scales (Majić and Bath, 2010; Treves *et al.*, 2013; Piédallu *et al.*, 2016) and the reasons behind these variations can be multiple and difficult to identify. In this section, I will attempt to trace the effect of the different wolf governance approaches that I identified in the previous chapter, and look at how they play out on the ground. The quantitative data will be complemented with, and interpreted through, the qualitative data I collected. The aim is to highlight ways in which the subjectivities promoted by wolf environmentality approaches, and local resource users' own narratives of coexistence, may be interacting with each other, producing different subjectivities across the study sites.

7.4.3.1. Common coexistence narratives and subjectivities

Informants' narratives of coexistence with wolves very much reflected how they viewed their landscape and their role within it (Chapter 5). Positive attitudes toward wolves were sometimes expressed in terms of the joy experienced in seeing and knowing they exist but, more often, informants referred to their longstanding coexistence with wolves as evidence of their tolerance and of their acknowledgement that wolves belonged to the local landscape. Habituation to wolves meant that their presence was not viewed as extraordinary, neither in a positive nor a negative sense, but rather, informants who showed tolerance towards wolves saw them as just another animal: "*It's not important to have wolves, but they have always existed*"… "*I can hear wolves howling at night from here (Do you enjoy it?) I don't hate it*"… "*it is important to have wolves, like any other animal*" (PHGs of León). Farmers' habituation to wolf presence was often reflected in their livestock herding practices, the damage prevention measures they adopted (chapter 5), and their tolerance for a certain level of damages , *"they don't bother me, I spend the whole day with my livestock and I have livestock guarding dogs*" (PHGs of León)… "*you have to tolerate a few damages if you live in this area*" (RHR of Riaño) "*they too must eat*" (Somedio).

The large majority of respondents spoke of "conservation with control", referring to their acceptance that wolves had to exist, but that their population required

management. Human activity was seen as essential in shaping and preserving local resource user's view of a natural balance and wolves, therefore, had to be conserved "*inside of an order*" (PHGs of León), which could only be maintained through intelligent and sustainable population control. The wolf's contribution to maintaining an ecological balance in the landscape was not necessarily denied, but considered secondary to the role that humans played. "*Here wild animals don't maintain the natural balance because humans control wild animals*…. (but later says) *wolves do us a favour because they keep disease in check*" (RHR of Riaño)… " *if there are too many wolves there can't be a balance*" (Cangas). Control, was a concept that emerged repetitively throughout the interviews, and referred to local communities' ability to respond to intrusions and to control the outcome of interactions with wildlife (Lescureux and Linnell, 2010), but it also took on varied meanings that reflected informants' vision of what the proper relationship between humans and nature should be (Ghosal *et al.*, 2015). For some respondents, control was associated with the ability to restore a moral order of things and to enforce symbolic and physical boundaries. To others, control meant feeding wolves or monitoring their behaviours and movements with the use of technology, to ensure they did not attack livestock, decimate wild prey, or trespass boundaries. More often, "conservation with control" referred to maintaining the wolf population and the damages caused by wolves at acceptable levels.

However, it is important to note that several informants alluded to a level of control that would most likely contrast with the species' conservation: "*If there were only one or two it would be fine, the problem is that they move in packs*" (Somiedo). Several informants also mentioned that wolves should be conserved in enclosures, or that they should be completely eradicated. "*they should only exist in controlled areas… enclosed but not wild, and they should be fed*" (PHGs of León)… "*they should be enclosed so that tourists can see them*" (Cangas).

Reasons behind the negative attitudes toward wolves expressed by informants were primarily associated with the damages that wolves cause to livestock. Farmers spoke both of the economic impact they had on their activities, the induced damages that could result from depredations (like abortions), and the burden that wolves placed on their livestock herding practices. Informants also

spoke of the emotional effect of losing or witnessing the injury of livestock, particularly reproductive cattle that are not destined to slaughter and are sometimes "*baptised*" with a name. Moreover, informants lamented the government's and environmentalists' reluctance to take responsibility for depredations, by compensating damages fairly or by managing or allowing for the management of wolf populations. Finally, wolves were portrayed both as a cause and as a symbol of depopulation. Based on these narratives, it is difficult to disentangle the material from the social and symbolic impacts of wolves on local resource users' lives. Damages had economic consequences on those who suffered them, but also triggered emotional responses. Fair government compensation and predator control were deemed necessary to reduce the number and burden of damages, but also stood as political symbols of commitment to local communities (or lack thereof). Finally, the perceived increase in wolf damages was said to have caused some livestock owners to abandon their activity, yet even more powerful was the metaphor of wild wolves taking over once populated and productive landscapes.

An important element explaining why the personal reported experience of damages did not always match informants' perceptions, was how conflict appeared to be socially constructed and amplified through word of mouth and rumour. Attitudes of farmers who had never experienced damages were influenced by their neighbours' and colleagues' experiences, which farmers would often refer to. At the same time, it appeared that communities were not always fully aware of each other's realities. Villages that had experienced few damages would refer to nearby villages that had reputedly experienced several, but based on my findings that did not always turn out to be true.

7.4.3.2. PHGS of León

Wolf governance in the PHGs of León is decentralized and appears to be strongly influenced by a neoliberal governmentality approach. Wolf hunting and hunting in general are carried out through concessions between sub-municipal entities called *Juntas Vecinales*, who own the hunting rights, and private holders. The damage compensation system also shows strong elements of neoliberal

governmentality, as it mainly works through a private insurance. However, wolf hunting quotas are still decided by the regional government.

The PHGs of León were the site where the lowest percentage of sampled farmers claimed to have suffered depredations in the past years, and where the second lowest level of depredations, suffered on average by each farmer, was recorded for the year 2015 (1 livestock head depredated / farmer). Compared to the other sites, respondents in the PHGs of León consistently perceived wolves as posing a lower threat to livestock activities, and along with hunters, were also generally more tolerant of the size of wolf population. Whilst farmers from all the other sites predominantly felt that wolf hunting quotas were too low, farmers in the PHGs of León were split over their adequacy. Even though farmers in the PHGs of León were more satisfied with the wolf population size, and viewed wolves as less of a threat, they were more likely to claim that wolves should be culled persistently (as opposed to only culled when there are a lot of damages). In addition, whilst farmers in the PHGs of León were significantly more likely to claim that wolves enrich their experience of nature, than farmers in the other sites, they were also more likely to claim wolves are killed illegally and that illegal killing is acceptable when there are a lot of damages. Moreover, despite having a less advantageous compensation system from the regional administration, farmers in the PHGs of León were less likely to claim their tolerance would increase with improved compensation.

A variety of hunting arrangements were in place across the different private hunting grounds. These involved different agreements between the *juntas vecinales*[13], that own the hunting rights, and the parties that buy the hunting concessions. In some cases, the *juntas vecinales* would directly manage the concessions and sell the hunting permits for each game animal, in other cases the concessions were bought by a federation of local or non-local hunters, and yet in other cases they were bought by one or a small group of non-local hunters. Once they had paid the *junta vecinal*, the concession holders had the right to

[13] The term translates to “neighbourhood association” and represents sub-municipal districts within each municipality, which exclude urban spaces. The administrative board is elected by local residents and the institution has ancient roots that date back to the feudal period.

decide who could hunt what, and at what price. Hunting therefore functioned through a highly decentralized system and according to the informants, this administrative discretion impacted both on the rights of local hunters and on the sustainability of hunting practices. Overall, hunting was considered a major source of income for the *juntas vecinales*, along with timber exploitation and revenue generated from grazing concessions. Revenue that went to the *juntas vecinales* for public works, was highly valued by all informants, while the profit that private concession holders generated from reselling hunting permits was generally frowned upon. Several local hunters voiced disagreement with a system that they saw as favouring affluent hunters and excluding locals: "*hunting is for the rich, local hunters pay as much as the others"… "(and they) can hunt only if they are invited. Sometime the holder doesn't want us*". Compared to the neighbouring RHR of Riaño, the PHGs were said by informants to be much less regulated and enforced. Some hunters viewed the lack of rule enforcement in the PHGs positively because it allowed them to hunt more freely and to regulate their practices based on local knowledge regarding prey availability. Other hunters saw the lack of rule enforcement negatively, particularly in some of the hunting concessions run by foreign holders or large federations of hunters that had no interest in preserving game in the long term. One hunter claimed that the duration of the concessions was shorter than the reproductive cycle of most large game species and, in some situations, hunters depleted game by the end of their lease.

Conflicting opinions regarding the ecological and social impacts of the different hunting arrangements can be seen to reflect fundamental tensions between the environmentality approaches that underpin them. Hunters' comparison between the lack of enforcement in the PHGs of León and the more regulated RHR of Riaño, where each hunt is supervised by a regional ranger, reflects their perceptions regarding: on the one side, community/ neoliberal approaches in which management is largely decentralized; and other the other side, sovereign/disciplinary approaches in which the state takes an active role in natural resource management. Some hunters felt that government interference was often harmful, and that when *juntas vecinales* were allowed to manage and benefit from hunting, they acted as the most successful conservationists. Hunters often claimed that with greater autonomy also came a greater sense of responsibility, which they described as being engrained in traditional ways of

relating to their environment: "*in the PHGs there are very few checks and in the last few years game populations have been damaged a lot. I used to be a poacher but I never went over the line, I would check myself. You start losing passion once you (have to follow rules). We used to hunt in large groups and spend all day in the mountain, now there are rangers checking on everything, and keeping time, and ending hunts if there is fog… you end up being more concerned about the rules than about the game*". Tensions were also evident between neoliberal governmentality approaches, through which hunting concessions were sold to the best bidder, and community driven approaches, through which *juntas vecinales* and local hunters actively participated in managing the hunting grounds: "*when the hunting grounds are managed by one person that is not a salesman it works best, if it's a large club they will overhunt. I am against buying and selling game, I don't like it when it's done for money" … "this hunting concession used to be held by hunters from (another region) and when they left, it had been devastated. But now we manage and care for it*.". Finally, hunters' negative evaluation of the government's management capacities may possibly also reflect the effects of recent austerity measures: "*Now private hunting grounds function better than regional hunting reserves, because the regional government is neglecting (the RHRs)*".

Despite claims that decentralized management increased hunters' sense of responsibility and stewardship of wild game, and despite wolves being listed as a game species, responsibility for wolves was still often attributed to the regional government. Moreover, even though farmers in the PHGs of León were less likely than farmers in Cangas and Somiedo to claim that improved compensation would increase their tolerance of wolves, the lack of a fair compensation system was often mentioned as a motivation for illegally hunting wolves.

Out of the four study sites, the case study of the PHGs of León suggests that stronger levels of decentralization and reduced rule enforcement are associated with more open and relaxed attitudes towards the illegal killing of wolves and furthermore, also associated with a stronger emotional attachment to the species, as both farmers and hunters in the PHGs of León were significantly more likely to claim that wolves enrich their experience of nature. Although emotional attachment to wolves and higher levels of wolf poaching are seemingly in contrast

with each other, they make sense if one considers how strongly local resource users value their autonomy and their role in maintaining their vision of a natural balance: "*when there are few wolves it's not a problem. If people were to respect the quotas there would be a lot more, but quotas are surpassed (regularly)" … "Wolves carry out a good selection of wild prey, they take out the sick ones. I like to see them and I also hunt them. It would be better if the regional government did not do anything, we (hunters) can control them perfectly*."

7.4.3.3. RHR of Riaño

Compared to the PHGs of León, the RHR of Riaño is managed with greater involvement on the part of the Regional Administration. Hunting revenue is reinvested in the local community but most of it is managed by the Regional Administration, hunters are always accompanied by rangers, and wolf damages are fully compensated by the regional government. Wolf hunting permits are occasionally auctioned, but most wolves are hunted by wild boar hunters without paying. Out of the four sites, the RHR of Riaño is the most famous tourist destination for wolf sightings. Compared to the other sites, respondents in the RHR of Riaño were significantly more likely to believe that wolves increase tourism, and also more in favour of using wolves to increase tourism in the area (compared to respondents in Cangas and Somiedo). Over half of the famers (66%) in the RHR of Riaño claimed to have suffered depredations in the past years, and on average farmers lost 1.19 livestock heads to depredations in the year 2015. Despite having the highest wolf hunting quotas, out of the four sites, farmers and hunters in the RHR of Riaño still felt that the quotas were too low, and were more likely to believe that there are too many wolves in the area (compared to farmers in the PHGs of León and Cangas).

Being the study site that is most famous for wolf tourism, Riaño is the place where respondents were most favourable of using wolves to attract tourists. According to a few respondents, tourism was the one benefit that wolves could bring to the area, and this was an important asset to exploit, because it had the potential to improve people's tolerance of the species. "*you have to push people towards accepting and wanting (wolves), and the best way would be by creating jobs. If people can earn money through them they will want to conserve them*" (RHR of

Riaño). The economic incentive of tourism, therefore, was thought by some to have a disciplinary effect in changing local attitudes and beliefs about wolves. Although my results do not indicate that wolf tourism in Riaño resulted in resource users having noticeably more positive views towards wolves, they show that resource users had a slightly more positive view of wolf tourism compared to the other sites.

However, several informants from the RHR of Riaño and from the other sites voiced concerns that signalled a divide between the tourism project and local resource users' way of seeing and experiencing wolves and the local landscape. Informants contested the romanticised vision of wilderness that they felt was being promoted through wolf tourism activities, claiming that tourists were not shown the reality of coexistence. Instead, by claiming that wolves were baited in order to ensure sightings, informants felt that tourists were being sold an unrealistic and performed depiction of wilderness: "*Tourists want to see wolves and bears easily, from the side of the road so as not to have to walk too far, but they are wild animals, it is not normal for them to be accustomed to humans. They want to turn Somiedo into (a zoo)*" (Somiedo). Any point of view that valued the encroachment of wild animals into human dominated spheres of the landscape was deemed problematic and destabilizing to local resource users' visions of an orderly and functional landscape. Moreover, other than the fact that wolves were often considered difficult to spot, for many informants the idea that wolves could represent an attraction to foreign visitors and consumers seemed both unlikely and undesirable: *"Nobody wants to see a wolf" (*Cangas*… "I don't like the idea that someone is profiting from this*" (RHR of Riaño). As another example, the representative of a farming association categorically denied that farmers could ever use wolf presence as a marketing strategy to sell their products: "*wolves are (our) total enemies, you cannot use their image to sell local meat because it would be like letting the environmentalists win*". Such claims were not universal, and do not mean that wolf tourism is completely incompatible with local aspirations and activities. However, they exemplify one side of the problematic interaction occurring between, on one side, a vision of wilderness that is promoted by certain wildlife tourism initiatives, and on the other, local resource users' ways of seeing and relating to nature. Moreover, they show that neoliberal environmentality

approaches may be contested and resisted when they do not align with local "truths", even if they have the potential to generate income.

The final set of narratives surrounding wolf tourism initiatives highlights tensions between neoliberal and community driven governmentality approaches. Perhaps the main criticism to the wolf tourism project in the RHR or Riaño, concerned how the benefits of tourism were being shared across the community. Many informants felt that the tourism companies should share their profits with those who enabled tourism activities by restoring foot paths, clearing shrubland etc… and those who were most adversely affected by wolves. Like other public land uses such as hunting, grazing, and timber exploitation, respondents felt that tourism too should contribute payments to the local *juntas vecinales*.

Regarding the extent to which wolf related tourism and hunting had the potential to actually generate revenue for the local community, informants had different opinions. Like in the PHGs of León, hunting in the RHR of Riaño was considered an important source of revenue for the *juntas vecinal*es. Famously, an Iberian ibex was sold for 67.000€ in an auction in the RHR of Riaño in 2012. Whilst some informants felt that wolf hunting could be organized in such a way to generate more revenue than it did, a few others claimed that based on past hunting auctions, the wolf's value was limited. On the other hand, wolves were largely seen to compete with hunters for valuable prey. Several informants expressed a strong sense of ownership over wild game "*if wolves don't cause damages to domestic livestock they cause them to wild livestock*"… "*they (the regional administration) should compensate wolf damages to wild game too because they take money away from the town*". Such narratives of wildlife ownership are likely to have been strengthened by a regional development policy and a hunting system that has made rural towns dependent on hunting and thus has transformed wildlife into a valuable economic asset. However, indications that some informants already related to wildlife in similar ways to how they related to domestic livestock, can also be found in their descriptions of the landscape and of their stewardship role within it (chapter 5). In this case, therefore, cultural and neoliberal narratives appeared to work together to define the meaning and value attached to wildlife. Most important of all, is that when informants roughly weighted the economic benefits and disadvantages of wolf hunting and tourism,

they sometimes concluded that conserving wolves was not worthwhile: "*before the juntas vecinales lived on hunting revenue but now there is no money left, because wolves are being protected and they are depleting game... it's good for the hotels but for the area in general it's bad*"… "*you can sell a wolf for 2000 or 2500 €, but if you compute all the game that the wolf eliminates you'll see that it's not worth it*"… "*in the end, breeding wolves is more expensive than what tourism can bring in*" (PHGs of Riaño).

7.4.3.4. Cangas and Somiedo

Cangas and Somiedo share very similar wolf management strategies. Neither treats wolves as a game species, both allow for wolf culling to be carried out by rangers, and wolf damages are fully compensated by the regional administration. However, two main factors differentiate between how land and natural resources are governed across the two sites. The first concerns the enforcement of hunting rules, as Somiedo consists of a regional hunting reserve in which hunters are always accompanied by rangers, and Cangas consists of both a regional hunting reserve and a regional hunting ground, in which hunting parties are not regularly accompanied by rangers. The second factor concerns the different land tenure systems in place across the sites and the different histories behind the creation of protected areas in the two municipalities. The effects of land tenure and protected area governance on local narratives of carnivore coexistence are explored in greater depth in Chapter 8, and so they will only be mentioned here briefly. In Cangas, tensions between private land owners and the protected area created by the Regional Administration have resulted in repeated legal litigations. In Somiedo, on the other hand, most land is public, the protected area is well established and viewed relatively positively by local residents.

Reflecting the relatively uniform wolf management structures in Cangas and Somiedo, attitudes and beliefs towards wolves did not vary significantly. This was despite Cangas having a much lower level of reported damages (0.31 livestock heads reported per farmers in 2015, yet 51 claimed to have suffered damages in past few years) compared to Somiedo (1.89 livestock heads reported per farmer in 2015, and 71% claimed to have suffered damages in past few years). In Cangas, in fact, farmers' attitudes towards wolves were often independent of their

reported experience of damages (table 7.2), suggesting that other factors were at play shaping farmer's views. Possibly, the conflict occurring between local resource users and the protected area has had a negative impact on how they view protected wildlife (see Chapter 8 for a more in-depth analysis).

Somiedo, on the other hand, had the highest level of reported damages out of all the study sites, and was among the sites where farmers most often expressed negative attitudes towards wolves (compared to the PHS of León, where damages were much lower). However, despite the fact that most farmers in Somiedo viewed wolves as incompatible with livestock activities and as needing greater population control, Somiedo was the site where the lowest percentage of farmers claimed that wolves were killed illegally (only 6%, compared to 61%, 17% and 13% in the other sites). These claims were validated by reports from local rangers and administrators.

Greater law enforcement, at least compared to the PHGs of León and Cangas, might explain this result, influencing the actual occurrence of illegal behaviour or, in any case, people's willingness to discuss it. Informants in Somiedo almost always citied ranger patrols and the consequences of being caught as the main reason why wolves were not killed illegally "*people don't do it out of fear of the consequences, you would be putting yourself at risk, before people did it all the time, but now there are laws*". However, informants also often mentioned having obtained a greater conscientiousness: *"people are aware that it is not allowed, they have internalized it, that's what the regional administration is for (to control the wolf population)" …"here people are very legal, we are small town people but we are noble… of course there can always be a moment of (weakness)*". One farmer and hunter mentioned that because rangers were first of all people's neighbours, nobody wanted to put them in an uncomfortable position. These accounts suggest that in Somiedo, law enforcement worked to constrain people's practices. It has however, not directly affected local views and subjectivities with respect to wolves, as informants in Somiedo openly criticized the regional administration's management of wolves and were just as likely as people elsewhere to claim that wolves should be eliminated. Such findings align with other researchers that have doubted the extent to which subjects' minds and worldviews can ever really be colonized (Scott, 1985; Cortés-Vázquez and Ruiz-

Ballesteros, 2018). For example, Cortés-Vázquez and Ruiz-Ballesteros (2018) found that individuals exposed to environmentality projects had moulded their practices to comply with new requirements and regulations, while still retaining their own views and beliefs , which they had developed through previous engagements with nature. Therefore, people can adopt conservation practices and narratives, but how they choose to embody and enact this new subjectivity will always be mediated by their interests and their historical engagements with nature. Both "old" and "new" subjectivities may at once inhabit people's minds (Cortés-Vázquez and Ruiz-Ballesteros, 2018). In the case of Somiedo compliance with rules may have resulted not just out of a "fences and fines" approach, nor from a disciplinary influence that has changed how local communities view and understand wolves, but rather it may have emerged from a voluntary and productive alliance between park authorities and local resource users (see also Scott, 1985; Forsyth and Walker, 2014). As discussed in the next chapter, even though Somiedo's park administration is not spared from criticism, the park is seen to have generally positively impacted the local development of the area, contributing support and subsidies, as well as promoting the development of a tourism and service sector. Local resource users and park administrators may be seen as having engaged in co-producing a narrative which depicts traditional practices as essential to maintain and conserve the natural environment and in doing so, have negotiated a commitment to each other's interests.

A final important element to consider when attempting to understand illegal hunting in general is how prevalent the behaviour was in the very recent past, and how this practice may have been reduced by the 1989 Hunting Law, which ensured hunting rights for local residents: "*before we were all poachers, because there were no checks and because we weren't allowed to hunt legally*".

7.5. Discussion

This chapter sought to shed light on the processes through which wolf governance approaches come to shape local practices and subjectivities. The main results indicate that the transition from environmentality to subjectivity is

never a smooth one, and regardless of the governance approach that is adopted, all of them are mediated by local interests and historical engagements with nature (Cortés-Vázquez and Ruiz-Ballesteros, 2018).

Overall, the quantitative data on farmers' and hunters' attitudes towards wolves depicts a reality of coexistence that is far from being free of conflict but where, nonetheless, local farmers overwhelmingly believe that wolves belong to the nature of the area and that, with improved management, they could become compatible with livestock activities. More than a third of the sampled farmers claimed that is important to conserve wolves, and more than two thirds of the sampled hunters claimed so. Considering that the majority of hunters and over one in three farmers view wolf conservation as important, results from this study are moderately positive. Local narratives of coexistence contribute a deeper understanding of how resource users situate themselves in relation to the local landscape and to the nature that they share it with. Overall, what emerges from the qualitative data suggests that the majority of local farmers are not opposed to wolf conservation, and instead favour an approach that might be summarized as "conservation with control". This view is one where people play a central role in maintaining a kind of natural balance that is conducive to an ordered and productive landscape. This invariably involves controlling wolf populations to maintain damages at an acceptable level. "Control" took on varied meanings that reflected informants' vision of what the proper relationship between humans and nature should be. In some cases, it suggested a level of culling that would be incompatible with wolf conservation.

Analysing wolf governance through an environmentality framework facilitates an understanding of the main conservation approaches being implemented in each site and how they differ. By then looking at how these approaches interact with communities on the ground, it is possible to understand some of the most fundamental tensions characterizing coexistence between people and wolves. The private hunting grounds of León offer an example where a high level of decentralization is associated with more open and relaxed attitudes towards the illegal killing of wolves and furthermore, is also associated with a stronger emotional attachment to the species. Considering how strongly local resource users value their autonomy and their role as environmental managers, this result

is not surprising. However, it does provide a definition of coexistence in which illegal killing is rather prevalent. On the other hand, Somiedo offers an example in which wolf governance is highly centralized. Here attitudes were comparatively more negative, yet illegal killing appeared to be rather limited. Such a difference is explainable through different levels of rule enforcement, but the qualitative data suggests that in Somiedo, compliance with rules may also have emerged from a productive alliance between local resource users and park authorities. These results suggest that attitudes do not predict behaviours in ways that are always self-evident, as proposed by the theory of cognitive hierarchy (see also Lauer, 1971; Scott, 1985). Instead environmental practices are the result of negotiations occurring between individuals and the governmentality approaches they are exposed to. Such negotiations can result in communities being enrolled in conservation behaviours, whilst still maintaining their fundamental views (Cortés-Vázquez and Ruiz-Ballesteros, 2018).

An important element of the environmentality framework is the notion that multiple environmentalities may be at play within any given conservation initiative, and that these approaches may be either in conflict with each other, creating tensions on the ground, or they may be in collaboration, helping to sustain one another (Fletcher, 2017). The example of the RHR of Riaño shows how even though wolf tourism is viewed positively by a significant portion of respondents, it nonetheless reflects tensions between neoliberal, community and truth or culturally-driven environmentalities. The current system through which tourism is managed by a private company was contested by some informants on the basis of how the economic benefits were distributed at the community level, and on the basis that wildlife tourism was thought to promote an idealized notion of wilderness that conflicted with farmers' and hunters' perceptions of nature. At the same time, results also raise doubts regarding the extent to which conservation approaches that solely rely on economic incentives can result in positive conservation and social outcomes.

Finally, like most other studies of farmers' attitudes towards large carnivores, this chapter highlights the sheer complexity of developing management tools that favour positive coexistence. Although based on a limited set of examples, and using only self-reported information, this study suggests that allowing for legal

hunting of wolves does not necessarily result in lower levels of illegal hunting (see also Chapron and Treves, 2016). Moreover, it also suggests that public compensation programs are not necessarily associated with higher levels of tolerance of damages (see also Naughton-Treves *et al.*, 2003; Agarwala *et al.*, 2010). This is likely due to the fact that different management tools and policies are not experienced in isolation, but rather depend on and interact with each other, producing multiple and, at times, conflicting environmentalities. How governance approaches are then received by individuals and communities, is furthermore mediated by their expectations, interests and historical engagements with the natural environment. In cases such as the ones presented in this chapter, where people and wolves have always coexisted and where there is a degree of tolerance that maintains viable population, managers should avoid introducing major changes that risk disrupting functional arrangements. They should, instead, focus on building productive engagements with local narratives of stewardship and with pre-existing coexistence mechanisms.

8. CHAPTER 8 Narratives of land tenure, protected area governance and bear recovery

8.1. Introduction

Large carnivores are often said to symbolize broader social struggles that go beyond the animals themselves (Chapron and López-Bao, 2014). The field of political ecology focuses on disentangling the political and economic conflicts that underlie conservation controversies. Although conservation may focus on nature, it is inherently concerned with political choices and negotiations between people, over what should be conserved and over what conservation means (Adams, 2015). When one social group asserts their interests over natural resources above the interests of another group, environmental issues acquire a social component (Robbins, 2012; Redpath *et al.*, 2013). Likewise, historical social conflicts that result in changes in natural resource management, ownership or conservation acquire an ecological component (Robbins, 2012).

Political ecology studies are typically concerned with uncovering the different layers of complexity that characterize conflicts over natural resources and their management (Robbins, 2012; Perreault *et al.*, 2015). When they take history into account, they can contribute an understanding of the conditions through which environmental conflicts, processes, and ideas have evolved over time (Adams and Mulligan, 2003). Studies in environmental history seek to trace the impact of humans on the environment by bringing to light political changes in resource management as well as changes in environmental attitudes, values and practices (Lambert, 2015; Pooley, 2016). A historical approach therefore, can serve to unearth the underlying causes of conflict between stakeholder groups or between governments and local communities, who are engaged over territorial or natural resource disputes. Acknowledging the roots that underlie disputes between stakeholders involved in conservation conflicts can be essential to repair trust and build consensus on the way forward (Sjölander-Lindqvist *et al.*, 2018).

Historical developments in tenure, access rights and division of labour are central to defining human relations with the environment, whether they are based on agricultural systems, hunting, forestry or other practices involved in extracting natural resources (Robbins, 2012; Perreault *et al.*, 2015). In this way, nature itself may be understood as a historical document or artefact, embodying the negotiations and practices of past generations (Ingold, 1993). On the other hand, among many actors entangled in negotiations over land use, nature and wildlife too have the potential to affect land conflicts and policy, and to reconfigure landscapes and social relations (Hobson, 2007; Evans and Adams, 2018; Jepson *et al.*, 2018). Brown bears are often considered to be among the most charismatic species in western Europe and given their highly territorial nature and endangered status, may be seen as emblematic of conflicts over land use and protection. Where they inhabit mixed use landscapes, bears cross paths with humans in forests, fields or along roads, when they enter towns, or when they feed on crops or livestock. Communities that have historically coexisted alongside bears, have developed several mechanisms to cope with negative interactions, including collectivized systems of livestock herding that contributed to determine the local division of labour and the types of land tenure arrangements in place (Gómez Gómez, 2006). Along with other species they were once (and in some cases still are) valued trophies, and their presence motivated the creation of private hunting reserves for wealthy elites. Nowadays, based on their conservation value and their requirements for large spaces and suitable habitat, bears have legitimised the need for protected areas and thus may be seen to have reworked the physical and social space they inhabit (Dempsey, 2010).

In this chapter, I will use a case study of two municipalities in the north west of Spain, to explore ways in which narratives over land tenure, protected area management and bear recovery, resonate with each other and serve to reinforce one another. I take a historical approach to illustrate the ideological influences and political struggles that have characterized the area over the past centuries, in order to explore the structural forces that underpin past and present land territorialisation policies and local interactions between humans and bears. The chapter will trace historical developments in land tenure and the history behind

the creation of two nature reserves in the municipalities. It will then look at the relationship between coexistence with bears, protected areas, and land tenure.

Finally, I will interpret local resource users' views of past and present territorialisation processes, through three main lenses: 1) "Nature as a resource", summarizes the struggles over the appropriation and protection of land and wildlife; 2) "Nature as heritage", summarizes the negotiations between local communities, park administrators, and tourists, to determine what aspects of local nature and culture should be valued and protected; and 3) "Nature as a commodity", summarizes local expectations regarding how the benefits of protected areas of bear tourism should be distributed among the local community.

8.2. Approach

This chapter relies on both secondary sources of historical and ethnographic text and on data I collected from local stakeholders and informants, through qualitative as well as quantitative interviews (based on a random sample of n=76 and n=67 farmers in Cangas and Somiedo, respectively; and a snowball sample of n=38 and n=34 hunters, and n=27 and n=13 beekeepers, in Cangas and Somiedo, respectively; see Chapter 4). Finally, I use data from the registry of damages caused by bears, provided by the Asturias Regional Administration.

8.3. Study Areas

Somiedo and Cangas del Narcea are two adjacent municipalities, found in the heart of Asturias' mountains (fig. 8.3). On first glance they appear similar, both are protected areas of historical bear presence and follow the National Bear Management Plan (MMA 1999). However, different social and historical contexts affect how the protected areas are perceived, and influence the meanings and symbolism that local communities attach to bears. Land tenure and its historical evolution marks an important difference between the two sites, and is a topic that has shaped local views regarding the legitimacy of protected areas and of conservation in general. On the one side, Somiedo is mostly composed of public

land, it is relatively small (291 km^2), and has very low human population density (5 inhabitants /km²). Historically, it was isolated and poor, and even today it has few amenities and services. The whole territory of Somiedo is part of a well-established nature reserve, which uses bears as a main tourist attraction. On the other side, Cangas del Narcea is bigger (825 km^2), comparatively more densely populated (18 inhabitants/km^2), and composed of a relatively diverse socio-economic structure. Most land is private, and the creation of a nature reserve in the southern part of the municipality (and two other neighbouring municipalities) resulted in legal action between landowners and park authorities. Similarly to Somiedo, it is an area of historical bear presence, but over the past years, bear encounters with humans seem to have increased and 2 poached bears were found in the municipal territory in 2016 and 2017. The following sections will trace the history and the evolution of discourses around land tenure, protected areas and bears, and the ways in which they are connected.

8.4. Land tenure narratives

8.4.1. A history of land tenure

8.4.1.1. Communal land during antiquity and the old regime

Up until the 7th century, land use in the Cantabrian Mountains was managed under a system of Germanic tenure, through which communities would communally access grazing areas and other natural resources. The first main change to the Germanic tenure system came under the influence of the Roman Empire, through the institution of large agricultural estates called *villaes*. These estates marked the first clear differentiation of social relations into a ruling class and a labourer class, and along with it, also created a differentiation between land owners and land users. This change began the gradual onset of a feudal regime which ruled over Spain until the end of the 19th century (Rodríguez-Vigil Rubio, 2005) and represented Spain's first main territorialisation process, through which a new system of land tenure established control over local resources and people (Vaccaro, 2005).

Under the feudal regime, between the 11th and 19th centuries, land tenure and organization was shaped by competition between Crown, nobility and church powers. Asturias remained the main catholic stronghold of Spain during the Reconquista (Manderscheid, 2003) and, as new territories were won over, settlers began to migrate from Asturias into newly conquered lands. Because the crown and nobility were tied up in war, the church was tasked with organizing the re-establishment of a settled population, and it did so by granting a series of privileges to local settlers, known as *foros* (Rodríguez-Vigil Rubio, 2005; Fernández Rodríguez, 2017). *Foros* essentially represented agreements stipulating that, while church and nobility remained the effective owners of land, local residents held rights of use over grazing areas and forests. Resources like livestock and beehives were owned by the monasteries or nobility (*la comuña*) but were cared for by the local communities, who paid the landlords up to half of the profits generated (Rodríguez-Vigil Rubio, 2005). These extensive properties were managed by landlords through parish districts, under very oppressive regimes. However, *foros* did provide for the right of local communities to participate in decisions that affected their everyday life (inscribed as *vozdevilla* or "voice and vote") (Rodríguez-Vigil Rubio, 2005). This right was normally institutionalized through neighbourhood associations called *juntas vecinales*, which were attended by male heads of households and tended to matters ranging from awarding grazing rights, organizing hunting parties, fixing public works etc.. (Fernández Rodríguez, 2017).

The relationship between nobility and church during Spain's old regime fluctuated from alliance to competition (Fernández Rodríguez, 2017). Second-born male nobility members would often enter monastic orders, consolidating alliances while also maintaining a strong influence of the nobility over the church. The decline of church power began around the 14th century, when large parts of Asturias, including the township of Cangas del Narcea and parts of Somiedo were handed over to the nobility (Fernández Rodríguez, 2017). Meanwhile the Spanish Crown had also begun to consolidate its power by establishing townships (*polas* or *pueblas*), with the intention of creating a local bourgeois or smaller nobility class that would act as a counterweight to the power thus far accumulated by the church and the extended nobility (Fernández Rodríguez, 2017). These new townships were effectively "public" administrative entities, so that when Pola de

Somiedo was founded in 1269 its inhabitants came under jurisdiction of the crown (Arango Fernández, 2011). This status was confirmed in the 14th century, when the Asturias kingdom claimed superior rights to township lands, laying the grounds through which local townships would come to contest the dominance of the nobility and clergy, by claiming state ownership (Rodríguez-Vigil Rubio, 2005). However, it was not until the land reform in the 19th century when the foundations of the municipal regime of the liberal state were laid, which tasked the municipal government of managing all public and communal land (Rodríguez-Vigil Rubio, 2005).

By the 18th century the nobility had lost interest in its rural estates and moved to larger urban centres. During this period, local communities and transhumant *vaqueiros* began to fence off areas to claim individual property rights over in-by land. These consisted of fields where fodder was grown and livestock kept during the colder seasons. Larger grazing and forested areas remained communally used and, at that point, many of them were still owned by church and nobility (Fernández Rodríguez, 2017). Despite these shifts in power the leverage held by the nobility remained strong, first as it extended its influence in township councils and in the kingdom's legislative and executive branches, and later through the dominant role in played in the land reforms of the 19th century (Fernández Rodríguez, 2017).

8.4.1.2. Land reforms of 1835 and 1855

The land reforms were prompted, on one side, by the economic crisis after the Crown had lost the colonies and had been engaged in several wars. On the other side, they were prompted by enlightenment and liberal ideologies that had gained traction across Europe throughout the 17th and 18th centuries (Manderscheid, 2003). The first land reform in 1835, known as the Mendizabal disentailment, involved the seizure and sale of church properties across Spain. In Asturias, because there was a lack of interest in mountainous lands from wealthy buyers, many church properties remained unsold and came into the hands of municipalities (Rodríguez-Vigil Rubio, 2005; Fernández Rodríguez, 2017). A second land reform in 1855, known as the Madoz disentailment, focussed on the sale of properties of the state and of municipalities, encompassing many of the

territories that had not been sold in the first reform. This reform was opposed by politicians and intellectuals and, a few months after it was declared, the Association of Forestry Engineers *(Cuerpo de Ingenieros de Montes*) was tasked with creating an inventory of state owned and communally used land. The Association was the first to adopt a scientific approach to land surveying and reforestation (often of non-native species), advocating for a rational exploitation of woodland and for the importance of forest cover in the provision of ecosystem services (soil humidity, clean upper watersheds etc…). The creation of the school of Forestry, in 1848, from which the Association of Forestry Engineers was developed, marked the institutionalization of science-driven forestry in Spain, and gave scientific legitimacy to subsequent changes in its land tenure regimes (Vaccaro, 2005). According to Manderscheid (2003), through its conservation advocacy and its framing of woodland as a public good, the Association of Forestry Engineers played a central role in promoting legislation that exempted from sale, properties of over 100 ha that were covered by oak, pine or birch, as well as properties that were used communally (Rodríguez-Vigil Rubio, 2005). The process of claiming communally used land as public resulted in the creation of the registry of *Montes de Utilidad Pública* ("forests of public use/utility") in 1901 (Manderscheid, 2003). Also significant during the period of the land reforms, was the suppression in Asturias of the Juntas Vecinales, which had previously sanctioned the relative autonomy of local communities over the use of natural resources (Fernández Rodríguez, 2017).

Text box 1. The ideology behind Spain's land reforms

Two main narratives dominated the struggles over public and private ownership during the land reforms, representing the deep ideological rifts that characterized Spain at the turn of the century. On one side were the liberal thinkers who viewed state lands as unproductive and as a threat to public order:

"*The communal use of towns and all other socialist practices must disappear, and this confused, irregular, and primitive use must make way for private property, seed of progress and guarantee of efficient order. (A front must be created) against the agricultural socialism which, although more meek in comparison to the turbulent socialism that is sprouting up in (Spain's) industrialized centres, nonetheless weakens the country*."

Jose Echegaray, Finance Minister, 1873
(in Rodríguez-Vigil Rubio, 2005)

On the other side were the conservatives, the conservationsists, and the progressive intelectuals (Manderscheid, 2003):

"*Only the state has the life, interests and necessary means to breed, conserve and exploit woodlands. The sale of woodlands would cause their irredeemable ruin, placing them in inept hands (…) Without (imposing limitations on the land reform), woodlands would quickly be converted into cultivations and intensive logging would (for ever destroy) the masses of timberland accumulated through centuries. What would be the purpose of the land reform if it served to perpetuate the catastrophes that fill the lower classes with tears? What would be the use of expanding cultivated land if there is no certainty of maintaining temperature and humidity? The expansion of property requires the protection of collective interests (…) and the respect of the limits set by Eternal Reason, between fields and woodlands*."

Report on the land reform by the Association of Forestry Engineers
in the 1850s
(in Manderscheid, 2003)

Elements of the conservationist discourse rooted in state property are still evident in the language used by the Association of Forestry Engineers today:

"(Montes de Utilidad Pública) are a symbol of political and ideological resistance. From the very beginning, (they) served to conserve forested land that, due to its peculiar characteristics, merited the honour of being protected from the ambitions of man."

(https://www.ingenierosdemontes.org/cns/historia-imo-9.aspx)

In the midst of this conflict between the state and the upper class, some local communities jointly acquired the land they occupied, either during the land reforms or subsequently. They did so often by accruing large debts (Rodríguez-Vigil Rubio, 2005). The lands acquired by local communities are now under a property regime known as *pro-indiviso*. Transhumant *vaqueiros* were the first to redeem their property and freedom. They began this process prior to the land reform, between the 14th and the 18th century, when they became owners of their livestock and fenced off in-by land. In the 18th century they redeemed the

jurisdictional dominiom that weighed over them[14], and by the late 19th and early 20th century they had acquired several communal grazing lands (Arango Fernández, 2011). This long struggle for autonomy gave rise to a popular saying with which transhumant *vaqueiros* refer to themselves as freemen and owners of their soil "*from the pebble in the stream to the leaf in the tree*" (in Arango Fernández, 2011).

8.4.1.3. Land tenure in the 20th century

Asturias' coastal and industrial towns were fertile grounds for the social unrest that swept through Spain in the early 1900s, culminating in the declaration of the Second Republic of Spain (1931), followed by the Spanish Civil War (1936-1939) and the fascist dictatorship under Franco (1939-1975). The mountainous areas of Asturias however, remained relatively untouched by the agrarian reforms of the Second Republic and of the Fraquist era[15]. Instead, under Franco, plans to increase the productivity of forested areas intensified the municipalization of communal land (Rodríguez-Vigil Rubio, 2005). Through the municipalities, communal lands with high timber value, including several *Montes de Utilidad Pública*, were entered into partnerships with the state forestry department to arrange logging concessions. These would provide the wood needed for Asturias' coal mines and industries (Rodríguez-Vigil Rubio, 2005). The logging concessions were developed without the local communities being consulted. Many farmers were encouraged to abandon their livestock and were employed as tree planters in former grazing areas, but once the plantations had been established they were left unemployed (Varillas, 1980). In Ibias and Allande, both municipalities that border Cangas del Narcea (the former is also currently part of the nature reserve Fuentes del Narcea), such logging concessions caused strong confrontations between farmers and the administration (Varillas, 1980). Arson of forested areas became the habitual response of dispossessed neighbours (Varillas, 1980; Rodríguez-Vigil Rubio, 2005).

[14] Around that time Gua and Caunedo, in Somiedo, had also been redeemed by neighbours (Arango Fernández, 2011)

[15] In which irrigation projects and "colonization towns" were built to provide agricultural land to labourers.

During Spain's transition to a democracy in the late 1970s early 80s, *Montes de Utilidad Pública* went from being a source of state income to being a figure of environmental protection. The forestry management of *Montes de Utilidad Pública* was transferred from the municipal to the regional level, even though their property remained either municipal or, more often, sub-municipal (at the level of *parishes*)[16]. This change was coupled with large investments, which began to flow into Asturias' marginal areas from the regional government. The Spanish constitution contains an article that provides for special treatment of mountainous areas[17]. While up until the 1970s, mountainous communities survived on a subsistence economy of farming and cultivation, subsidies by the state and later by the Common Agricultural Policy promoted the professionalization of the livestock sector. Meanwhile, roads, electricity and other services poured into previously isolated towns (Rodríguez-Vigil Rubio, 2005).

8.4.2. Present day communal land tenure

The different ways in which the land reform played out across the landscape generated three main present-day types of communal land tenure[18]. Before delving into them, it is worth noting that although the direct translation into English of the Spanish word *monte* is "mountain", the term actually has a broader meaning and refers to all forest and pasture land, as well as mountainous land (Manderscheid, 2003). The first communal land tenure system is a form of public land called *monte comunal*. Ownership belongs either to the municipality [19] or to a sub-municipal entity (parish), and use rights belong to the people who reside

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[16] Ley del Principado de Asturias 3/2004, de 23 de noviembre, de Montes y Ordenación Forestal
[17] Article 130
[18] State laws governing land tenure

- *Ley 55/1980, de 11 de noviembre, de Montes Vecinales en Mano Común*.
- *Ley 43/2003, de 21 de noviembre, de Montes*, which in Art. 11 establishes a classification of the land tenure.

Asturias Laws governing land tenure

- *Ley del Principado de Asturias 3/2004, de 23 de noviembre, de Montes y Ordenación Forestal* (articles 102 onwards)

Decreto del Principado de Asturias 23/2007, de 14 de marzo, which rules how to classify and manage a Monte Vecinal.

[19] When they are owned by the municipality, rather than sub municipal entities, use may be extended to residents of the municipality who do not reside on the specific stretch of communal land (Rodríguez-Vigil Rubio, 2005)

on the land, following principles of indivisibility and inalienability[20]. Montes de Utilidad Pública are only found on this type of land tenure system, but whatever the level of forest protection, the revenue generated from the land's natural resources must be redistributed among neighbours that hold use rights[21].

The two remaining types of communal land tenure are both variations of private property. *Montes vecinales en man comun* are in essence very similar to *montes comunales*, as they are subject to the same principles and are also not taxed. However, they are owned by groups of neighbours rather than by public administrative entities: these include all the residents of the towns found on the land, at any given moment (referred to in the legislation as "houses with smoking chimneys"). Revenue generated from *montes vecinales* must be divided equally among its members or invested in public works. *Montes pro-indivisos* differ *from montes vecinales en man común* because they are taxed, individual shares can vary in size and can be sold and inherited, which means that land owners may not necessarily live on or use the land (often having emigrated). Many communities that acquired land after the land reforms did so under this type of property system. Finally, the land reforms also resulted in large stretches of previously communal land becoming non-communal private property.

There is significant confusion regarding the names used to describe the various tenure systems. This confusion arises from the inscription of custom into law, whereby expressions such as "*man comun*" and "*indiviso*", traditionally used to describe communal land tenure in general, now denote specific legal types of tenure. Notions of historic use rights also manifest in the use of words that imply ownership, even when referring to land that is now the legal property of public institutions.

[20] Indivisibility: the land cannot be divided between the co-holders as they are not assigned quotas or allotments. Inalienability: the mountain cannot be sold, donated or ceded, in whole or in part. Moreover, the property of mountains cannot rightfully be taken away, lost, or revoked

[21] The financial precariousness in which most municipalities find themselves make them very dependent on the income they generate from public lands. This is even more so for accessing EU funding for several rural development initiatives in Pillar 2 of the CAP, which require matching funding. (Rodríguez-Vigil Rubio, 2005)

8.4.3. Local perceptions of land tenure in Somiedo and Cangas

Nowadays, in Somiedo 82% land is *monte communal* which, in the large majority of cases, is owned and managed by parishes. Despite the fact that 79% of its communal lands are *Montes de Utilidad Pública* (Fernández Rodríguez, 2017), Somiedo was never entered into partnerships with the forestry commission, because it was largely inaccessible (personal comm., of Forestry Engineer). Instead, it formed part of a private and a national hunting estate, up until 1979.

In general, land property was not a topic that came up spontaneously in the interviews in Somiedo. When specifically asked, most interviewees claimed that the land was public but in reality, owned by the village: "*the mountain is public, undivided, owned by the town*"… "*if you are part of a parish you can access any part of the mountain*" (both farmers from S). The tone of the large majority of people's responses was relaxed, as if in acknowledgement of a fact. However, two villages, whose land is owned and managed directly by the municipality (rather than the sub-municipal entity) were reportedly in the process of claiming private ownership under the communal tenure system known as *monte vecinal*. According to an informant, a more local management would increase the efficiency and speed with which several issues could be addressed, like the repair of roads to access high grazing areas.

On the other hand, most land in Cangas del Narcea is private, and so most farmers graze livestock on communal or non-communal private land. The interviews with local farmers highlighted a strong feeling of property among many, and a perception that property was under threat: "*the regional administration believes the mountains are everyone's, they forget that this is private property*". One informant who had moved to the area in the past decade, told of how it took a long time before he was able to acquire use rights to the mountain: "*people here very much appreciate ownership ("what is theirs") and prefer for their grandparent's house to fall apart rather than sell it*". Among some farmers there was a feeling that communal use was less productive, and could be done away with, altogether: "*this mountain used to be owned by all the neighbours but we divided it into equal parts. We cleared it and ploughed it, and turned it into productive land*". Similarly another farmer believed that the land he owned along

with others under *pro-indiviso* tenure would be better managed if it were split up into separate plots and allocated to each owner. Later, when talking about the management of large carnivores by the regional government, the same farmer exclaimed: "*my field, my cow, my house, your bear: my fault?*".

However, such strong views against communal tenure were voiced only by a minority. One informant spoke of negotiations that were being carried out within his village to claim private property of a mountain that was currently public and included in the registry of *Montes de Utilidad Pública*[22]. This informant was in favour of adopting the semi-private land tenure system of *monte vecinal en mancomun*, describing it as the most democratic way of managing land. In his view, by instituting a *monte vecinal*, the community would be able to form a local governance structure that would involve all neighbours in land management decisions. Still according to him as well as a regional public official, the "smoking chimney" type of ownership envisaged under *monte vecinal* tenure was preferable to the inherited ownership envisaged under *montes pro-indivisos*, because inheritance by people who have migrated hinders decision making and management. Several other farmers that owned land under the *pro-indiviso* system lamented high taxes and, additionally, claimed that public lands were privileged in negotiations for Common Agricultural Policy payments.

8.5. Protected area narratives

As evidenced in the previous section, conflicts over land tenure have a long history and are still unravelling today, in different ways across the Asturian landscape. The following section will first trace the creation of nature reserves in Somiedo and Cangas, and illustrate how local discourses over land tenure and protected area management have shaped one another.

[22] Via legal procedures, villages that can prove historical ownership of land can claim private ownership, and thus be excluded from the registry of Montes de Utilidad Publica.

8.5.1. The protected areas in Somiedo and Cangas

Somiedo's nature reserve was created in 1988[23]. The transition from a hunting reserve to a protected area was relatively smooth, as the park effectively entailed a more local form of government. According to the mayor who was in power at the time, Somiedo's villages were informed of the plans to create a nature reserve and local needs were considered in the designation of restricted access zones. The creation of the park followed Spain's transition to a democracy and coincided with significant investments into Asturias' rural areas. The main road of the municipality was repaved, and through the 80s and 90s several secondary roads were built to connect isolated villages (Arango Fernández, 2011). Livestock farming underwent several structural changes under the Common Agricultural Policy, but remained the main economic activity of the municipality, employing the largest portion of its residents[24]. The creation of the park significantly increased CAP subsidies to the local livestock sector, even though farmers now claim that park subsidies have been reduced. The service sector also grew considerably since the park was first created[25], with tourism being the most significant source of income. Moreover, in 1989, the regional hunting law (see chapter 6) promoted an important change in local communities' relations with the natural environment, as it provided hunting rights for local residents. Finally, public perception of the park was likely aided by the fact that local politicians supported the park's creation from the very beginning: *"This was the first park of Asturias, the recovery of bears began here. It is probably the most restrictive protected area … and yet it has been the economic motor of Somiedo. The park has brought development and wellbeing to an area that was previously destitute… In Somiedo, as in much of Europe, the environment is the result of thousands of years of livestock breeding and agriculture, there is nothing that has not been the product of human and livestock activity. In 2000, (we worked to enlist) Somiedo as a UNESCO biosphere reserve, to reflect our plans for a more*

[23] Ley 2/1988 de 10 de junio

[24] Cattle became the main species of livestock. The number of cattle farms decreased from 333 in 1986 to 182 in 2009, but the number of cattle heads has increased from 3860 in 1986 to 6540 in 2009. Milk production, which in 1987 was carried out by 91 farmers, has disappeared completely. The agricultural sector in 2008 employed 50% of (employed) residents and generated 28% of gross added value in the municipality.

[25] The service sector in 2008 employed 47% of (employed) residents and generated 62% of gross added value in the municipality

sustainable development. There is no greater ecological disaster than an abandoned town, (and) local livestock activity is a fundamental part of Somiedo's biodiversity." (Mayor of Somiedo, from 1996 until today). Therefore, the creation of the Somiedo's protected area was facilitated by several factors. Broader socio-economic changes paralleled the institution of the park and brought a significant improvement in life conditions. Public land tenure and a relative homogeneity of the local economic and social fabric, facilitated governance. Meanwhile, the benefits of the park were advocated by leaders that held close relations with local communities and that established a narrative that placed value on conserving both biodiversity and cultural heritage.

On the other hand, the Fuentes del Narcea Reserve was created in 2002[26], during very different times and in a relatively heterogenous social and political context. The park stretches through three municipalities, including the southern part of Cangas del Narcea[27] (fig. 8.3). The portions of the park that were entered into logging concessions with the state forestry department during the Fraquist era, are known as places where arson and confrontations with the authorities took place (Varillas 1980). Subsequently, throughout the 1970s and 80s, coal mining became the driving economic activity of the area, generating considerable wealth, growth of the service sector and investment in public services. As coal mining dwindled in the 1990's, through national labour unions, local miners were able to negotiate hefty early-retirement payments. At that point, after having played a secondary role for several decades, livestock breeding returned as an important economic activity and today, many farms are registered under the name of female heads of households, to enable the men to receive mining retirement payments. Although the area remains supported by the "golden years" of mining, the park was created during a time of economic decline.

Following legal action by land owners in 2013 and again in 2016, the management plans for the park were suspended on the basis that they did not provide an adequate budget to carry out the development plans that had been established by the park, and that they were developed without sufficient involvement of local interest groups. These rulings rendered Fuentes del Narcea

[26] BOE-A-2003-1811
[27] 475.89 km2, including 53% Cangas del Narcea, 88% of Degaña and 18% of Ibias

park virtually inoperative, since a new plan has not been approved yet and since the park cannot receive funding, and therefore deliver subsidies, without a management plan. Hunting activities have also been suspended in some areas of the park on request of the landowners. On a regional scale, the rulings prompted a change in the law that regulates protected areas, in favour of an increased representation of the affected parties within the regional park management boards[28].

8.5.2. Local perception of protected areas

Opinions on the protected areas in Somiedo and Cangas del Narcea were nuanced. In Somiedo, respondents discussed both positive and negative aspects of living in a protected area. Although they questioned park regulations, the large majority did not contest the existence of the park itself. In terms of the benefits, informants mentioned that the park contributed to Somiedo's development, by providing additional subsidies to livestock activities and by funding various public services (specifically access routes to pastures, clearing of grazing areas, restoration of ancient *brañas* or herder shelters, access to water holes etc.). Most respondents claimed that tourism had a significant economic impact in the municipality, while some also mentioned the social benefits of having visitors and expressed pride for the fact that through the park, Somiedo had become known to the rest of the world. On some occasions, respondents mentioned how the park supported and "*cared for*" the interests of livestock farmers (Somiedo). In terms of the negative aspects of living in a protected area, most informants discussed several restrictions imposed by the park, including limitations on the construction of new buildings and stables, rules for the restoration of old buildings, limitations on clearing land, carrying out controlled burns, collecting firewood, fixing roads to access high pastures, and increased bureaucracy and requirements to obtain permits to conduct the above activities. Several informants also mentioned how the park offered increased protection to wildlife, thereby promoting the "*uncontrolled*" proliferation of wolves and bears: "*a park without*

[28] BOE-A-2017-15287; which came into force after the interviews with farmers and other informants were carried out.

wild animals wouldn't be a park, it's beautiful but they cause a lot of damages" (Somiedo).

Although a majority of respondents saw a positive side to the park, there were also respondents who held strongly negative views, mentioned disputes with park or local authorities, and felt that the disadvantages of the park outweighed its benefits. For example one farmer lamented tourists' lack of respect for private property and the pretence of park authorities to legislate on private land. At the same time, some informants recognized the challenges experienced in the park as the same as those experienced in many other rural areas of the country. They explained that Somiedo was already suffering from depopulation when the park was created, and that legislation protecting carnivores and regulating prescriptive burns applies to all of Asturias and not just the park: "*under the park you can keep living as before, the restrictions are mostly for tourists but not for locals, with small things such as obtaining a permit to burn you can carry on as before*" (Somiedo). Overall, the reduction of subsidies given to farmers for carrying out livestock activities in a protected area poses, by far, the biggest challenge to the image of the park: "*all of this has stopped, there is no money for anything anymore and we are left with bureaucracy*" (Somiedo).

In Cangas del Narcea, opinions were more negative. Several informants viewed the prospect of having a park in the area favourably, but almost everyone disagreed with the way it had been done. Tourism and increased subsidies to the livestock sector (in the earlier years of the park) were mentioned as pros, whilst similar limitations as those referred to in Somiedo were mentioned as cons. However, allegations against the park in Cangas differed from those raised in Somiedo, on various levels. Firstly, informants in Cangas claimed that the park interfered with the exploitation of timber and coal: *"land owners see the park as harmful because it limits the possibilities of profiting from what is theirs. Until the 1950s there was an intense exploitation of timber in (two localities of the park)"* (Cangas). Secondly, several informants claimed that an equitable distribution of the costs and benefits of having a park would require finding ways to compensate all those affected, and not just livestock farmers. Specifically, informants leveraged land tenure as a way to claim financial retribution and greater political

representation: "*we went to court because they want to create a public park on private property*" … "*the park exists thanks to the people that live in it… the subsidies that parks such as Somiedo use to fix roads, in our case should be paid directly to private owners. The money should go through the neighbourhood association , and we should be allowed to participate in park decisions, to (ensure the development of) infrastructure and businesses*." (Cangas). A few informants voiced scepticism of state subsidies and instead viewed property as a more secure assurance of wealth and autonomy. Some reportedly hoped to negotiate expropriation payments, whilst others were moving towards claiming private property of publicly owned land (either under *monte vecinal* or *monte pro-indiviso* tenure).

Whatever their reaction, the large majority of informants wanted greater participation in park management claiming rights of "*voice and vote*". The perceived lack of transparency through which decisions were made undermined the legitimacy of park governance and also contributed to a series of uncertainties and misunderstandings regarding park regulations and the state of the park after the recent legal disputes. This resulted in false claims that the park banned hunting, shut down coal mines, and stopped subsidies on purpose or due to corruption. According to some informants the majority of the population was not actually aware of the contents of the park management plan, and assumed it to be more restrictive than it actually was.

8.6. Bear recovery narratives

In the mid 1900s, following centuries of heavy offtake from hunters and local communities, bears were critically endangered. The earliest population estimate available reported the presence of only 13 breeding females in all of the Cantabrian Mountains in 1989-1990, split into two isolated populations. Since then, the population has undergone a remarkable recovery (Gonzalez *et al.*, 2016). It now numbers 81 breeding females and enjoys greater connectivity (FOP, 2015). The following section will trace the history of coexistence with bears, and how bear recovery narratives have become entangled with historical and current developments.

8.6.1. A history of coexistence with bears

Under the old regime, both livestock and beehives belonged to *la comuña* as assets owned by landlords and cared for by local communities. *Cortines* are ancient structures that were used to protect beehives from bears (fig. 8.1). Traditional herding practices known as *veceras* (see chapter 5), on the other hand, were employed throughout the history of livestock breeding in the area, up until recent times, in order to guard livestock from carnivore depredations and other risks. Livestock were herded into groups according to species, age and purpose, and kept in progressively farther pastures according to their vulnerability. Designated herders would take care of the livestock in the pastures, day and night: "*our ancestors used to spend the night in the mountains and light a fire, to keep warm and to scare away the wild beasts*" (Somiedo). Under the old feudal regime, veceras became obligatory in the whole territory of Asturias through regulations passed in 1781 (Rodríguez-Vigil Rubio, 2005). Another herding system that ensured the close vigilance of livestock was transhumance. *Vaqueiros* are a group of transhumant herders that emerged in the 14th century, when they were employed by landlords to herd cattle across long distances.

Due to their value as hunting trophies, bears, like livestock, were also owned by landlords. Bear hunting was prohibited to local communities, while wealthy hunters and political elites held exclusive hunting rights in Somiedo's National Hunting Reserve and private hunting reserve of a nobility family. In a collection of memories and folk stories from Somiedo put together by Martínez Rodríguez (2018), older townspeople remember when wealthy hunters would hire locals to help them hunt bears. When the trophies were brought down into the villages to be prepared and carried away, village children would rush over as it was likely to be their only chance to be immortalized in a photograph (fig. 8.2). This collection of oral histories contains many stories of villagers' peaceful encounters with bears (Martínez Rodríguez, 2018). Several stories also recount how bears were killed illegally by local residents, either because hunters gained prestige by performing a role of "defenders (and) protectors of (their) territories", when bears transgressed barriers (Bobbé, 1993), or because they would sell the fur on the

black market (Martínez Rodríguez, 2018). More often, bears are said to have been hunted out of hunger: "*we have a saying that goes: 'if you want meat, kill a bear'.*" (Martínez Rodríguez, 2018). The fur of the bear would be burned to erase the evidence and the meat shared within the community (Martínez Rodríguez, 2018).

Socio-economic changes affecting the area at the end of the 20th century are likely to have reduced the vulnerability of local communities to bear damages and relieved poaching pressures. Following the professionalization of livestock breeding and the growth of the mining sector, agriculture was almost completely abandoned as a livelihood means (Chapter 5). Maize and fruit, both prized by bears, became a supplement rather than a staple, as disposable income increased. Although small livestock species that are more vulnerable to bear depredation are still kept by a few farmers, they were also largely replaced by cattle. Similarly, traditional beekeeping declined, whilst the professional beekeepers that are now emerging in Cangas are better equipped to invest in bear damage prevention. Moreover, in 1973 bears became completely protected by national law and, once the regional administration began compensating damages, bears became the legal property and responsibility of the state. Ranger presence increased across the whole territory, especially within protected areas. Worth mentioning is also the presence of an NGO[29], dedicated to bear conservation, with staff in both Cangas and Somiedo. For the past decade, the NGO has engaged in bear monitoring, anti-poaching activities, education and awareness raising, mostly in schools but they also run a "bear museum" in Somiedo.

8.6.2. Present day coexistence with bears

Results from the representative sample of livestock farmers and the snowball sample of hunters and beekeepers (Appendix 8) show that attitudes towards bear conservation are overall positive in both sites, and consistently more positive in Somiedo. The majority of farmers believe that it is important to conserve bears (78% in Somiedo and 60% in Cangas), as do an even higher proportion of

[29] Which was my initial point of contact in field

beekeepers (85% in Somiedo and 82% in Cangas) and hunters (94% in Somiedo and 82% in Cangas). Respondents' narratives attested to a normalized and longstanding coexistence with bears. More than once, informants referred to bears as "another neighbour", and a few mentioned how they felt connected to bears and sometimes spoke to them when they saw them from their window, walking through the town and eating their apples. On various occasions, informants claimed to be tolerant of bear damages and, in the case of beekeepers, many accepted the need to protect beehives from bears.

Some respondents mentioned that attitudes towards bears had changed significantly over time because of damage compensation, greater "*conscientiousness*", and because bears had turned into allies, by virtue of generating revenue through tourism. The proportion of farmers that viewed bears as a tourist attraction was considerably higher in Somiedo (100%), where the tourism industry is more developed, than in Cangas (61%). Moreover, tourism was valued more positively in Somiedo, where almost everyone agreed that it contributed to local development, and that the disadvantages it brought were mostly outweighed by benefits: "*for livestock farmers, bear tourism isn't good, but it generates revenue for the municipality and income to the hostelry sector. Tourism doesn't bother me, it doesn't give me anything either, but we all need to live of something, right? The more work there is the better* "(Somiedo). On the other hand, tourism was viewed with more suspicion in Cangas. Many did not see it as a feasible or desirable activity and furthermore, some informants voiced disagreement with how the benefits of tourism were distributed "*bear tourism would be good but it should be done in agreement with local people. It should generate income for the landowners, not just for the administration*"(Cangas). One informant felt that bear tourism activities should be kept separate in space from livestock activities, reflecting divisions in public and private land tenure: "*bears should be kept in enclosures in Montes de Utilidad Pública, so that tourists can come see them and stay in local hotels and restaurants*" (Cangas).

Bear recovery was associated with protected areas in two main ways. Firstly, bears and protected areas were referred to interchangeably as causing restrictions and limitations to local activities. Informants mentioned that because of bears, hunting parties were interrupted, certain areas could not be accessed

or developed, paths and roads could not be restored and mountain sports were forbidden. Secondly, in relation to restrictions on logging, land clearing and prescriptive burns, both bears and protected areas were associated with the gradual replacement of grazing areas by shrubland and forest. Expressions like "*the mountain is eating us*" and "*(shrubs) are invading and circling us*" were common in both sites, and depict a vivid picture of wilderness encroaching on domestic space. The reality of landscape change was felt strongly by the elder informants, who claimed to hardly recognize the view from their windows. The direct causes of landscape change (depopulation, the abandonment of goat and sheep farming, and greater regulations on the use of fire), were often seen as deliberate outcomes of policy: "*they want to kick us out to have bears*"(Cangas)… "*Grazing areas are decreasing and wild beasts are reaching our homes because they don't let us clear and burn*" (Cangas)… "*instead of (clearing) mountains, they want more trees for the bears to roam* " (Cangas). This perception was accentuated by recent changes in the Common Agricultural Policy that significantly reduced payments to farmers that graze livestock on shrubland. Farmers claimed that grazing land they had used for centuries was now considered unsuitable even though their livestock continued to feed on it. In this way, narratives of bear recovery closely resonate with narratives of current and past territorialisation processes, which are seen to devalue traditional livelihoods and to displace local residents in order to favour activities of timber extraction or conservation.

Although the association between bear conservation, forest protection and land dispossession was made across both sites, it was articulated much more explicitly in Cangas, where conflicts over land tenure and protection were more pronounced and where bear recovery was perceived more negatively. Despite Somiedo having higher bear densities (fig.8.3) and despite the two areas having similar bear damage levels (Appendix 7), in Cangas bears were perceived by farmers as a greater threat to local activities (Appendix 8), and their population was deemed by over half of the farmer sample as being too large and in need of being controlled.

Figure 8-1 Ancient structure used to protect beehives from bears, known as cortin

Figure 8-2 Photo of a bear hunted in Somiedo, surrounded by the village children (in Martínez Rodríguez, 2018; photograph by Carlos Florez Lorenzo, Mueso del Pueblo de Asturias).

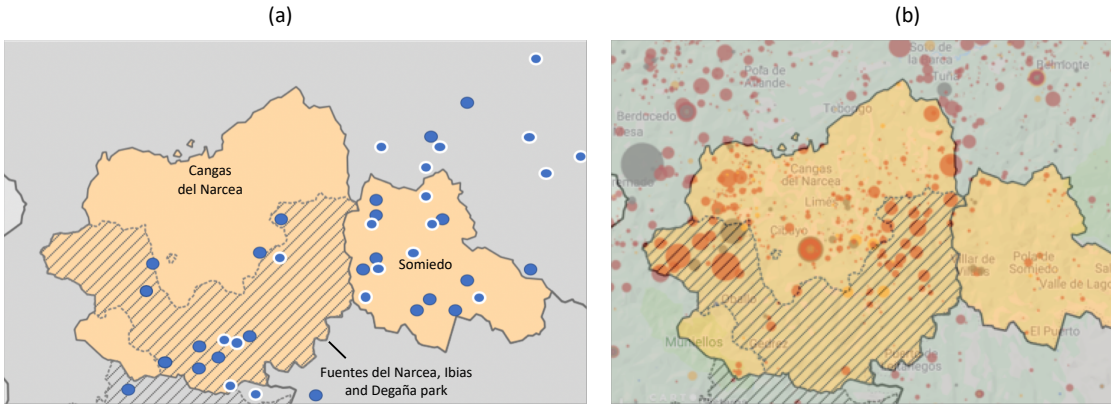

Figure 8-3 Maps of (a) female bears with cubs (FWCs) (FOP, 2018) and (b) arson events during the between the years 2001 and 2015.
Cangas del Narcea= 15 FWCs / 823.57 km^2; Somiedo= 18 FWCs / 291.38 km^2. The points with a white border are FWCs from the year 2016 and the points without a white border are FWCs from the year 2017. FWCs estimates are always counted over two consecutive years to account for female bear reproductive rates.
(b) Fires marked in red refer to known arson events, the cause of the fires marked in grey are unknown, and fires marked in yellow were caused by accident or negligence. The image was taken from Fundación Ciudadana Civio (2015).

8.7. Fire as a manifestation of conflict

Fire has been viewed throughout history as an element of both ecological destruction and ecological regeneration, occurring naturally or being actively employed to shape and remodel physical landscapes (Kull, 2002). Fire can also be seen to play an important role in the reconfiguration of political landscapes, having been used as a tool across many different contexts, from land conquest to social protest (Manderscheid, 2003). Both Agrawal (2005a) and Guha and Martinez-Alier (1997), report forest arson by local communities in India to protest colonial government, and specifically the confiscation of local peoples' communal land by the forestry department. Throughout Spain, the use of fire as a traditional scrubland management tool is widespread (Molinero *et al.*, 2008), and still today, it is primarily used to clear pastures (Herrera, 2014). Viewed traditionally as a necessary component of "orderly" land governance, the perceived positive properties of fire are culturally articulated through words that refer to burning as "*cleaning the mountain*", and to shrubs as "*maleza (badness)",* originating from "*malas hierbas (bad plants)".* The earliest laws regulating the use of fire in Spain date back to the 14th century, when the first tree plantations were created to provide wood for the Spanish fleet (Manderscheid, 2003). Severe punishments

were handed out to communities that used fire in plantation areas, and in the 16th century it was forbidden to graze livestock on burnt land without permission from the council (Manderscheid, 2003).

In a report commissioned by the Institute for Nature Conservation in 1976, Varillas (1980) found that the large majority of forest fires affecting Asturias at the time originated as arson carried out by local communities in protest against their land dispossession to create timber plantations. Large sections of Asturian forest (8,835 km^2) were destroyed between 1960 and 1980. Among the most affected municipalities were Ibias and Allande, both neighboring Cangas (and the former is also included in the Fuentes del Narcea, Ibias and Degaña park). Despite strong regulations[30], unlicensed fires remain a reality throughout Asturias and occurred with special intensity in 2015 and 2017.

In both Somiedo and Cangas, livestock farmers viewed the "*controlled*" or "*responsible*" use of fire as a widely acceptable and versatile land management tool. However, fires occurred with much higher frequency and intensity in Cangas than in Somiedo (fig. 8.3) When discussing the causes of the fires that took place over the past years, in Cangas many informants recalled old confrontations with the forestry department, recent confrontations with the park administration over land property and compensation, conflicts with wildlife, and a myriad of other causes[31]. Most of all, and in line with the information collected by Fundación Ciudadana Civio (2015), informants claimed that fire was used to clear grazing areas and access routes to pastures, and "*for the general cleanliness*" and upkeep of the mountain, which some informants viewed as being in a state of neglect and deterioration. Most informants attributed illegal and "*uncontrolled*" burns (referring to fires that spiral out of hand) to the difficulties local residents experienced in obtaining permits from the park and municipal governments to carry out "*controlled*" burns. Lack of public funding for manual or mechanical land

[30] Under current laws, any use of fire is prohibited unless authorised by the regional administration. Activities that may prevent the regeneration of flora (including grazing) are prohibited for at least 1 year after fires occur, while land use change is prohibited for 30 years. Properties where over 50% of the land surface is affected by fire may be excluded from subsidy payments for 5 years following arson (Ley del Principado de Asturias 3/2004, de 23 de noviembre, de Montes y Ordenación Forestal)

[31] Involving farmers, timber interest groups, hunters, firemen, litigious neighbours, pyromaniacs, foreigners etc…

clearing[32], and changes in the CAP funding for shrubland, were also mentioned as important motivations. In this way, fire was used as a tool to protest both past and current territorialisation policies and to resist undesired changes in the local landscape.

8.8. Discussion

Local resource users' views of the territorialisation processes unfolding in Somiedo and Cangas, can be interpreted through three main lenses. "Nature as a resource" summarizes the local struggles over the appropriation and protection of local land and wildlife. "Nature as heritage", refers to the negotiations between local communities, park administrators, and tourists, to determine what aspects of local nature and culture should be preserved. Finally, "nature as a commodity", pertains to local expectations regarding how the benefits of protected areas and of bear tourism should be distributed. In the following sections, I discuss these three components in more depth.

8.8.1. Nature as a resource

In both Somiedo and Cangas, the evolution of land tenure, the creation of protected areas and the history of coexistence with bears are linked by structural forces that over the past centuries have mediated relations between public and private interests. In this context, the interactions between local populations and conservation interventions cannot be understood without considering the history of local struggles over sovereignty between local communities, landowners and the state (see also Homewood, 2010).

The processes of territorial appropriation, rationalization of resources, and conservation that are unfolding in Somiedo and Cangas, mirror situations elsewhere in which conservation policies have reproduced past social conflicts (Brockington and Igoe, 2006; West *et al.*, 2006; Homewood, 2010; Adams and

[32] Although a few informants recalled land clearing used to be carried out at the cost and labour of the local residents of town, and who are now do few and to elderly and have come to rely on the municipal administration for an increasing number of services.

Hutton, 2019). Vaccaro (2005) recounts the evolution of land tenure in the Pyrenees, by tracing the expansion of the Spanish modern state through four main phases of land territorialisation. In the case of Somiedo and Cangas, these four phases can be summarized as: (1) the onset of a feudal regime, which first established methodical control over land and natural resources and differentiated between resource owners and resource users; (2) a process of state driven reterritorialization of land and resources, through Spain's disentailment reforms in the mid 19th century involving the sale of church and communal land, which resulted in a redistribution of tenure amongst public and private owners; (3) a second process of reterritorialization at the turn of the 19th century in which the state appropriated land of traditional users in order to conserve, replant and rationally exploit woodlands; and finally (4) the more recent creation, under democratic mandate, of protected areas and conservation policies to protect and rewild ecosystems. These state driven processes of territorialisation recall the sovereign environmentality approaches discussed in the previous chapters (Fletcher, 2017). Struggles between public and private land property are reproduced through struggles between public and private animals, or rather, wildlife protected by the state and domestic animals owned by local communities. In this way, both protected areas and bears come to represent the expansion of public authority into the private sphere (Vaccaro and Beltran, 2009). Through this lens, conservation interventions can be seen as part of a longstanding struggle to control land and natural resources (Vaccaro, 2005).

8.8.2. Nature as a heritage

West, Igoe and Brockington (2006) propose that protected areas be understood as both material and discursive means through which conservation actors remake their world. Protected areas are socially constructed in as far as they respond to the definition of which natural and cultural elements of a given landscape constitute a heritage in need of protection. Usually, this definition is not shared across all conservation actors. Instead, it is informed by a mediation process between different actors' interests and worldviews, and most of all, by the capacity of actors to influence the outcome of the mediation process (Beltran *et al.*, 2008; Vázquez Cortés *et al.*, 2011; Cortés-Vázquez *et al.*, 2017). In many ways, the conflict surrounding the creation of protected areas in Somiedo and

Cangas, relates to how park administrators and different sectors of the local community have negotiated the significance of ecological and cultural elements of the landscape. Such negotiations may be seen as reflecting tensions and alliances between the disciplinary environmentality approach, intended to infuse environmental ethics in local subjectivities and practices, and the truth or cultural environmentality approach, which guides local worldviews and practices (Fletcher, 2017). While in Cangas the negotiation between top-down and culturally-driven environmentality is a source of social fracture, in Somiedo it appears to have successfully recreated identities and strengthened narratives of peaceful coexistence between people and wildlife (Beltran *et al.*, 2008; Vázquez Cortés *et al.*, 2011).

Ideas about what natural heritage is or should be are associated with ideas about nature's political economy (Vaccaro and Beltran, 2009). In both Somiedo and Cangas, the majority of livestock owners, hunters and beekeepers valued above all else a productive landscape, in which traditional activities like livestock and beekeeping and more recent activities like coal mining, are the defining features of social relations and human interactions with the environment. On an even more fundamental level, traditional resource users value a kind of nature that is produced and maintained by human activity. This includes practices like grazing and burning to maintain a patchwork of ecosystems that facilitates mixed uses while promoting the kind of species assemblages that thrive in such landscapes. On the other hand, at least in origin, protected areas followed a dualistic ideology which viewed humans as separate from nature, and nature as needing protection from human activity (Adams and Mulligan, 2003; Peterson *et al.*, 2010; Descola, 2013; Mace, 2014). Aesthetic and conservationist values on which nature reserves are generally built, contrast with the utilitarian and extractive character of traditional and more recent uses (Beltran *et al.*, 2008). From a political economy point of view, this involves transitioning from agricultural and industrial activities to a service-based economy. Tourism and hostelry, in fact, are promoted across many protected areas because they are deemed to be more compatible with the preservation of a "wilder" nature (West *et al.*, 2006).

Most of all, however, in this context the creation of nature reserves has been influenced by market forces, and driven by principles of rationality and efficiency

(Vaccaro, 2005). Once the activities of mountainous areas became incorporated in the wider national and European economy, they struggled to compete with more intensive modes of production (this goes both for livestock rearing and coal mining). The restructuring of the local economy has taken a toll on the social fabric and identity of local communities, but at the same time it has opened up a new set of development possibilities, by creating a space in which the value of local nature and culture needed to be redefined and identities needed to be recreated (Vaccaro, 2005). The case of Somiedo and Cangas are very different in this respect, as the two nature reserves were created in very different times and cultural contexts.

Since its very beginning, Somiedo's park administrators and mayors adopted the locally resonant narrative that traditional activities form the heart of the area's natural and cultural heritage. Local practices, traditions, architecture and ancient transhumant shelters were all used to claim a unique identity. What was previously viewed as harsh lifestyle and a merciless environment became a source of pride. In support for this narrative, greater subsidies were handed to livestock farmers. A unique cultural value was thus assigned to an economically marginal territory, and furthermore marketized by promoting tourism. Value was also assigned to Somiedo's biodiverse and aesthetically appealing nature. The bear was used as the emblematic species of the park, by virtue of its endangered status in Spain and its historical presence and current abundance in Somiedo. The local community's responses to the park's narrative were varied, and ranged between appropriation, willing compliance, reluctant acceptance and resistance. Although the park administration was not spared criticism, the notion that the park had benefited the area was largely accepted. Some informants resented both how tourists viewed the landscape as wilderness, and how they considered the bear as the landscape's most emblematic feature. However, attitudes towards bears were predominantly positive. Despite the unprecedently high bear population density, bears were mostly seen as unproblematic and as allies, contributing to local development and providing evidence of the sustainability of traditional practices. Given the low historical population estimates, even accounts of historical peaceful coexistence with bears are likely to have been to some extent reconstructed. These findings show how wildlife can be discursively and symbolically reworked to fit a useful purpose. At the same time, they show that

local identities can also be reinvented. By appropriating language on sustainability, local communities re-elaborate notions of tradition, in order to make them compatible with dominant conservation narratives (Beltran *et al.*, 2008; Vaccaro and Beltran, 2009; Homewood, 2010).

In Cangas del Narcea, the creation of a protected area also contributed to the moulding of local identities, in this case, by solidifying opposition towards park authorities and conservation initiatives. The landscape's heterogenous socio economic context may have contributed to the park's failure to establish a narrative that resonated across all sectors of the local community and that built on their cultural understanding of nature and heritage. Moreover, due to Cangas' history of land tenure conflicts, protected areas are seen to reproduce past dynamics of dispossession. This is likely to have hindered possible synergies between local communities and conservation, as appeals to local traditions of stewardship may be viewed only through the prism of historical land conflicts (Homewood, 2010). In Cangas resistance to a top-down conservation model that failed to engage with local environmental values was expressed in legal courts, through everyday discourse, and through large scale arson events.

8.8.3. Nature as a commodity

Finally, the case of Cangas exemplifies some of the unintended consequences that a market or incentive driven conservation model may generate. A growing body of literature has looked at the way conservation adopts a market driven strategy to pursue its goals (Castree, 2008; Büscher *et al.*, 2012; Cortés-Vázquez, 2018). This strategy recalls the neoliberal or incentive-driven environmentality approaches, discussed in the previous chapters (Fletcher, 2017). Examples include paying for conservation or ecosystem services, compensating for wildlife damages, and creating business opportunities, like ecotourism, based on the marketization of nature and sustainable products. Market driven conservation has roots in colonial resource management and analogous reterritorialization processes, and has more recently been revived by the birth of the sustainable development paradigm and by community-based conservation initiatives (Hutton *et al.*, 2005; Cortés-Vázquez *et al.*, 2014). This recent paradigm shift in conservation reflects an alliance between neoliberal and

community-driven environmentality approaches (Fletcher, 2017). It was developed in an attempt to remedy the injustices imposed on local communities, by redressing the uneven distribution of conservation costs and benefits, and by allowing local communities to manage and benefit from the natural resources on which they depend. Normative claims regarding the rights of local communities to achieve material well-being, self-determination and social justice were also coupled with pragmatic claims, which viewed bottom-up and decentralized community-based conservation as a more efficient and cost-effective way of managing resources (Hutton *et al.*, 2005). It is based on these pragmatic claims, that the neoliberalization of nature and of conservation interventions has accelerated under current austerity measures. Across Europe, the 2008 financial crisis produced a drastic reduction in public funding and a roll back of the state (Young *et al.*, 2012; Higgins *et al.*, 2014; Apostolopoulou and Adams, 2015). The need to find alternative sources of funds and alternative management structures for conservation, is resulting in the decentralization and privatization of protected areas (Cortés-Vázquez, 2017). The process is so pervasive and transformative, that we may consider it as a separate and more recent reterritorialization process in its own right.

The failure of many community-based conservation initiatives worldwide, in delivering positive social and biodiversity outcomes, has sparked debate over their legitimacy (Hutton *et al.*, 2005; Dressler *et al.*, 2010; Galvin *et al.*, 2018). Some have attributed these failures to the fact that community-based conservation approaches have not gone far enough in allowing local communities to take full leadership and control over their destiny and resources, or the fact that they are often burdened by corruption and co-option by local and foreign private interests (Hutton *et al.*, 2005). The more fundamental critiques of the neoliberal conservation model focus on how it promotes, as a solution to the current socio-ecological crisis, the very same processes and structures that have caused the crisis the first place. This is because it is based on the precarious notion that economic growth will result in conservation and that conservation will result in economic growth (Castree, 2008; Büscher *et al.*, 2012). Development becomes the paradigm through which social and environmental justice is achieved (Foucault 2008 and Fletcher 2010). In this respect, there is a growing body of literature looking at the ways in which neoliberal conservation creates

subjectivities, or rather how it moulds social relations and collective imaginations to construct a dominant narrative (Foucault, 2008; Fletcher, 2010; Cortés-Vázquez *et al.*, 2014).

In the case of Somiedo and Cangas, the neoliberal conservation model has produced different types of subjectivity. Increased subsidies to livestock farmers and the promotion of bear tourism were effective in supporting local development in Somiedo. In doing so, they had the disciplinary effect of creating positive attitudes towards the park and the bear, even though the balance appears more precarious now that subsidies have been reduced. Cangas, on the other hand, has a wealthier past than Somiedo, as well as a more conflictual relationship with land property. The promised benefits of the park were deemed insufficient especially under the prospect of decreasing subsidies. Expectations regarding an equitable distribution of conservation benefits (see Zafra-Calvo *et al.*, 2017), also differed in Cangas . Several informants felt that the subsidies to livestock farmers were not enough and that landowners should also be compensated by the park. Furthermore, tourism activities were viewed with more scepticism by traditional resource users and landowners, who felt they should profit from activities carried out in the park. All of this contributed to an intensification of land tenure litigations, a rush towards claiming private property and in some cases toward dismembering neighbourhood communal property arrangements. Similar findings are presented by Baird *et al* (2015), who describe how the creation of a protected area in Tanzania increased neighbouring villagers' sense of insecurity over land restrictions, bringing them to convert their land to agriculture in an effort to secure tenure rights.

The legal disputes between landowners and the regional government raised attention across Asturias regarding the need to involve local communities in the design and implementation of protected areas. Changes were made to the regional law on protected areas, resulting in the inclusion of landowners in park administrative boards. Although this may appease some of the louder opponents of Cangas' protected area, Cortés-Vázquez (2017) warns against the danger that participation and decentralization processes may be co-opted by private interests. The local community of Cangas is composed of much more than landowners. Therefore, their inclusion as representatives of a much more

complex and diverse social realty, may fall short of promoting equitable development and conservation initiatives (Cortés-Vázquez, 2017). A more inclusive participatory process based on the principle of free and informed consent, may go farther in improving communication, transparency and negotiation of interests between the local community, stakeholders and other conservation actors (Lewis *et al.*, 2008; Zafra-Calvo *et al.*, 2017).

8.8.4. Significance for coexistence with bears

The case study of Somiedo and Cangas highlights the importance of understanding coexistence between people and carnivores within a wider historical and political context. Discourses regarding bears, protected areas and land tenure are interrelated, they provide meaning to each other and to the communities adopting them. Bears cause conflict throughout their range (Can *et al.*, 2014; Bautista *et al.*, 2017) and the case of both Somiedo and Cangas actually presents a situation where attitudes towards bears are relatively positive. By contrast, in the Spanish Pyrenes, where bears have been reintroduced over the past two decades and where the population barely numbers 40 individuals, their presence and conservation generates intense conflict (Knight, 2011; Piédallu *et al.*, 2016). Given the large bear population in both Somiedo and Cangas, the tolerance levels recorded in Appendix 8 are remarkable. This raises questions regarding, on the one side, the historical and cultural circumstances that have allowed bears to survive alongside the local community for centuries, and on the other side, the more recent conditions that have enabled the bear population to increase without local communities turning against it. Important conservation lessons can be learned both from the local community, and from the governance structures that mediate the relations between people and bears.

Bears require vast native forests and relatively undisturbed habitat. Being among Asturias' most endangered and charismatic species they have legitimized the need for land protection and contributed to the placement of protected areas (Dempsey, 2010). Perceptions of bears are linked to perceptions regarding the legitimacy of conservation interventions, and therefore they are also linked to the history of conservation and land territorialisation through which the Spanish state extended its influence over natural resources. Moreover, by representing either

notions of pristine wilderness or of longstanding interactions and coexistence, bears become significant elements in negotiations over local identity and tradition. The experience of Somiedo highlights how productive engagements can be forged between conservation interventions and local communities, when the role of local communities in shaping the environment is acknowledged, and when they are made to feel ownership over how local heritage is defined (Beltran *et al.*, 2008; Vázquez Cortés *et al.*, 2011). Such engagement is likely to be most successful in a context like the one of Cangas and Somiedo, where local communities hold an affective attachment to the species in question, which has likely developed through centuries of coexistence (Singh, 2013).

The conjuncture of different social, political and economic contexts reflects on coexistence between people and bears not just by producing different levels of tolerance of bears, but also by influencing the occurrence of poaching and the use of fire in bear habitat. Likewise, narratives of bear recovery resonate with and reinforce narratives of protected area and land tenure conflicts. This understanding is built on two distinct theoretical approaches. One relies on identifying the socio-economic structures that link different conflicts to each other (Vaccaro, 2005). The other relies (also) on viewing conflict as having its own momentum and its own capacity to shape identities and relationships, so that even loosely linked issues come to be interpreted through the dynamics of ongoing conflicts (Pellis *et al.*, 2015, 2018). Pellis, Pas and Duineveld (2018) propose that, beyond studying the social lives of the individuals, groups, institutions and non-humans engaged in conflict, it may be useful to turn our focus on the "social life" of conflict itself. They describe conflict as recursive and self-referential. It may endure over long periods of time, when it is influenced and fuelled by other or past conflicts, as well as wider structural processes. In this way conflict is seen to acquire almost an agency of its own, a sort of "parasitical nature" which allows it to develop and reproduce "semi-independently of its 'source' or 'subject'" (Pellis *et al.*, 2018) The case of Somiedo and Cangas illustrates the usefulness of understanding place contingencies that affect the resonance of certain discourses, and that ultimately determine how coexistence with bears is experienced on the ground.

9. CHAPTER 9 Conclusion

9.1. Overarching question and relevance

In this thesis I set out to explore what affects and what promotes coexistence between humans and large carnivores in the north west of Spain. The question is relevant given the context of large carnivore recovery across Europe and North America. As large carnivores are expanding beyond their former ranges and causing damages to local livelihoods, conservation efforts are being directed towards creating more positive experiences of coexistence. But beyond carnivore recovery in the northern hemisphere, coexistence has much wider implications for conservation and human wellbeing (Woodhouse *et al.*, 2015). Based on the knowledge that the current coverage and protection afforded by protected areas is not sufficient to halt the dramatic rate of biodiversity loss (Mora and Sale, 2011; Oldekop *et al.*, 2016), focus has shifted towards exploring more flexible arrangements of land sharing and sustainable use and on debating the socio-economic changes that would allow humans to have a more balanced, meaningful, and fulfilling connection with nature (Brightman and Lewis, 2017; Büscher *et al.*, 2017). Perhaps the most relevant push towards embracing coexistence has come on an ontological level, through the slow realization that landscapes that were once thought to be pristine and untainted from humans, have actually been shaped by centuries of human activity, productive interactions and co-dependencies between local natures and cultures (Adams and Mulligan, 2003). As the notion of wilderness has begun to be understood as having been socially constructed and produced, through techniques that discounted the agency of local and indigenous communities and through coercion and displacement (Adams and Mulligan, 2003; Brockington and Igoe, 2006), a new understanding of coexistence has emerged. This involves searching for new and creative solutions, as well as valuing and ensuring the resilience of what already works, and has worked for centuries. This new understanding places significant emphasis on human relationships and the politics though which social groups negotiate control over nature, both materially and conceptually. In this way, the

study of coexistence carries with it a concern for both nature sustainability and social justice.

Within the literature on coexistence between people and large carnivores, management plays a dominant role, as efforts have traditionally focussed on managing humans, managing carnivores and managing the interactions between the two. Several definitions of coexistence have been used in the literature which for the most part, has conceptualized conflict and coexistence as opposites ends of a scale (Woodroffe *et al.*, 2005; Frank *et al.*, 2019), contributing the notion that coexistence in its purest form is free of conflict and therefore that conflict must be eliminated or reduced to a bare minimum. Thus, most definitions of coexistence are largely aspirational and reflect dominant narratives of what the ideal relationship between humans and nature should be. Although there is a growing body of literature aimed at understanding how local and indigenous communities conceive coexistence (Goldman *et al.*, 2010; Baynes-Rock, 2013; Jalais, 2014; Pooley, 2016), in Europe and North America, much of the literature is directed at developing management strategies to mitigate conflict. Fewer studies have focussed on understanding what coexistence looks like on the ground and how it is experienced and defined by local communities and individuals (but see Bobbé, 1993; Lescureux and Linnell, 2010; Figari and Skogen, 2011; Dorresteijn *et al.*, 2016).

I chose to look at coexistence in Spain because the country holds the largest population of wolves and bears in western Europe, two species known to pose a "coexistence challenge" (Mech, 1995; Marvin, 2012; Can *et al.*, 2014; Lute *et al.*, 2018). The Cantabrian Mountains of north western Spain offer the opportunity to study ways in which historical coexistence mechanisms have changed over time, and how they have been shaped by policy. The specific sites were chosen because they offer different examples of carnivore governance, and different types of interplay between policy and the experience of coexistence.

9.2. Specific objectives

To tackle the overarching aim of the thesis, of understanding the factors that affect coexistence in my study sites, I divided the task into 4 main objectives.

Firstly, I situated coexistence with large carnivores in the context of broader changes occurring in the local landscape and in livestock breeding traditions. I did this in order to provide an understanding of how traditional coexistence mechanisms have changed as local communities and resource users adapt to broader socio-economic changes. Secondly, I looked at the structure and ideology of different governance approaches that have been implemented in each study site to enhance coexistence between people and wolves. Thirdly, I traced the effects of the different wolf governance approaches that I identified, onto local resource users' attitudes and narratives of coexistence. Finally, I explored the history of land territorialisation in two of my study sites, and looked at how it has connected conflicts over land tenure, protected area governance and bear recovery.

I used these four steps to build an understanding of how coexistence is defined and experienced by local resource users. At the same time, the different chapters were intended to explore various governance approaches and their interplay with local narratives of coexistence (whether related to the modernization of the livestock sector, the governance of wolves, or the historical evolution of land tenure and protected areas). Such an approach was built on the understanding that past and present governance systems and conservation regulations can impact local resource users' narratives and practices in different ways, being at times either internalized, contested, manipulated or co-produced by individuals and communities (Agrawal, 2005a; Fletcher, 2010; Cortés-Vázquez and Ruiz-Ballesteros, 2018). I chose to adopt the environmentality framework to interpret the different governance approaches because it enabled a certain level of abstraction, whilst still keeping track of the details. The framework facilitates an understanding of governance as being guided by overlapping yet distinct approaches, namely: top-down sovereign conservation approaches; centralized disciplinary conservation approaches which nonetheless manage to engage productively with local subjectivities; neoliberal, market or incentive driven approaches which see individuals as rational agents acting in order to optimize economic gain; community driven approaches that emphasize self-determination and equitable governance; and "truth" or cultural systems through which individuals and communities understand, value and build attachments with nature (Fletcher, 2010; Cavanagh, 2018).

9.3. Resource users' definitions of coexistence

In Chapter 5 I explored the broader context in which interactions with carnivores take place, by looking at how landscape changes and the structural forces driving them can affect coexistence with carnivores. Depopulation dominates resource user's perceptions of their surroundings, and is seen to negatively affect the social and environmental quality of the landscape. This is because informants viewed their activities and every-day engagements with nature as central in promoting and maintaining a natural balance. Human intervention therefore, was seen as beneficial to restoring order and enabling a functional and balanced landscape. Although informants appeared to hold separate notions of wild and domestic spaces and entities, the boundaries between the two were permeable, reflecting Ingold's (2000) and Descola's (2013) understandings of how familiarity, everyday engagements and interactions with nature can pre-empt or dissolve conceptual dichotomies between nature and culture and between the wild and the domestic. Such an understanding of how local resource users situate themselves in the landscape and in relation to other animals that inhabit it is fundamental to understanding their definition of coexistence. In the case of bears, such everyday engagements (along with other factors), appear to have brought about an emotional attachment to the animal. This was expressed by informants that referred to bears that they saw frequently as their friends and neighbours. These results highlight the importance of affect in determining how individuals and communities relate to their environment (Singh, 2013) but also raise questions regarding the conditions that enable such feelings to develop. In the case of wolves, proximity and habituation did not appear to result in a strong emotional bond with the species. Instead what dominated resource user's subjectivities was the extent to which they could freely reciprocate interactions and control the wolf population. Research by Lesureux & Linnell (2010) has evidenced the characteristics of bears and wolves that are likely to elicit such disparate responses. These include their behaviour and perceived harmfulness, but also the extent and ease with which they lend themselves to being controlled.

In my study sites, bears are completely protected whilst wolves are either hunted or culled. Nonetheless local resource users valued most of all, a form of

coexistence with wolves in which population control and reciprocity were prevalent features. These results are not novel, as farmers and hunters are known to demand measures of predator control, and to hold more negative attitudes towards wolves than bears (Lescureux and Linnell, 2010; Dressel *et al.*, 2015). However, grounding such demands in broader cosmology, and in wider notions that local resource users hold about the landscape and their role within it, can help explain the origin and symbolic importance attributed to predator control. Nature conservation though control therefore, has important implications for resource users' sense of identity, autonomy and place, it is at once both a process and an objective.

My findings also provide cautious evidence of a relatively functional coexistence, which is fraught with conflict and yet not all doom and gloom. They show that overall, bear conservation was viewed positively by the majority of respondents, and wolf conservation was viewed positively by hunters. Only a minor (yet still significant) portion of farmers believed wolf conservation was important but nonetheless, the majority believed that wolves had a place in the landscape and that their presence could be tolerated if their management were compatible with their vision of an ordered and productive landscape.

9.4. Systems of territorialisation and coexistence governmentality

Livestock farming was the most important activity across my study sites, and one that gave shape and meaning to the landscape. In chapter 5 I traced the evolution of the livestock breeding sector through changes in the Common Agricultural Policy's (CAP) political economy, and showed that these have had important repercussions on how local resource users experience their landscape and coexistence with carnivores. The CAP's principle of multifunctionality, referring to the idea that agriculture provides multiple services to rural environments, closely mirrors local resource users' vision of a natural and social landscape that is constituted through their practices. However, the gradual reduction in payments and the introduction of environmental requirements has had negative effects on livestock activities in marginal areas. Particularly important has been the reduction in payments for grazing land that is rugged and covered in shrub. Coupled with regulations that limit the use of fire to clear grazing land, these

policies are seen to promote land abandonment and to favour forest regeneration. Farmers drew a clear link between the neoliberalization of agriculture and conservation policies, as both were perceived as attacks on their ability to maintain a productive and inhabited landscape. The image of forest and wildlife gradually taking over once productive lands is very powerful for local resource users, and carnivores have become the unfortunate symbols of this process. These results echo research by Ghosal, Skogen, & Krishnan (2015), who have emphasized the importance of understanding perceptions of carnivores in the context of landscape change and the meanings that local communities attach to such change. Finally, farmers' sense of powerlessness derived from their inability to influence the direction the CAP and the uncertainty they expressed regarding the future helps to partly explain the narrative of marginalization that is so often interwoven in farmer's accounts of carnivore coexistence.

The case study of Cangas, evidenced in chapter 8, shows how current narratives of marginalization and perceptions of land abandonment forced by hostile market mechanisms are accentuated by historical and ongoing struggles over land rights. In Cangas, following the disentailments of the 1830s and 60s, land that was previously owned by elites during the feudal period, was restructured into a variety of land tenure arrangements that varied from communal to private land. During the 20th century communal grazing land was appropriated by the state for purposes of forest conservation and timber extraction, resulting in the forced displacement of livestock owners. More recently, a protected area that was created in the south of the municipality has ignited conflicts over land use and self-determination. The case study therefore represents an example of a top-down conservation initiative that has been met with resistance. This situation is reflected in the widespread use of arson fire to clear shrubland and a relatively low tolerance of carnivores, despite the relatively low levels of damage. The case study shows the importance of considering the historical baggage of parties engaged in conservation conflict, and the tendency of conflicts to gravitate towards each other (Pellis *et al.*, 2018), especially when there are similar processes of land territorialisation underpinning them (Vaccaro, 2005). Given their history and the prospect of decreasing agricultural and protected area subsidies, resource users and land owners in Cangas contested the creation of

the protected area and came to rely on private property as a more secure assurance of wealth and autonomy. Moreover, the varied systems of land tenure have also resulted in expectations of compensation and benefit sharing that are not currently reflected in the park management plan, and which may be difficult to accommodate. Cangas urgently requires a conflict mediation process, and efforts would best be directed at addressing the underlying historical, social and political drivers of the conflict.

Compared to Cangas (and Somiedo) PHGs of León represent a much more decentralized hunting and wolf governance system, which shows elements of privatization and of community management. As I show in chapter 7 these two governance approaches support each other, as privatized hunting generates revenue for local juntas vecinales, and also allows local and foreign hunters a high level of autonomy and protagonism, which they value. However, the two systems are also sometimes in tension with each other, as some hunters suggest that market driven hunting can be unsustainable and that it excludes local hunters. The stronger level of decentralization and weak rule enforcement in the PHGs of León are associated with more open and relaxed attitudes towards the illegal killing of wolves, which some justified with the lack of damage compensation from the state. At the same time, the PHGs of León are also associated with a stronger emotional attachment to wolves on the part of hunters and farmers. This result is interesting and suggests that, along with a low level of damages, greater autonomy over wolf management is associated with more positive experiences of coexistence. However, given some respondents' mention of unsustainable hunting practices and illegal killing of wolves, the site would require continued monitoring of populations of wolves and other wildlife, to ascertain the ecological sustainability of the system.

The RHR of Riaño also demonstrates elements of conflict between a market driven wolf governance approach (based on tourism and an auction system of wolf hunting) and a community driven hunting governance approach that depends on income from ungulate hunting. It also reflects a conflict between notions of wilderness supposedly promoted by tourism initiatives and local understandings of nature. Whilst some informants claimed that the benefits of tourism needed to be better distributed at the community level, others claimed

that from a purely economic perspective, the setbacks caused by wolves were far greater than the benefits. This suggests that economic incentives alone, particularly ones that are insensitive to community governance structures and that antagonize local notions of nature, may fail to enhance coexistence with wolves. Having considered the tensions arising from wolf tourism, it is important to notice that actually, support for using wolves to attract tourism was highest in Riaño than anywhere else, suggesting that the activity has the potential to be well received or tolerated by local communities, particularly if tourism initiatives were to engage more closely with the *juntas vecinales* where they carry out their activities, and potentially experiment with expanding tourism activities to include attractions that reflect local resource users' traditions and cultural heritage.

Finally, as evidenced in chapters 7 and 8, the case study of Somiedo presents an example of centralized governance that has been relatively successful in engaging with local resource users' subjectivities and practices. The nature reserve in Somiedo coincided with and resulted in important investments in the area, and has established a narrative that emphasizes the biological and cultural uniqueness of the site. In support for this narrative, greater subsidies were handed to livestock farmers. A cultural value was assigned to an economically marginal territory, and marketized by promoting tourism. Bears in Somiedo are mostly seen as allies, contributing to local development through tourism and providing evidence of the sustainability of traditional practices. Whilst depredations from wolves are the highest across the sites, and attitudes toward wolves were among the most negative, wolf poaching does not appear to be prevalent. According to resource user's own explanations of why poaching is marginal, this result tentatively suggests that resource users' practices are not directly influenced by their attitudes towards wolves, nor are they solely regulated through enforcement. Instead they are the outcome of negotiations with park authorities. The delicate balance in Somiedo appears to be sustained through a system in which traditional livestock breeding and local hunting practices are valued elements of the natural environment, and the economy of the area has been supported by both public investments as well as tourism. Park subsidies given to livestock farmers appear as an important element that authorities should strive to sustain, as is close monitoring and intervention to ensure that negative interactions with carnivores and damage levels are kept within acceptable levels.

9.5. Reflections on the methodological approach

Given the emphasis of my thesis on measuring and understanding local attitudes and subjectivities, I will conclude with some reflections on the mixed-method data collection approach that I adopted. The biggest challenge in collecting attitude data is that of obtaining measures that are both internally and externally consistent. Adopting mixed methods allowed me to gauge the internal consistency of closed ended questions, by recording qualitative data when informants' instinctive answers did not conform with the available response options or when they challenged the adequacy, relevance or wording of some questions. At the same time, the close ended questions that held well across most informants and study sites, allowed me to establish the resonance and relevance of certain narratives across the sample and between the different sites. Collecting quantitative data allowed me, for example, to determine that overall attitudes towards bears are more positive in Somiedo than in Cangas, where protected area conflicts are rife and it allowed me to trace the effects that the material experience of damage had on respondent's perceptions of wolf damages. It also allowed me to determine that respondents under the most decentralized and unregulated wolf governance approach were more likely claim that wolves were poached in the area. Hence, while qualitative data provided emic insights that enabled a framing of coexistence that was sensitive to local culture and cosmology, the quantitative data I collected provided etic insights linking the resonance of different coexistence narratives to the presence of different governance approaches.

Despite the usefulness of quantitative data in allowing comparisons across sites, in my opinion, one of the most relevant results emerging from resource user's narratives is that coexistence with carnivores is complex, multi-layered, and not easily captured on a Likert scale, because it may take on a form that is all-together different from the restrictions predisposed by a questionnaire. It is only when informants are allowed to define and explain coexistence in their own terms, and when their accounts are understood in the context of everyday interactions with nature, as well as through the history and broader changes in the social and political landscape, that a clearer picture begins to emerge. In my

research, this has involved allowing local knowledge to influence my objectives, and being willing to follow unexpected avenues that appeared more relevant to local concerns.

Moreover, my results show that informant's feelings towards carnivores were often characterized by ambivalence. Even answers that were delivered with conviction would sometimes be later contradicted: "*this area is the best for wild game… there are plenty of damages from wolves… (but later says) wolves finish all the game, once a pack is established game is either eaten or it moves away*" (PHR of León). This is because, as I have shown throughout the thesis, discourse can serve strategic purposes and therefore its analysis requires interpretation, abstraction and a considerable amount of background research. A commitment to reporting local narratives does not mean they are taken at face value, instead it means understanding why narratives are framed as they are. Moreover, a commitment to reporting local voices involves continuously reassessing one's personal biases, filters and choices (Sultana, 2007; Peterson *et al.*, 2010; Sundberg, 2015). For me, this has involved realizing that understanding viewpoints different from mine requires both intellectual and emotional engagement. Maintaining such a level of engagement throughout the fieldwork experience can be challenging, and I would argue that if this is the chosen approach, the design of samples sizes and the choice of study sites should value depth and quality above breadth and quantity (Drury *et al.*, 2011). Whilst a few, well planned closed ended questions proved very important to allow comparisons across sites and to facilitate an understanding of the different links between coexistence indices and governance approaches, I found that qualitative data gave me the most honest, spontaneous and nuanced representation of informant's views.

Finally, Pellis et al.'s (2018) framing of conflict, which I adopt to explain the connection between land tenure, protected area and bear conflicts, has important implications for research that involves asking and writing about conflict. They describe conflict as having agent- or parasite-like properties that make it contagious, recursive and all consuming. This understanding of conflict places responsibility on researchers, who should reflect on the possibility that through their enquiry and their publications, they may be contributing to the spread of

conflict. In this way, rather than viewing a researcher's filters and choices as impediments for objective research, they should perhaps be viewed as a way to ensure more ethical and reflexive research practices. In the thesis, I often consciously pursued and attempted to unpack conflict that emerged from my interviews. In the case of Chapter 8 I went further to explore some of the historical drivers of the conflict, which appeared to form part of the collective memory of local communities even if the specifics were not known by everyone. I did this because I believe it is important to understand how certain narratives originate and why they persist over time, but where possible I always tried to use quantitative data to contextualize the conflict I described, by also presenting data that shows elements of positive coexistence. Furthermore, I make the point throughout the thesis that the presence of conflict does not preclude the possibility of functional coexistence. In fact, it may in some cases be a sign of healthy pluralism and cultural diversity (Mouffe, 2000; Dryzek and Niemeyer, 2006).

9.6. Thesis conclusions

Coming back to my original thesis question, regarding what affects coexistence with carnivores, my results suggest that each site contains a unique set of conditions and governance structures that impact on local subjectivities in unique ways. Certainly, the presence of large forested areas and difficult terrain across my study sites has provided 'source' habitat for both bears and wolves. At the same time, carnivore protection and wildlife hunting regulations are likely to have facilitated the recovery and expansion of carnivore populations that previously survived in very low densities. However, my results show that local resource users hold their own definition of coexistence, which in many cases appears to provide space or moderate tolerance for large carnivore conservation.

My conclusions suggest that the experience of coexistence varied based on the species involved, and the specifics of each study site. In the case of bears affective connections developed over centuries of interactions appeared to be aided by policies that have promoted tourism and that have constructed bears into symbols of ecological and cultural significance. In the case of wolves on the

other hand, coexistence appeared much more delicate and its conditions varied according to each site. Most relevant of all is how coexistence emerged as a unique product of each site's community, their culture, history, land and environmental politics. These results highlight the usefulness of studies that illustrate diversity and "patchiness" is social-ecological systems (Tsing, 2017), and point to the importance of developing place-based conservation approaches (Williams *et al.*, 2013). This is a kind of conservation approach that foregrounds local voices (Homewood, 2017), that is sensitive to the needs and interest of different societies (Brightman and Lewis, 2017), and to the various ways through which they "establish or maintain good relations with nature" (Sandbrook, 2015; Martin *et al.*, 2016). It is a kind of conservation that avoids predetermined definitions of what coexistence should look like, leaving open to debate exactly how 'good relations' and 'nature' should be understood (Sandbrook, 2015).

Despite the importance of appreciating the contingency of local experiences of coexistence, some general lessons may be drawn from my results regarding the factors that are likely to promote positive experiences of coexistence for resource users in mixed use landscapes, such as those in my study sites: **1)** The presence of flexible governance institutions that enable the integration of historical, cultural and political contingencies. Such factors will inevitably influence local notions of justice and equity and therefore should be carefully considered. This point also requires acknowledging how historical and current processes of territorialisation may relate to each other, and may demand the recognition and incorporation of different land tenure systems into governance arrangements; **2)** The recognition of the role of that local communities and resource users play in shaping and maintaining the local environment. The practices of livestock herding and hunting in my study sites imply at once elements of control and domination but also of care and stewardship. Conservation, therefore, could benefit from engaging with cultural notions of nature stewardship, as grounds for more durable coexistence arrangements. This point relates to the importance of allowing resource users a certain degree of autonomy and protagonism in how they interact with and manage nature; **3)** The maintenance of productive and inhabited landscapes, in which the traces of past generations remain visible and which offer local residents the opportunity to stay and work; **4)** Under decentralized governance approaches, the importance of continued monitoring of wildlife populations to

ensure their long term sustainability; **5)** Under centralized governance approaches, the importance of developing narratives and interventions that engage with local subjectivities and traditions, and also the importance of maintaining subsidy systems that allow the continuation of traditional livestock farming; **6)** The development of a type of wildlife tourism that does not antagonize local conceptions of the landscape and of wilderness; **7)** The avoidance of interventions that disrupt coexistence arrangements that are already functional and sustainable.

Finally, my thesis contributes to the discussion of how subjectivities and practices, are formed through interactions between conservation policy and local culture and interests (Agrawal, 2005b; Fletcher, 2010; Erb, 2012; Cortés-Vázquez and Ruiz-Ballesteros, 2018). Although any results based on self-reported illegal behaviour must be interpreted cautiously, my data suggest that attitudes do not predict behaviours in ways that are always self-evident. Contrary to the linear link between attitudes and behaviours proposed by the theory of cognitive hierarchy, so often adopted as a basis for psychological studies of coexistence, my data suggests that more positive attitudes towards wolves do not necessarily result in lower levels of illegal killing. Instead environmental practices appeared to be the result of negotiations occurring between individuals and the environmentality approaches they are exposed to.

Across my sites, local resource user's identities and traditions were created in relation to how they felt their role was perceived by other groups, and therefore narratives of marginalization played an important role in identity formation (Skogen and Krange, 2003; Skogen *et al.*, 2008; Robbins, 2012). The way they situated themselves in the landscape represented a political statement which enabled them to assert their values and aspirations. My results present several different examples of how conservation regulations can be accepted, internalized, resisted, used strategically or co-produced by individuals and communities. They also show that productive engagements and negotiations between local interests and conservation interests have the potential to strengthen narratives of peaceful coexistence between people and wildlife.

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11. Appendices

11.1. Appendix 1 Questionnaire administered to a representative sample of livestock owners, and a snowball sample of hunters and beekeepers

STATEMENT TO OBTIAN VERBAL CONSENT:

(Presentation) I am collecting data for a doctoral thesis on rural development and coexistence with wildlife in the Cantabrian Mountains. I am mainly researching the livestock farming sector, the beekeeping sector and hunting. Would you be willing to answer a few questions? The questionnaire will take about 20-30 minutes (…it is for a university research project).

I will explain a few things before we begin. The study is financed by a British research agency (NERC), the Royal Geographic Society, University College London and the Institute of Zoology (ZSL).

The objective of the study is to understand the aspects that affect coexistence with wildlife and local opinions regarding how wildlife should be managed. Yours would be one among approximately 400 interviews that we are doing with other farmers, beekeepers and hunters. The results of the research will be used to write the thesis, and may be published in an academic journal.

Your participation is voluntary, and you are free to interrupt the interview in any moment. Your personal data will remain confidential. Your privacy is guaranteed and your name or any detail that may allow for your identification will not be revealed to anyone

BACKGROUND (all groups)
Study area
(PHGs of León / RHR of Riaño / Cangas / Somiedo)
Municipality
What are the main economic activities and development prospects in the area?
Has the protected area benefited or harmed the area? In what way?

FARMERS
Do you own livestock?

(yes / no)
Have you worked as a livestock farmer at any point in your life?
(yes / no)
Why have you abandoned the livestock farming activity?
Were your parents livestock farmers?
(yes / no)
What type of livestock do you own currently?
(meat cattle / dairy cattle / meat sheep / dairy sheep / meat goats / dairy goats / horses)
Did you used to own another type of livestock?
(yes / no)
Type of livestock you used to own:
(meat cattle / dairy cattle / meat sheep / dairy sheep / meat goats / dairy goats / horses)
Why did you stop farming that type of livestock, did it entail carrying out different herding practices?
What proportion of your income comes from livestock breeding?
(100% / between 75 and 100% / between 50 and 75% / 50% / between 25 and 50% / less than 25%)

(for each type of livestock owned, separately)
How many adult (livestock type) do you own?
How many (livestock type) do you own in total, including the young?
How do you manage them?
(in stables / in in-by land / in extensive grazing areas)
How often do you check on them when they are grazing in high pastures?

Do you practice transhumance?
(yes / no)
Normally do you graze your livestock on private or public land?
What are the main problems/challenges of livestock farming?
Do you receive CAP funding?
(yes / no)
What are the advantages of the CAP ; what are the main problems; what is your general opinion?
How has the CAP changed in the past few years?
How many Ha. do you declare to the CAP?
Has the number of Ha. you declare to the CAP increased or decreased in the past years? Why?
(increased / stayed the same / decreased / don't know)
Has this changed your livestock herding practices?

BEEKEEPERS
Do you own beehives?
(yes / no)

Have you been a beekeeper at some point in your life?
(yes / no)
Were your parents beekeepers?
(yes / no)
How many beehives do you own?
What proportion of your income depends on beekeeping?
(100% / between 75 and 100% / between 50 and 75% / 50% / between 25 and 50% / less than 25%)
Do you practice transhumance
(yes / no)
Normally do you keep your beehives on private or public land
What are the main problems/challenges of beekeeping?

HUNTERS
Are you currently a hunter?
(yes / no)
Have you hunted regularly at some point in your life?
(yes / no)
What animals do you hunt?
(wild boar / ungulates / small prey and birds)
Where do you normally hunt?
(in regional hunting reserves / in regional hunting grounds / in private hunting grounds in CyL)

BEARS (farmers, hunters and beekeepers)
Your general attitude towards bears is…
(very negative / negative / neutral / positive / very positive)
It is important to have bears in Spain
(strongly disagree / disagree / neutral / agree / strongly agree)
It is important to have bears in my area
(")
It is important to conserve bears in my area
(")
Bears enrich my experience of nature
(")
Bear belong to the nature of the area
(")
Bears are important to maintain a natural balance in the area
(")
Currently, bears are compatible with livestock breeding activities (can they coexist?)
(")
If there were managed differently, bears could be compatible with livestock breeding activities
(")

Bears cause a lot of damages to livestock in the area
(')
Bears are a menace for the viability of my livestock farming activity
(')
Currently, bears are compatible with local beekeeping activities (can they coexist?)
(')
If there were managed differently, bears could be compatible with beekeeping activities
(')
Bears cause a lot of damage to local beekeepers
(')
Bears cause a menace to the viability of my beekeeping activity
(')
In this area bears cause a lot of damages to people's gardens and fruit trees
(')
In this area bears pose a threat to human safety
(')
Bears have been used as an excuse to impede local development
(')
In what way?
Bears are a significant disturbance to hunting activities
(')
Bears incentivize tourism
(')
Bears should be used more to incentivize tourism
(')
Why? Do you feel that it is/ could be positive for the area?
The bear population has increased over the past 10 years
(')
There are too many bears in my area
(')
It is necessary to control (reduce) the bear population in my area
(')
It will be necessary to control the bear population in the future
(')
The bear population will keep increasing if it is not kept under control
(')
My tolerance would increase with greater bear control
(')
My tolerance would increase with improved compensation
(')
Currently it is acceptable to control the bear…
(to reduce the risk of damages to livestock, beehives, fruit trees etc… / when they come close to towns / because people are scared / to sell the trophies / it is never acceptable)

BEAR ILLEGAL HUNTING
It is acceptable to kill a bear illegally…
(if bears come close to towns / if bears cause a lot of damages / if their population grows a lot / it is never acceptable)
Are bears killed illegally in your area? Why?

WOLVES (farmers and hunters)
Your general attitude towards wolves is
(very negative / negative / neutral / positive / very positive)
It is important to have wolves in Spain
(strongly disagree / disagree / neutral / agree / strongly agree)
It is important to have wolves in my area
(")
It is important to conserve wolves in my area
(")
Wolves enrich my experience of nature
(")
Wolves belong to the nature of the area
(")
Wolves are important to maintain a natural balance in the area
(")
Currently, wolves are compatible with livestock breeding activities (can they coexist?)
(")
If there were managed differently, wolves could be compatible with livestock breeding activities
(")
Wolves cause a lot of damages to livestock in the area
(")
Wolves are a menace for the viability of my livestock farming activity
(")
In this area wolves pose a threat to human safety
(")
Wolves pose a threat to hunting activities in this area
(")
Wolves incentivize tourism
(")
Wolves should be used more to incentivize tourism
(")
Why? Do you feel that it is/ could be positive for the area?
The wolf population has increased over the past 10 years
(")
There are too many wolves in my area
(")

It is necessary to control (reduce) the wolf population in my area
(")
My tolerance would increase with greater wolf control
(")
My tolerance would increase with improved compensation
(")

WOLF HUNTING
Currently, it is acceptable to control the wolf population…
(to reduce the risk of depredations to livestock / to reduce competition with hunters for wild prey / to sell the trophies / because people are scared / it is not acceptable to kill wolves)
If we must cull wolves, who should do it?
(rangers / farmers / any hunter with a paid permit / wild boar hunters without a paid permit)
What was the wolf hunting/culling quota in your municipality this year (or allow to specify another geographic unit)
Wolf hunting/ culling quotas are…
(too low / right / too high / don't know)

WOLF ILLEGAL HUNTING
It is acceptable to kill a wolf illegally….
(if there are a lot of damages / if they come close to people / if the population grows a lot / it is never acceptable)
Are wolves killed illegally in your area? Why?

TRUST IN INFORMATION SOURCES (all groups)
Would you trust the information that the following groups might give you on wolves and bears…
Representatives of the Regional Administration
(not at all / a little / some / a lot / no opinion)
Forestry officials / rangers
(")
Biologists
(")
Hunters
(")
Farmers
(")
Environmental groups
(")

LIVESTOCK DEPREDATIONS (farmers)

Have you suffered depredations to livestock in the years 2014, 2015 and 2016

(yes / no)

(repeated for each livestock depredation event in the above time period)
Date of depredation
What was the species responsible?
What livestock type was depredated?
(cattle / sheep / goats / horses)
Were they young or adult?
(young / adult)
Were they meat or dairy?
(meat / dairy)
Number of adult (livestock type) heads dead
Number of adult (livestock type) heads injured
Number of adult (livestock type) heads lost
Number of young (livestock type) heads dead
Number of young (livestock type) heads injured
Number of young (livestock type) heads lost
Did you declare the damage to the Regional Administration (RA)?
(yes / no)
Why not?
Was the damage compensated?
(yes / no)

** in PHGs of León, questions were slightly different. Respondents were asked if they were insured, if they knew that the RA compensated part of the damage to insured farmers, if they declared the damage to the insurance and the RA, and if they were compensated from the insurance and from the RA; if not, why?

Did you suffer any depredations before 2014
(yes / no)
(for people who used to own livestock) Did you ever suffer depredations when you owned livestock
(yes / no)

DAMAGE COMPENSATION (farmers)

(for farmers that suffered damages) After having received damage compensation are you…
(very satisfied / satisfied / neutral / unsatisfied / very unsatisfied)
What are the main problems of the damage compensation system?
(for farmers that suffered damages) Considering the last time you were compensated, how many months passed from the time you suffered the damage to the time you were compensated?
What type of damage compensation system would you prefer:
(damages are compensated by the RA after they occur / farmers that coexist with predators receive an annual sum that they can invest in damage prevention or keep as compensation for any eventual damages / private insurance paid by farmers / private insurance co-financed by RA / don't know)
Are you insured against depredations?
(yes / no)
What type of insurance is it? What is the name of the company?
Would you be in favour of being compensated for predator damages through the CAP?
(yes / no)

LIVESTOCK DAMAGE PREVENTION MEASURES (farmers)

(separate for each livestock type)

Currently, are you employing any measures to protect livestock from carnivore depredations?

(stables or predator proof enclosures at night / stables or predator proof enclosures during birthing season / I don't graze young livestock in high pastures / livestock guardian dogs / I dispose of livestock carcasses / I have changes livestock species / I have started checking my livestock more often / I have stopped grazing livestock in risky areas / other / I don't use any damage prevention measures)

At what age do you send (livestock type) to graze in high pastures?

How many livestock guarding dogs do you keep with (livestock type)?

In what circumstances did the depredation occur? If you had adopted damage prevention measures, why do you think they did not work?

What do you think about damage prevention measures? Do they work well?

If you are not adopting any damage prevention measures, why not?

(I have not had a sufficient level of damages to invest in them / it is not my responsibility to defend my livestock from predators / I cannot afford them / they don't work / they are not feasible / other)

DEPREDATIONS TO BEEHIVES (beekeepers)
Have you suffered damages to your bee hives in 2014, 2015 and 2016?
(yes / no)

(for each depredation event separately)
Date of depredation
How many beehives were destroyed?
Have you declared the damage to the RA?
(yes / no)
Why not?
Was the damage compensated?
(yes / no)

Did you have any damages before 2014?
(yes / no)

DAMAGE COMPENSATION
(for those who suffered depredations) After having received damage compensation are you…
(very satisfied / satisfied / neutral / unsatisfied / very unsatisfied)
What are the main problems of the damage compensation system?
(for those who suffered depredations) Considering the last time you were compensated, how many months passed from the time you suffered the damage to the time you were compensated?

BEEHIVE DAMAGE PREVENTION MEASURES (beekeepers)
Currently, are you employing any measures to protect your beehives from bears?
(Metallic fences (2m high) / electric fences / traditional *cortines* / I have started checking my beehives more often / I have moved my beehives out of risky areas / other / I don't adopt any measures)
What do you think of the measures you are employing? Do they work well?
If you are not employing any measures to protect your beehives, why not?
(I have not had a sufficient level of damages to invest in them / it is not my responsibility to defend my beehives from predators / I cannot afford them / they don't work / they are not feasible / other)
Under what circumstances did the damage occur?

FINAL QUESTIONS (all groups)
Have there been arson fires in this area in the past? Did they affect your activity?
What was the cause?
Gender
(f / m)
Age
Are you in any way tied to the service/ hostelry sector?

(yes / no)
The interview has come to an end, would you like to add anything?
Do you have any questions?

If you think of any doubts or questions, here is my business card…

11.2. Appendix 2 Qualitative interview guide

STATEMENT TO OBTAIN VERBAL CONSENT:

(Presentation) I am collecting data for a doctoral thesis on rural development in the regions of Castilla y León, Asturias and Cantabria. The study is financed by a British research agency (NERC), the Royal Geographic Society, University College London and the Institute of Zoology (ZSL). It seeks to investigate aspects regarding the management of land-uses and natural resources and wildlife. Would you be willing to participate in an interview?

I am conducting a series of interviews to investigate the opinions of the representatives of regional, provincial, municipal and park administrations, as well as agricultural, hunting and environmental organizations. The aim of the interviews is to analyse perceptions regarding rural development, conflict over land-use and the issues associated with the management of wildlife in general, and of wolves and brown bears in particular. The interview would cover the following themes: prospects for the development of the local economy, with an emphasis on the tourism and agriculture sectors; the impact of wildlife on local economic activities; wildlife management and conservation policies.

The results of the research will be used to write the thesis, and may be published in an academic journal. Your participation is voluntary, and you are free to interrupt the interview in any moment. Your personal data will remain confidential. Your privacy is guaranteed and your name or any detail that may allow for your identification will not be revealed to anyone.

QUALITATIVE INTERVIEW GUIDE
(Mostly used to interview mayors, representatives of regional and provincial administrations, park representatives, and some livestock farmers, beekeepers and hunters.)

Introductory questions:
What comes to mind when you think of your (municipal, park…) territory
What are the main economic activities in the territory?
What are the development prospects for the territory
What are the main issues/problems regarding the territory's development

Are livestock breeding/bee keeping/agriculture important economic activities?
Is the sector growing or shrinking? why?
What animals cause the greatest damages to crops or livestock? can you list them in order?

Is tourism an important economic activity?
What drives tourism in your territory?

Ski station (I read about the controversy regarding the construction of a ski station in San Glorio…)
Do you consider the Supreme Court ruling (banning the construction of the ski station) a setback for the territory's development
What would have been the benefits and setbacks of the construction of the site?
Is ski site going to be pursued despite the Court's ruling?
Wolf/bear presence in the territory
What comes to mind when you think of bears
What comes to mind when you think of wolves
Are wolves/bears present in your municipality
Is it a stable or an occasional presence
Would you say their pops increasing or decreasing or more or less stable?
Have they always been there or is it a recent re-colonization?
Did the re-colonization occur naturally or were wolves/bears reintroduced? By whom?
Is it important to conserve them in your territory
In this region do you think wolves/bears are mostly a resource or an inconvenience?

The impact of wolves/bears on local economic activities
How do you think the presence of wolves affects local communities
OR
What are the impacts of wolves/bears on local economic activities?
Tell me about those who lose out from/gain from the presence of wolves/bears.
Livestock breeding/ farming
In your opinions do wolves /bears pose a serious threat to the agricultural activities of the territory
Is it mainly large or small livestock holdings, intensive or extensive?
Are livestock mostly managed open range or fenced?
Is the use of practices to prevent damages from wolves/bears common?
If yes, which ones are used?
If no, what is the main obstacle to the adoption of the preventive strategies
Are they really worth it?

Are there incentives aimed at facilitating the adoption of preventive practices
Are farmers aware they exist and do they take advantage of them?

The perception of farmers
Are farmers mostly opposed to or in favour of wolves/bears ?
Are they influential stakeholders OR is their viewpoint taken in consideration? are they sufficiently involved in the decision making process?
Hunting
Is hunting an important activity in the territory?
Do wolves/bears pose a threat to the hunting activities in the territory?

Perception of hunters
Are hunters mostly opposed or in favour of wolves/bears?
Are they influential stakeholders/ is their viewpoint taking in consideration ? are they sufficiently involved in the decision making process?
Tourism
Is the presence of wolves/bears a resource for tourism?
Are there possibilities of increasing the use of the image of wolves as an attraction for local tourism?
General public questions
Do wolves/bears cause a threat to human safety?*
Does the local population perceive wolves/bears as a menace to their safety?
Are the majority of local residents opposed or in favour of wolf/bear presence? why?

Illegal killing
Are wolves/bears killed illegally in the territory? by what method?
How is it dealt with?
Is there a need for more patrols? more severe laws? or would it be better concentrate on policies that improve public attitudes towards wolves/bears?

Damage compensation
Are you aware of the current system to compensate damages caused by wolves/bears?
Is it well designed or could it be improved? how?
Are farmers satisfied with the compensation?
Do you think the state should pay for the compensation or should farmers get insured? should the state subsidize the insurance premiums?
Should compensation be made conditional on the use of damage preventions?
Do you think that the damages that are declared accurately reflect the damages that are incurred? (are they an overestimate or underestimate?)

Feral dogs and hybrids
Is there a problem of feral dogs in your territory?
What has been done to address it?
Is it possible that many of the damages declared to be caused by wolves are actually caused by dogs?
Is this a common error among the local pop?
Have you ever heard of wolf hybrids? do you know what they are?
Do you know if they are present in the territory?
Do you see this as a problem?
Do you think something should be done to address the phenomenon? if so why?

Conservation policy.
Is it right for wolves to be hunted?
Is it right for bears to be completely protected?
Should the populations of wolves/bears be managed in order to favour an increase in their numbers?
Considering local attitudes and perceptions, is it realistic to aim for an increase in wolf/bear numbers?

Competences of the informant
As a (mayor, councillor etc) do you feel like you have a collaborative relationship with the other stakeholders and actors involved in the management of wolves/bears

11.3. Appendix 3 Official data on the livestock farming sector

	PHG of León	RHR of Riaño	Cangas	Somiedo
Farmers in PAC registry	n=310 **/km^2=0.29**	n=149 **/km^2=0.18**	n=882 **/km^2=1.07**	n=166 **/km^2=0.57**
Livestock heads (cattle + horses + sheep + goat)^2	n=37,128 **/km^2=35.26** of which: -45% cattle -53% sheep/goat -2% horses	n=10,062 **/km^2=12.05** of which: -52% cattle -29% sheep/goat -19% horses	n=27,842 **/km^2=33.81** of which: -88% cattle -10% sheep/goat -2% horses	n= 8,202 **/km^2=28.15** of which: -87% cattle -8% sheep/goat -5% horses
Cattle	n cattle= 16,636 **/km^2= 15.80** n farmers =155 mean n/farmer= 108(SD=301)	n cattle = 5,265 **/km^2=6.30** n farmers =100 mean n/farmer= 58 (SD=50)	n cattle = 24,401 **/km^2=29.63** n farmers =898 mean n/farmer= 27 (SD=29)	n cattle =7,135 **/km^2=24.49** n farmers=177 mean n/farmer= 40 (SD= 33)
Sheep + goats	n farmers=163 mean n/farmer= 120=(SD=200)	n farmer =37 mean n/farmer= 79=(SD=135)	n farmers=210 mean n/farmer= 13(SD=28)	n farmers=22 mean n/farmer= 32(SD=77)
Horses	n farmers=87 mean n/farmer= 10=(SD=18)	n farmers =82 mean n/farmer= 23=(SD=29)	n farmers =273 mean n/farmer= 2 (SD=3)	n farmers =82 mean n/farmer= 4(SD=5)

Table 11-1 Livestock farming statistics of the study areas, provided by the Regional Administration of Asturias and the Provincial Administration of León

11.4. Appendix 4 Background description of the livestock owner sample

The sample of livestock owners consisted mainly of males (85% in the PHGs of León; 82% in the RHR of Riaño; 64% in Cangas; and 84% in Somiedo). The average age varied between 48 and 50 years, across all sites. The large majority of sampled farmers came from parents who were also livestock owners (between 87% in the PHGs of León and 98% in Somiedo). Between 19% and 21% are currently hunters and between 27% and 36% had been hunters at some point in their lives.

The majority of all sampled farmers owned meat cattle (81%), a significant portion owned meat sheep or goats (24%) and horses (17%), whilst only a small portion owned dairy cattle, sheep or goats (5%). The farmers sampled in the PHGs of León owned a greater variety of livestock species and production types than the farmers in the other sites (meat cattle=59%; meat sheep or goats=42%; dairy production livestock=14%). In the RHR of Riaño, a higher percentage of farmers owned horses than the farmers in the other sites, and a slightly higher percentage owned meat sheep and goats than the farmers in Cangas and Somiedo. Instead, sampled farmers in Cangas and Somiedo owned a similar composition of livestock species. Overall, the farmers sampled in the PHGs of León and the RHR of Riaño owned more livestock heads than the farmers sampled in Cangas and S[33]. The size of meat cattle herds per farmer was greater in the PHGs of León and the RHR of Riaño (median=56 and 64, respectively) than in Cangas and Somiedo (median=30 and 36, respectively). The same is true for meat sheep/goats, and horses, where farmers in the PHGs of León owned the highest number of heads of livestock, followed by the RHR of Riaño and Someido and

[33] The average number of adult livestock heads owned by each farmer is calculated on a lower number of observations than the actual number of interviewed farmers. This is because I began the interviews asking famers how many livestock heads of each species they owned and later realized that some were including calves, lambs, foal etc… in the estimate. Because the presence/absence of young livestock depends on the period of the year in which the interview is carried out, it is usually good practice to only count adults. To have an accurate estimate of the size of herds/flocks etc… I only use observations in which I specifically asked farmers how many adult livestock heads they owned. The same is true for estimates on the number of livestock heads per livestock guarding dog.

Cangas where, bar a few exceptions, sheep/goats are mainly kept for personal consumption and horses for riding.

The highest proportion of farmers who owned a livestock species that they no longer own now, were found in the PHGs of León (59%), followed by the RHR of Riaño (51%), Cangas (39%) and Somiedo (25%). A significant portion had abandoned cow milk production in the PHGs of León (39%) and in the RHR of Riaño (31%), and a smaller portion had abandoned meat goats and sheep in the RHR of Riaño (15% and 14%, respectively) and in Cangas (15% and 13%, respectively).

Over 75% of the sampled farmers across all sites were professionals, meaning that livestock farming provided for their entire income. The highest percentage of transhumant cattle herders were found in Somiedo (21%), followed by Cangas (16%) and the RHR of Riaño (14%) where some cattle herders began practicing transhumance after a dam was built in 1989 in a valley formerly used for grazing. No transhumant herders were found in the PHG of León, which is less mountainous compared to the other sites. Similarly, the highest percentage of farmers that reported declines in the surface area for which they received CAP payments were found in Somiedo (70%), followed by Cangas (56%), the RHR of Riaño (24%) and the PHG of León (18%).

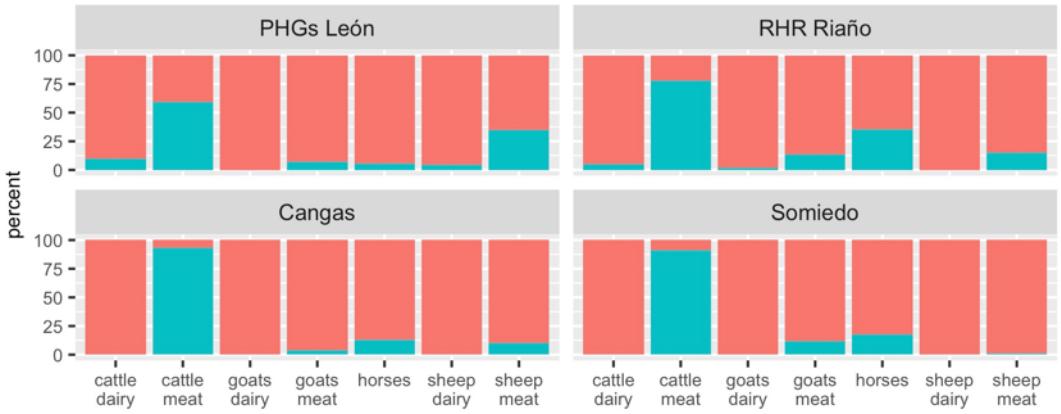

Figure 11-1 Type of livestock owned by the sampled farmers.
(the green bar represents farmers who own they indicated type of livestock)

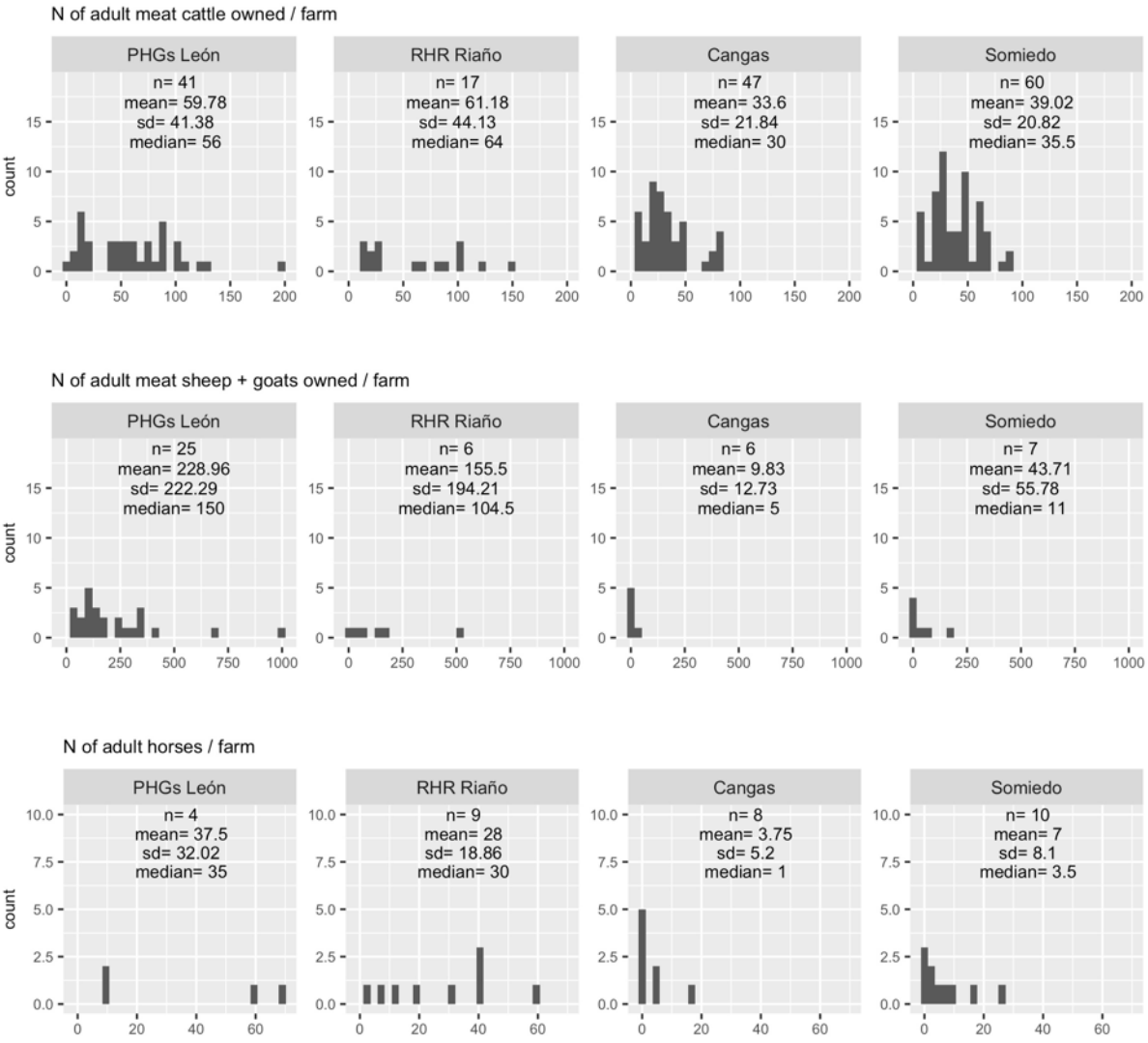

Figure 11-2 Number of livestock owned by the sampled farmers, in each study site.
N refers to the number of livestock owners included in the analysis.

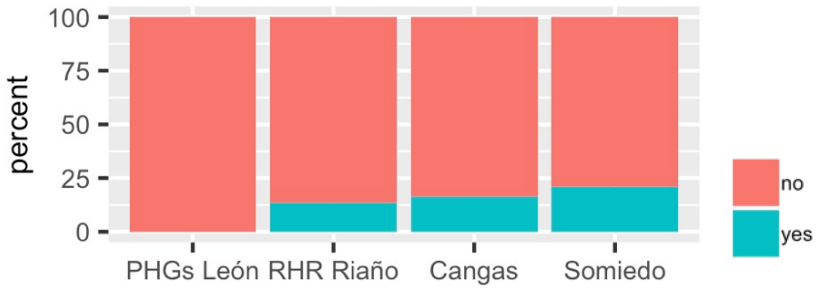

Figure 11-3 percentage of sampled livestock owners who practice long distance transhumance

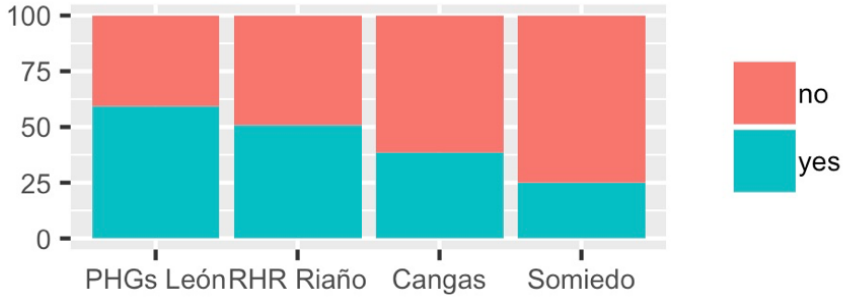

Figure 11-4 percentage of sampled livestock owners who used to own another species of livestock

Figure 11-5 Percentage of sampled livestock owners who used to own another species of livestock, divided by livestock type

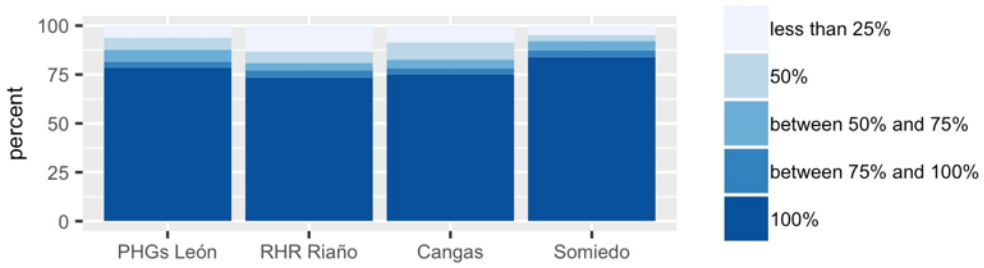

Figure 11-6 Proportion of sampled farmers' income that depends on livestock farming

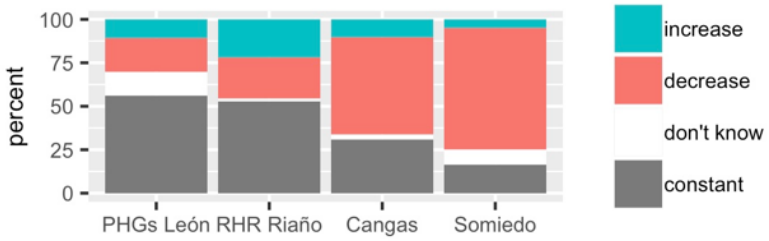

Figure 11-7 Trend in the surface area that sampled farmers declared to the CAP

11.5. Appendix 5 Damage prevention and livestock herding practices used by meat sheep, goat and horse farmers

Damage prevention measures used for meat sheep and goats

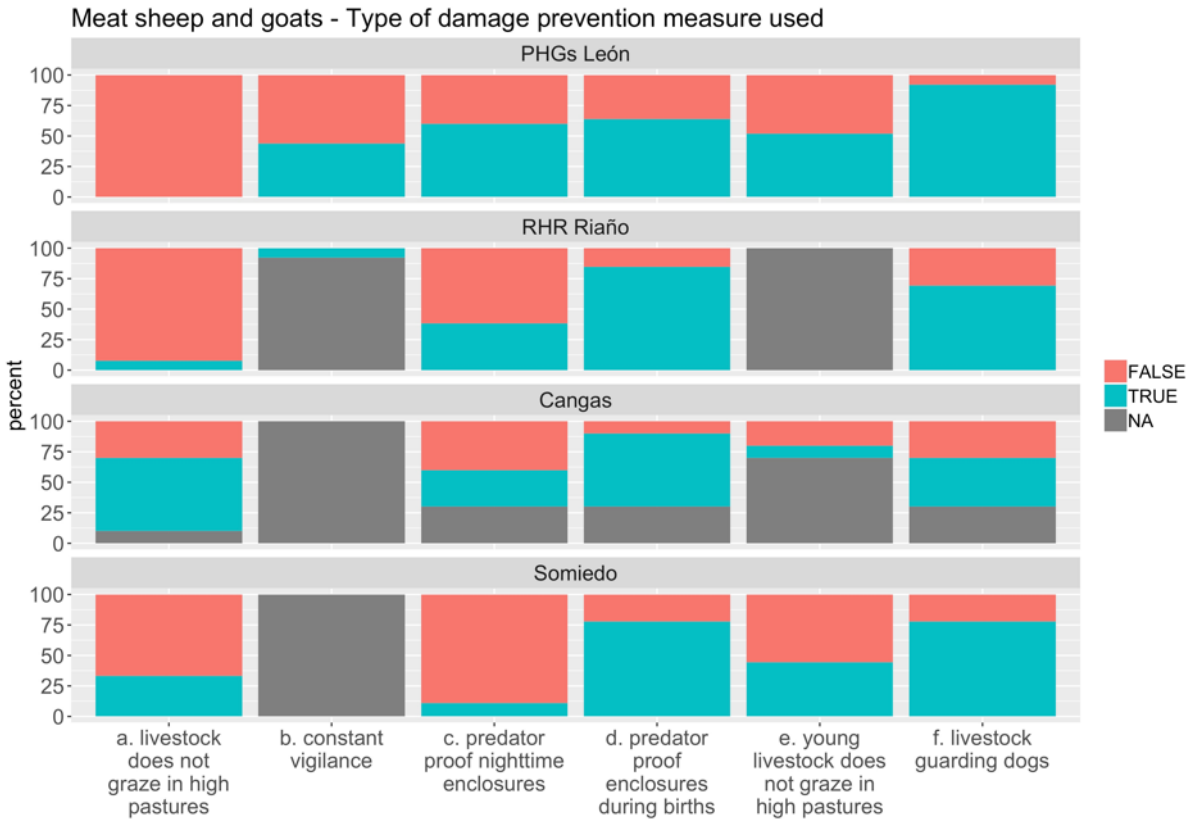

Figure 11-8 Measures employed to protect meat sheep and goats from carnivore damages.

Livestock is not grazed in higher pastures but instead is kept in in-by land. b) Livestock owners practice constant vigilance over their livestock c) Livestock are kept in predator-proof night-time enclosures year-round. d) Livestock are kept in predator-proof enclosures when giving birth (as a general rule but exceptions are allowed); e) Young livestock does not graze in high pastures (this variable contains several missing values because it was added after the survey had begun). f) The farmer owns livestock guarding dogs.

N= 25 in PHGs of León; 13 in RHR of Riaño; 10 in Cangas; 9 in Somiedo

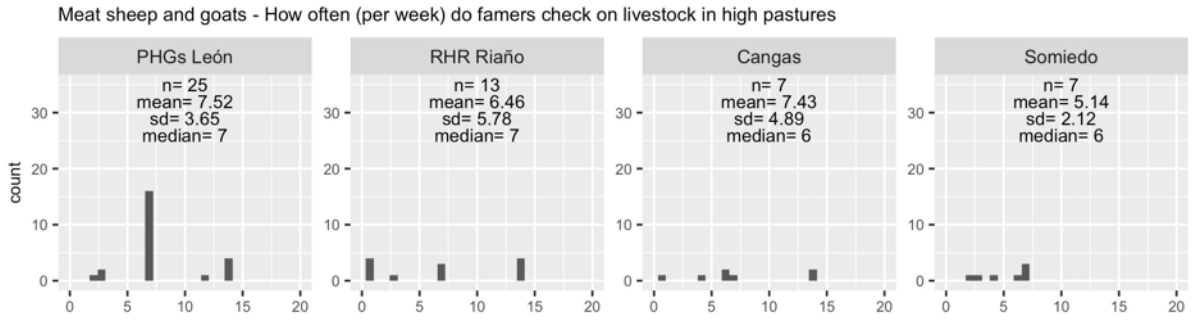

Figure 11-9 Number of times (per week) farmers check on meat sheep and goats in high pastures (and in in-by land, for those who do not graze livestock in high pastures). (NA= 3 in Cangas; 2 in Somiedo).

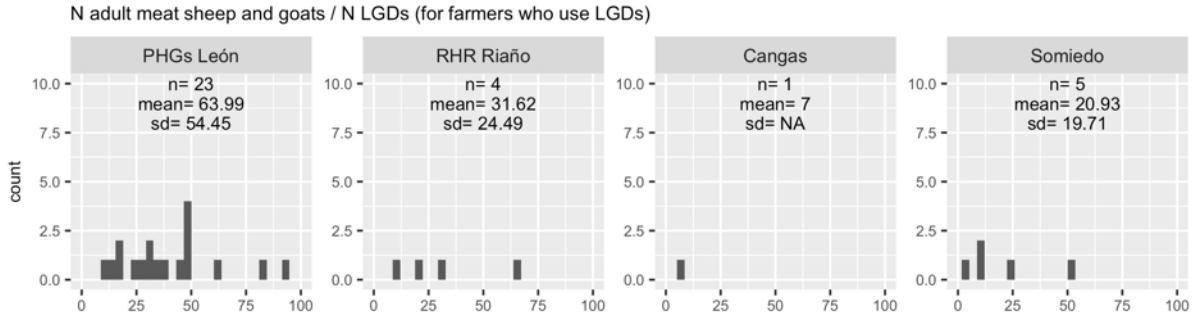

Figure 11-10 Number of adult meat sheep / goats owned per livestock guarding dog (LGD) owned, considering only farmers who own at least one LGD.
The number of observations included in this estimate is lower than the number of interviews carried out with farmers, due to possible inaccuracies resulting in the elimination of part of the data on the number of adult livestock heads (NA= 5 in RHR of Riaño; 3 in Cangas; 2 in Somiedo).

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Damage prevention measures used for horses

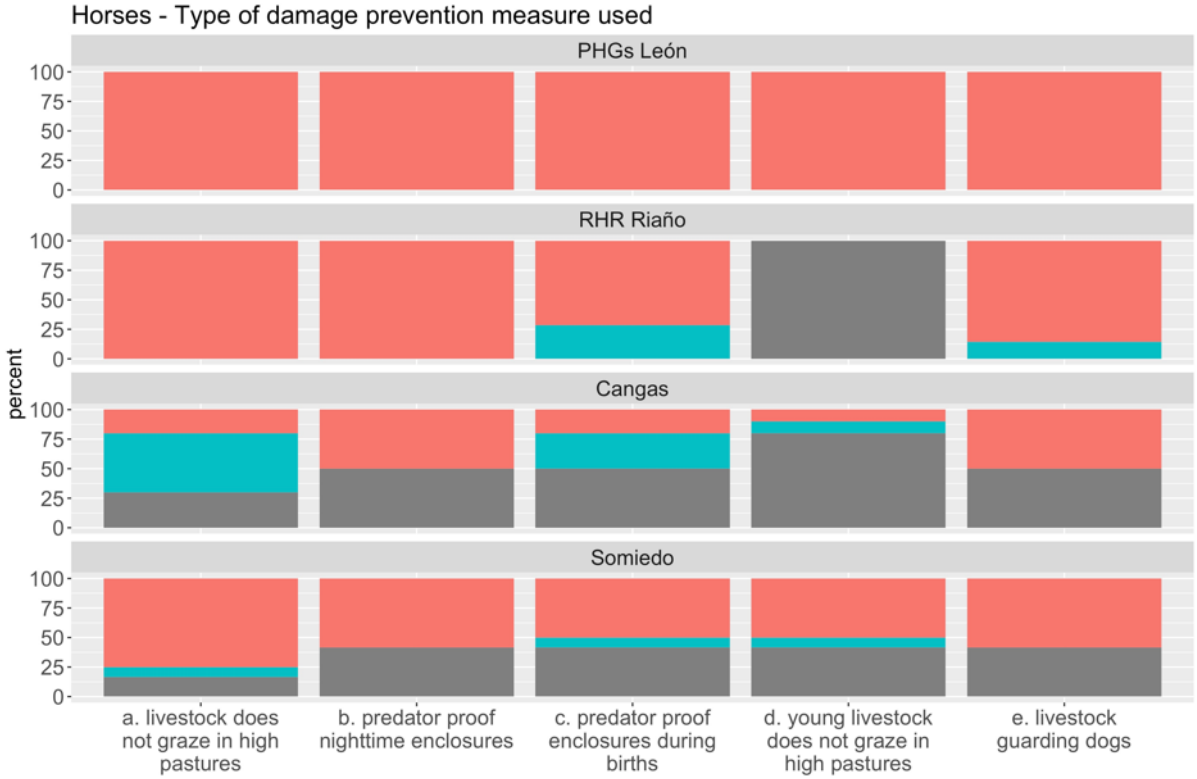

Figure 11-11 Measures employed to protect horses from carnivore damages. Livestock is not grazed in higher pastures but instead is kept in in-by land, where it is theoretically safer. b) horses are kept in predator-proof night-time enclosures year-round. c) Horses are kept in predator-proof enclosures when giving birth (as a general rule but exceptions are allowed); d) Young horses do not graze in high pastures (this variable contains several missing values because it was added after the survey had begun). e) The farmer owns livestock guarding dogs.
N= 4 in PHGs of León; 21 in RHR of Riaño; 10 in Cangas; 12 in Somiedo. The large number of NAs in the Cangas and Somiedo samples are due to the fact that these questions not asked to farmers who owned very few horses.

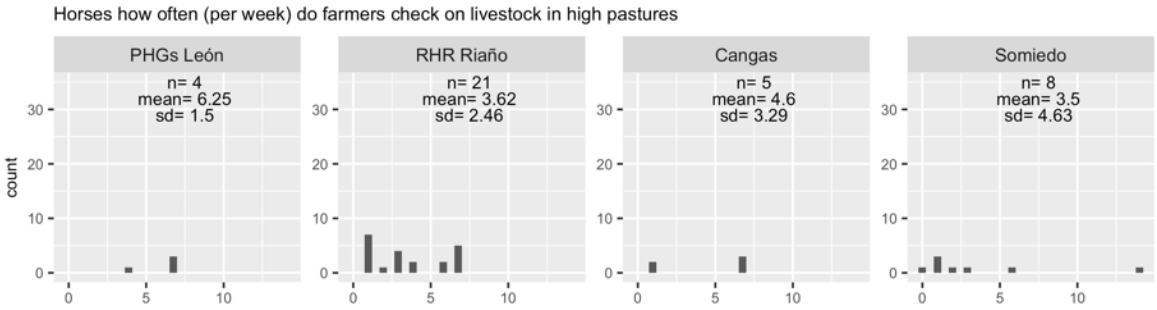

Figure 11-12 Number of times (per week) farmers check on horses in high pastures (and in-by land, for those who do not graze livestock in high pastures). (NA= 5 in Cangas; 4 in Somiedo).

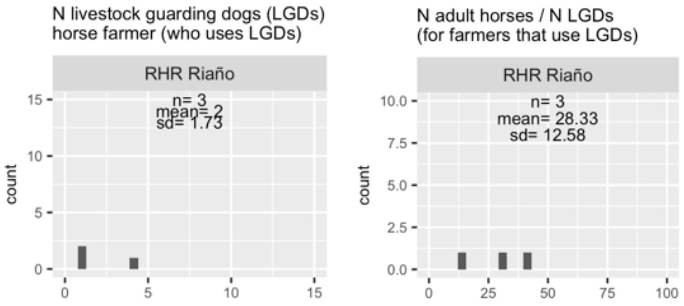

Figure 11-13 Number of adult horses per livestock guarding dog (LGD), considering only farmers who own at least one LGD.

11.6. Appendix 6 Additional notes on wolf policies

Table 11-2 Detailed summary of the wolf governance systems in each study site

Private Hunting Grounds (PHGs) of León, Castilla y León	
Background	11 municipalities; 1,053 km^2; human population density: 9 / km^2. In-by land and agricultural fields are privately owned, but the majority of land in the site is public and managed by sub-municipal entities called *Juntas Vecinales* ("Neighbourhood Associations"). The northern portion of the site falls under the National Park Picos de Europa, which overlaps with the Regional Hunting Reserve.
Hunting /rule enforcement	The Regional Hunting Law (1996) frames hunting primarily as a leisure activity whose social significance must be maintained and promoted, while also guaranteeing the conservation of the resources it relies on as well as the stability and balance of natural processes. The law also frames hunting as an activity that increasingly generates significant employment and revenue. This site includes several small private and semi-private hunting grounds. Hunting rights on public lands belong to the Neighbourhood Associations, who either lease them to local hunters or auction them out to private holders, who pay for the concession and a licence. 85 % of revenue generated by the hunting licences and auctioned concessions revert back to the Neighbourhood Associations and is invested locally, while 15% goes to the regional administration. Multiple laws regulate hunting behaviours but rule enforcement is limited as regional government ranger patrols are few and far between, whilst private rangers are hired by the grounds [2].
Wolf pop. Manage-ment	Wolves are a hunted species. Quotas are allocated to the private hunting grounds within each administrative district by giving priority to hunting grounds with greater livestock damages and greater chances to fulfil the quotas. In actuality, however, each private hunting ground that includes the wolf in its hunting plan automatically holds a wolf hunting permit. If the district quota

	is filled before the end of the hunting season, wolf hunting permits are revoked. Once a wolf is hunted, the hunter must pay an additional amount to keep the trophy. Rangers may intervene beyond the established quotas in conditions of intense conflict. Wolves are hunted through different methods (i.e. at artificial feeding sites and by wild boar hunting parties) depending on the Hunting Plan of each hunting ground [3].
Damage compensation	Private hunting grounds are supposed to reimburse livestock depredations but in reality, they seldom do so. As a remedy, compensation for damages by wolves was first adopted by the region of Castilla y León in 1999. In the private hunting grounds of León, compensation is available only to insured livestock breeders, and consists of the portion of damage value that is not covered by the insurance. To access this funding, farmers are required to have filed a request to the Regional Administration after the damage is verified by local rangers. In addition, state funds also subsidise a portion of the livestock insurance premium. Despite these provisions, damage compensation is barely paid, because the large majority of wolf damages are not claimed to the regional administration (Marino *et al.*, 2018)[4].
Damage prevention	The Wolf Management Plan calls for the promotion of damage prevention measures, but no specific measures were adopted in recent years.
Stakeholder participation	The Wolf Management Plan also calls for and the development of a wolf working group aimed at promoting exchange of experiences among stakeholders affected by and involved in wolf management. The wolf working group and scientific committee were instituted in 2017, after the fieldwork was carried out. The working group is headed by two members of the regional administration's environmental department, and its committee is composed of permanent and elected members. Permanent members include the heads of the regional farming, biodiversity and hunting departments as well as the coordinator of the wolf management plan. Its elected members include: representatives of the main farming (n=3), conservation (n=2) and hunting (n=1) associations, and eco-tourism companies (n=1) [5].
Wolf tourism	An eco-tourism company based in the RHR of Riaño frequently visits the eastern portion of the study are for wolf sightings.

Regional Hunting Reserve (RHR) of Riaño, Castilla y León	
Background	6 municipalities; 835 km^2; human population density: 2.61/ km^2. Land tenure arrangements are similar to those in the PHGs of León, with Neighbourhood Associations administering public land.
Hunting /rule enforcement	However, the Regional Administration owns the hunting rights in the RHR of Riaño, and applies direct management control over it. Hunting revenue is distributed the other way around compared to the PHGs of León: 15% goes to the Neighbourhood Associations and is spent locally, and 85% goes to the Regional Administration Ranger presence is higher than in PHGs of León.
Wolf pop. management	Wolves are subject to the same Wolf Management Plan, but slightly different hunting regulations apply. They are primarily hunted by wild boar hunting parties, with the aid of rangers to reach quotas. One wolf may be hunted by each hunting party until the quotas are filled (FYM/436/2014). Wild boar hunters participate in the wolf population control without paying, unless they wish to keep the trophy. Occasionally, wolf hunting permits are auctioned.
Damage compensation	Wolf damages are fully compensated by the Regional Administration, unless the farmers choose to claim compensation from their insurance [6].
Damage prevention	Same as PHGs of León.
Stakeholder participation	Same as PHGs of León.
Wolf tourism	An eco-tourism company based in the site attracts national and foreign tourists, specifically for wolf sightings.

Cangas del Narcea, Asturias	
Background	1 municipality; 824 km^2; human population density: 16/ km^2. Most of the land is privately owned. Part of Cangas forms part of the Nature Reserve Fuentes del Narcea Ibias y Degaña, established in 2002 but to date subject to legal disputes. A small, uninhabited portion of the municipality forms the Biosphere Reserve of Muniellos.
Hunting /rule enforcement	The Regional Hunting Law of 1989 (2/1989, of June 6) sought to insert hunting into the legal framework that regulates nature conservation, thus adapting traditional hunting practices to conservation goals. Under this law, hunted species were framed as public property and therefore as a resource to be managed by the regional administration (in contrast to the previous consideration of wildlife as "res nullius" – property of no one). As such, the law established the Regional Administration as guarantor of nature conservation, of equal rights and opportunities for all hunters, and as the entity responsible for the compensation of damages caused by all wildlife, except species that are hunted under concession rights. Two different hunting systems operate in Cangas: Most of Cangas is found within a Regional Hunting Ground, which is administered through a concession given to a hunting association. Revenue generated by the hunting concession is reinvested in wildlife conservation and management, and used to pay damages caused by hunted species. Some regional funding is also destined to conservation, game management and public works. Private rangers are hired by the association but mainly carry out game keeping activities, whilst the capacity of rangers hired by the regional administration is limited. The parts of Cangas that fall within a nature reserve (Fuentes del Narcea Ibias y Degaña) are instead part of a Regional Hunting Reserve, which is directly managed by the regional administration and where hunting goals are strictly subordinate to conservation goals. The regional administration pays a "concession" to the municipality, and compensates damages caused by all wildlife. Within this area, the administration applies stringent controls and hunting parties are always accompanied by a

	ranger. Due to issues relating to conflict over land tenure and the nature reserve (Chapter 8), some landholders within the reserve refuse hunting activities on their land [7].
Wolf pop. management	Wolves are not a hunted species in Asturias (Regional decree 24/91) but rather are subject to interventions of population control, carried out by rangers. The wolf management plan divides the regional territory into administrative districts, to which different population control quotas are assigned. The criteria on which annual wolf population control is planned are: the size of the wolf population, the damages caused by wolves, the social conflict surrounding them, and the availability of natural prey. Quotas are set on an annual basis by a committee composed of regional and municipal administrations, farmers, hunters, environmental organizations, specialists and scientists. The wolf management plan establishes the possibility, under certain circumstances, of involving hunters in the population control interventions, though to date this has not occurred [8].
Damage compensation	Damages caused by wolves have been fully compensated since 1989, according to the Regional Hunting. Damages occurring in protected areas are paid 10% more, and payments are not conditional on the use of damage prevention measures. In addition to regional compensation for wildlife damages, Asturias also subsidizes private and voluntary subscriptions to insure livestock and agricultural productions. Due to these subsidies, damages that are compensated by the insurance cannot be compensated by the regional administration. Farmers who claimed compensation from both were brought to trial in 2015 [9].
Damage prevention	In 2016 the regional administration provided subsidies to promote the use of wolf damage prevention measures. Of the 22 beneficiaries, only one was resident in Ca (and none were resident in S) [10].
Stakeholder participation	A Wolf Consultation Committee has been in place since 2003. It is headed by two high ranking officials of the regional administration's environmental department, and its committee is composed of 3 employees of the environment land use planning and infrastructure development department of the regional administration, 2 representatives of the federation of municipalities, 3 representatives of livestock associations, 1 representative of the regional council of hunting, 1 representative of conservation

	organizations and 1 representative of the University of Oviedo. The representatives are nominated by the heads of the committee, following a consultation with the represented groups or entities [11].
Wolf tourism	The area is not famous for wolf tourism but some small companies are considering various eco-tourism activities.

Somiedo, Asturias	
Background	1 municipality; km^2; human population density / km^2. Most of the land is public and administered by the municipality or by sub-municipal entities (Chapter 8). Somiedo has been a Nature Reserve since 1988 and was declared Biosphere Reserve in 2001.
Hunting /rule enforcement	Like the portion of Cangas found inside the nature reserve, Somiedo is a Regional Hunting Reserve. The regional administration directly manages the reserve and exercises a significant level of control on all activities carried out in the territory and hunting parties are always accompanied by a ranger.
Wolf pop. management	Wolf management in Somiedo is subject to the same regulations than wolf management in Cangas, except that Somiedo is found within a different management district (than most of Cangas).
Damage compensation	Same as Cangas.
Damage prevention	Same as Cangas but none of the beneficiaries of the subsidies resided in Somiedo.
Stakeholder participation	Same as Cangas. The mayor of Somiedo sits in the Wolf Consultation Committee.
Wolf tourism	Somiedo is a big destination for eco-tourism in general, especially of bear sightings but some small companies are trying to develop wolf tourism.

Footnotes:

1 Wolf Management Plans: For Castilla y León CV: BOCYL-D-23052016-2 and for Asturias NÚM. 78 DE 6-IV-2015

2 Hunting in the PHGs of León: Other than the National Hunting Law (1996), hunting is regulated by: the Regional Hunting Law (BOE-A-1996-19866); Yearly Regional Hunting Orders; District Hunting Plans; and Hunting Plans of each hunting ground. The Yearly Regional Hunting Orders contain information on the species that may be hunted and sold, the hunting season applicable for each species and area, and regulations regarding the hunting methods and captures permitted (BOE-A-1996-19866). District Hunting Plans are drafted by the Regional Administration and provide overall framework for the Hunting Plans of each ground (BOE-A-1996-19866). Each hunting ground must submit a Hunting Plan for approval by the Regional Administration, regulating the hunted species and methods to be used. These also include information on the population of the distinct game species, the maximum number of hunters that will hunt in the grounds at any given time, the amount of captures envisioned in total, and a plan to improve the habitat (BOE-A-1996-19866).

3 Wolf hunting in the PHGs of León: The controversial definition of wolves as a hunted species in the region of Castilla y León has been the subject of various legal disputes. In the spring of 2018, the wolf hunting plan was suspended by a court order. The ruling established that under the current management system not enough evidence existed to guarantee the favourable status and distribution of the wolf population. Despite this ruling, the Regional Administration has continued to implement the framework laid out in the wolf management plan and has published a wolf hunting quota for the 2018/2019 season.
In each administrative district of León, the quotas range between a minimum of 10% to a maximum of 18% of estimated individuals in the population, depending on whether there is evidence of illegal activity. Relevant legislation: Law BOCYL-D-23052016-2 and B.O.C. y L. - N.º 68.

4 Damage compensation in the PHGs of León: The responsibility of Hunting grounds to cover of compensation for damages caused by game species to can be found is stated in Article 12 of the 1996 Regional Hunting Law, and Article 33 of the 1970 National Hunting Law.

Payments from the insurance and regional administration are not conditional on the use of damage prevention measures and include damages from wolves as well as dogs. The compensation system introduced in 1999 was expanded in 2003 to offset other costs related to depredation (such as abortions, loss of milk production and subsidies per livestock head), and was included as a main conflict mitigation tool in the 2008 Wolf Management Plan of Castilla-León (Law BOCYL N.68 09/04/2008). The maximum amount payable by the Regional Administration for each depredation event is €770 for cattle, €300 for sheep or goats and €440 for horses (BOCYL-D-30092016-11).

The portion of the insurance premium subsidized by the regional administration varies slightly from year to year and according to the species of livestock insured (between 22 and 51% in years 2015 and 2016). Differences between minimum and maximum amounts subsidised depend on characteristics of the farms, whether they are certified organic, if insurance was renewed from the previous year and other features. Depredations are included in a basic livestock insurance package which also covers accidents, loss of many livestock in a single event, loss of production due to any event covered by the insurance and certain diseases, depending on the livestock species insured Insurance payments are made within two months of a damage claim (Entidad Estatal de Seguros Agrarios 2015 and 2016)

5 Stakeholder participation in the PHGs of León: Relevant legislation: CV: BOCYL-D-15062017-1.

Elected members of the wolf working group are nominated by the president upon suggestion of the relative groups they represent Livestock farming associations represented in the committee are those mentioned in the regional law (Ley Agraria 1/2014, de 19 de marzo); representatives of the environmental and conservation associations are elected during a separate meeting, where the associations are called to nominate representatives by vote (votes are weighed according to the number of members in each association); and the representative of the eco-tourism companies is voted during a separate meeting where

companies that are authorized to carry out wolf tourism in the region are called to vote. The mandates of committee members last 4 years. The main function of the committee is to invite stakeholders to debate, consult, contribute revisions to and receive information on the wolf management plan and its implementation, and any research being carried out. Meetings take place at least once a year. The heads, permanent and elected members all hold voting power over certain issues. Agreements are reached by majority voting (in case of tie, the vote of the president is final).

The heads and permanent members of the scientific committee are the same as the wolf working group, whilst the elected members are: 2 recognized experts of wildlife management from the universities of the region; 1 expert of free range livestock breeding from the universities of the region; 1 representing the professional schools of wildlife management of the region; 1 representing the professional schools of livestock breeding of the region (Representatives of universities and professional schools are proposed, in turn, by each university or professional school, in the order of their creation); 3 recognized wolf experts proposed by the environmental department; and 3 recognized experts of livestock breeding proposed by the farming department. Like the wolf working plan, mandates of the members of the scientific committee last 4 years. Meetings take place at least once a year with the objective of providing consultation regarding wolf management and conservation, and regarding any revisions of the wolf management plan. Agreements are also adopted by majority voting.

6 Damage compensation in the RHR of Riaño: Damage compensation includes loss of productivity, according to fixed amounts set by the compensation rules published in 2009 (B.O.C. y L. - N.º 77). Regulation passed in 2017 (BOCYL-D-25042017-6), after fieldwork was carried out, introduced several limitations to the context in which damages could be claimed. Damages occurring in non-predator proof fencing or enclosures are no longer compensated. Rangers producing the damage reports include information on the damage prevention measure in place and establish those to be used by the farmer ibn the future. Farmers who re-experience damages without employing the measures suggested by rangers are not compensated. The veterinary and pharmaceutical costs of injured livestock are covered up until the maximums established in a list of compensation amounts

for depredated livestock. Farmers must declare damages within 48h of their occurrence and these are compensated within 6 months of the damage claim

7 Hunting in Cangas: Following the Hunting Law of 1989 (2/1989, of June 6) , the previously small and numerous hunting grounds within Cangas were united into a single Regional Hunting Ground that spans across almost the entirety of the municipal territory. The Regional Hunting Ground is managed by a “open” hunting association, which allows membership by any hunter regardless of their area of residence. Instead, the Regional Hunting Reserves of both Cangas and Somiedo hold special rights for local hunters.

8 Wolf hunting in Cangas: The wolf management plan (first established in 2002, Decreto 155/2002, de 5 de diciembre; and revised in 2015, N. 78 DE 6-IV-2015) divides the regional territory into administrative districts, to which different population control quotas are assigned, but the districts do not follow municipal boundaries so it is not possible to calculate wolf cull quotas in Cangas and Somiedo. Regarding the criteria to determine wolf culling quotas, an analysis by Naves (2015) suggests that social conflict is the strongest predictor of wolf population control measures, despite the fact that the management plan does not specify how social conflict is defined and evaluated.

9 Damage compensation in Cangas: Compensation amounts were first published in 2017 (Resolution of May 17, 2017). Amounts are broken down in detail for each damage depending on the age, sex, species and productive orientation of livestock: compensation of cattle ranges from €150 to €1500 (plus an additional amount for pregnant cows ranging from €90 to €120); compensation for horses ranges from €60 to €990, compensation for donkeys and mules ranges from €50 to €350; compensation for sheep ranges between €50 and €90 (plus an additional 10% for those with certified genealogy); compensation for goats ranges from €85 to €125 (plus an additional 10% for those with certified genealogy. The regional wolf management plan includes among its objectives, the development of a quicker compensation system (within 15 days and within 45 days when there is disagreement over the compensation amount owed), the need to provide adequate training for damage inspectors and to consult farmer representatives when setting damage compensation amounts (Decree 23/2015, March 25, N. 78

DE 6-IV-2015). Legislation providing subsidies to private, voluntary insurance for agricultural productions: Resolution of March 20, 2015 NÚM. 80 DE 8-IV-2015)

10 Damage prevention in Cangas: in 2016 Asturias spent 89.250 € in subsidies (Resolución de la Consejería de 19 de octubre de 2016). The subsidies covered between 15 and 75% of the costs of the damage prevention measure.

11 Stakeholder participation in Cangas: Resolucion de 29 de octubre de 2003

11.7. Appendix 7 Damages caused by bears to livestock, bee hives and crops

The total number of damage events caused by bears and compensated by the regional government was similar in Cangas and in Somiedo (fig. 11.14), although the damage events were slightly more numerous in Cangas while compensation was slightly higher in Somiedo (due to the actual entity of the damage incurred). However, when surface area is taken into account, more funds were dispensed to compensate damages in Somiedo (73€ / year / km^2) than in Cangas (23€ / year / km^2; although this figure is a slight underestimation due to unprocessed claims). The total amount of damages incurred in both sites increased steadily between 2014 and 2016. The year 2016 in particular, marked a significant increase in damages caused by bears to livestock (39 livestock heads in Cangas, and 14 livestock heads in Somiedo). Higher amounts of compensation were dispensed for damages to beehives than to any other category of damage.

Figure 11-14 Damages caused by bears in each study site, based on official registries reporting certified damages.
Each row represents a different type of damage (all damages in total, and then broken down into damages to livestock, to crops and fruit trees and to bee hives). Each column represents a different estimate of damage (number of damage events, amount of compensation paid by the regional government, average amount of compensation paid per year, per km^2). The compensation figure provided for livestock damages which occurred in Cangas in the year 2016 (marked by a red X) is incomplete, as the regional administration had not yet processed all the damage claims.

11.8. Appendix 8 Attitudes toward bears

Below is a brief description of livestock farmers', beekeepers' and hunters' attitudes towards bears. Statistically significant differences between the sites were calculated using a Wilcoxon test, and are marked in figures 11.15 and 11.17.

Across both study sites, the sampled farmers overwhelmingly believe that bears belong to the nature of their area (99% in Somiedo and 89% in Cangas) and that it is important to conserve them (78% in Somiedo and 60% in Cangas). A slight majority of respondents in both sites also claimed bears enrich their experience of nature (58% in Somiedo and 56% in Cangas). Although those who believe that bears contribute to the maintenance of nature's equilibrium were a minority, if they are added to those that expressed neutral opinions, they reach 69% in Somiedo and 47% in Cangas. Attitudes towards bear presence and conservation were statistically higher in Somiedo than in Cangas (fig. 11.15), while the attitudes of beekeepers and hunters were even more positive than the attitudes of farmers. For example, the large majority of bee keepers (85% in Somiedo and 82% in Cangas) and hunters (94% in Somiedo and 82% in Cangas) claimed it was important to conserve bears in their area, compared to slightly fewer farmers (78% in Somiedo and 60% in Cangas).

In line with having more positive attitudes towards bears, livestock farmers in Somiedo were significantly more likely to believe bears are compatible with livestock breeding activities (78%) than livestock farmers in Cangas (49%). They were also less likely to claim that bears cause a lot of damages to livestock (10% in Somiedo and 39% in Cangas), and to fruit trees (45% in Somiedo and 80% in Cangas). However, when asked whether, through improved management, bears could be compatible with livestock breeding activities responses were overall positive, with no significant difference between the sites (91% in Somiedo and 79% in Cangas).

Moreover, the majority of beekeepers agreed (or were neutral regarding the fact) that bears are compatible with the beekeeping world (69% in Somiedo and 74%

in Cangas), even though most claimed that they cause a lot of damages to beehives (54% in Somiedo and 74% in Cangas). However, when asked whether, through improved management, bears could be compatible with beekeeping activities responses were overall positive (92% in Somiedo and 82% in Cangas). Interestingly, livestock farmers were far less likely to believe bears are compatible with beekeeping activities (24% in Somiedo and 27% in Cangas) than beekeepers (69% in Somiedo and 74% in Cangas) (fig. 11.16).

Only a minority of hunters believed bears posed a threat to hunting activities (18% in Somiedo and 29% in Cangas; fig. 11.17) and only a minority from all groups perceived bears as a threat to human safety (7% in Somiedo and 24% in Cangas amongst farmers) and as an excuse used by the authorities to impede local development (34% in Somiedo and 35% in Cangas amongst farmers). Instead, the majority of respondents from all groups believed bears incentivize tourism, in a significantly higher proportion in Somiedo than in Cangas (100% in Somiedo and 61% in Cangas among farmers). Farmers in Somiedo were less likely to claim that bears should be used more to incentivize tourism (27%), compared to farmers in Cangas (39%) (fig. 11.15). Those who opposed further promoting tourism in Someido usually claimed tourism was positive but has little capacity for further expansion, while those who opposed in Cangas often did not consider tourism feasible or beneficial.

Finally, despite lower bear densities in Cangas than in Somiedo (see) and overwhelming agreement that the bear population has increased over the past decade in both sites (99% in Somiedo and 92% in Cangas amongst farmers), respondents in Cangas were significantly more likely to want the bear population to be reduced (27% in Somiedo and 44% in Cangas amongst farmers). Moreover, despite the fact that beekeepers are the sector most affected by bears damages (according to the official registries) they were the group that was less likely to demand a reduction in the bear population (0% in Somiedo and 41% in Cangas).

Across both sites, the majority of farmers (75% in Somiedo and 80% in Cangas) and hunters (77% in Somiedo and 68% in Cangas) believe that the bear population will need to be controlled in the future, as it will keep increasing unless it is kept under control. Instead bee keepers were more split (53% in Somiedo

and 81% in Cangas). Finally, the majority of farmers in both sites (73% in Somiedo and 76% in Cangas) and the majority of beekeepers in Cangas (54% in Somiedo and 82% in Cangas), claimed that their tolerance of bears would increase with improved compensation

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Figure 11-15 Farmer's attitudes towards bears measured on a 5-point Likert scale (Cangas=75; n Somiedo 67).
Fig. Farmer's attitudes towards bears measured on a 5-point Likert scale (n Cangas=75; n Somiedo 67).
Significance stars (=p<0.05; **=p<0.01; ***=p<0.001) are added to the title of each plot to denote statistically significant differences between the study sites. These were carried out using a Wilcoxon test on items that were re-coded with dummy variables on a 3-point Likert scale (where strongly agree/agree and strongly disagree/ disagree were joined together).*

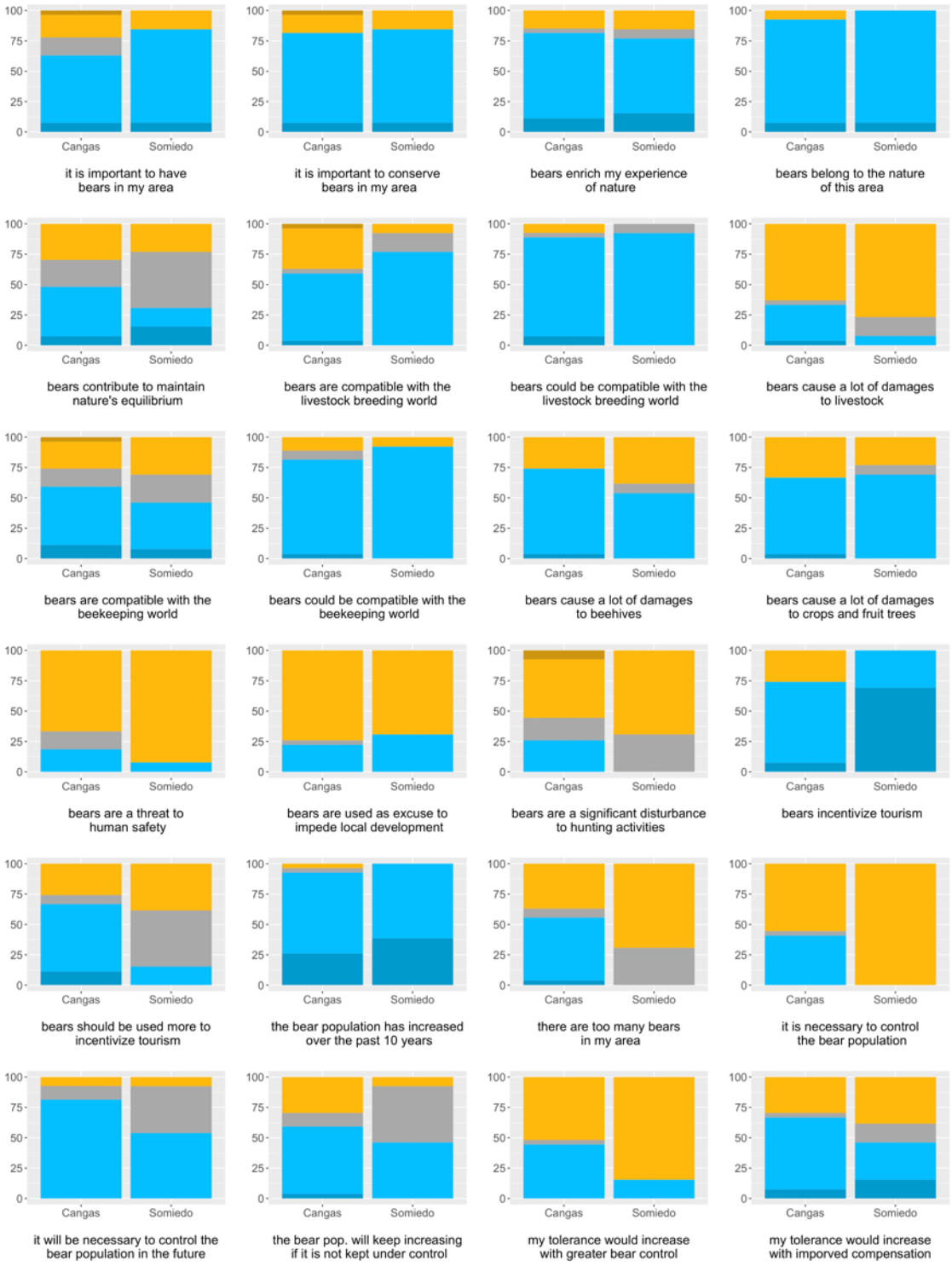

Figure 11-16 Beekeepers' attitudes towards bears measured on a 5-point Likert scale (n Cangas=27; n Somiedo 13).
Due to the small sample size, no statistical tests were carried out to detect significant differences between the sites. Caution should be adopted when interpreting these results, because they were collected through snow ball sampling.

Figure 11-17 Hunters' attitudes towards bears measured on a 5-point Likert scale (n Cangas=38; n Somiedo=34). Significance stars (=p<0.05; **=p<0.01; ***=p<0.001) are added to the title of each plot to denote statistically significant differences between the study sites. These were carried out using a Wilcoxon test on items that were re-coded with dummy variables on a 3-point Likert scale (strongly agree/agree and strongly disagree/ disagree were joined together). Caution should be adopted when interpreting these results, because they were collected through snow ball sampling*