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Sharing Landscapes with Wildlife: Conflict and Coexistence of Extensive Grazing Systems with Large Carnivores

Sharing landscapes with wildlife: Conflict and coexistence between high nature value pastoral systems and large carnivores

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Abstract

1. High nature value (HNV) pastoral systems, that is those maintained by herding, transhumance and extensive grazing practices, are recognised as cornerstones of European biodiversity, cultural heritage and ecosystem service provision. Yet these systems are currently under significant pressure from a range of economic, social and environmental drivers.
2. The recovery of large carnivore populations across Europe, while representing a major conservation success, constitutes an additional significant pressure. Pastoral systems are predominantly located in marginal and remote areas, maintained by the grazing of extensive livestock or reindeer, and are thus both at the frontline of carnivore recovery and most vulnerable to negative impacts, such as depredation.
3. This Special Feature, bringing together 15 interdisciplinary contributions spanning pastoral and rangeland systems across Europe, the Americas, and Central and East Asia, is published at a critical juncture in European wildlife, nature restoration and agricultural policy, while also coinciding with the UN International Year of Rangelands and Pastoralism. It aims to advance integrated and interdisciplinary knowledge of co-existence with carnivores in HNV pastoralist landscapes. This editorial discusses the joint challenges, solutions and research gaps highlighted by the contributions.
4. Three primary and systemic drivers are identified as undermining pastoral resilience and associated coexistence capacity with large carnivores: the loss of mobility and common resources; unfavourable market and policy environments; and shifting social and institutional contexts. A central finding across contributions

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is that large carnivore impacts (including depredation) must not be treated as an isolated issue, but as one feature within this broader socio-environmental context of challenges and drivers of vulnerability in pastoral landscapes.
5. Alongside these pressures, the feature also highlights enabling conditions for coexistence, including place-based approaches, co-production of knowledge, participatory governance platforms, maintained local institutions and the meaningful integration of pastoralists' expertise.
6. The feature concludes with calls for better coordination between agricultural and conservation policy, enhanced and holistic protection of pastoral systems' resilience, and for treating coexistence as an iterative, adaptive process requiring sustained institutional commitment and trusting relationships with local communities.

KEYWORDS
coexistence, Common Agricultural Policy, high nature value farming, large carnivores, participatory governance, pastoralism

1 | INTRODUCTION

Over half of European landscapes are under agricultural management, and the ongoing intensification of farming, encouraged in part by the European Union (EU) Common Agricultural Policy (CAP), has been one of the main drivers of biodiversity loss and deteriorating ecosystem health throughout the twentieth century (European Environment Agency, 2020; Pe'er & Lakner, 2020). In contrast, pastoralism and extensive grazing are recognised as supporting important habitats and species and providing additional ecosystem services such as wildfire prevention and carbon sequestration, as well as maintaining cultural heritage (Dean et al., 2024; Keenleyside et al., 2014; Kerven & Behnke, 2011; Plieninger et al., 2019). These animal husbandry practices, including livestock and reindeer herding, are known by various terms, including high nature value (HNV) farming or grazing systems, Globally Important Agricultural Heritage Systems, pastoral systems or extensive livestock systems (henceforth HNV systems or pastoralism, depending on whether we focus on the ecological outcomes or practices). Despite their long history and their recognition in research and policy, such systems are highly vulnerable to socio-economic transitions. In Europe and across the world, they are increasingly threatened by market pressures, demographic shifts and policy environments that favour more intensified agricultural production (Iordachescu, 2022; Krauß & Olwig, 2018; Leal Filho et al., 2017; Lomba et al., 2019).

Pastoral systems are also particularly vulnerable to depredation and damage by large carnivores, including wolves, bears, lynx and wolverines and avian predators (notably golden eagles in northern Fennoscandia) (Linnell & Cretois, 2018; Recio et al., 2020). The threat to (semi)domestic animals, combined with concerns for human safety and hunting interests, was the main driver of the deliberate extermination of many large carnivore species across vast areas of Europe, with bounties lasting into the 1980s. However, thanks mainly to supportive conservation policies, there has been a marked recovery of large carnivores across the European continental land mass, particularly of wolves (Chapron et al., 2014; Kaczensky et al., 2024). While this recovery constitutes a major conservation success, it also represents a complex coexistence challenge, since large carnivores often have the most detrimental impacts on the same pastoral systems that provide the greatest bio-cultural benefits. The main policy response to the ongoing large carnivore expansion and resulting depredation has been to financially compensate farmers and herders for animals lost, to promote and implement protection measures and to permit culling or hunting (Eklund et al., 2017; European Commission, 2021). However, such approaches often remain focused on the material damages, rather than the broader aspects such as socio-psychological effects, power relationships, conflicting values, as well as the unequal distribution of costs of large carnivores, and overlook the underlying and cumulative drivers of impacts and conflicts (Lécuyer et al., 2021; Salvatori et al., 2021; Zimmermann et al., 2020).

This Special Feature is released at a time when the debate around the presence and impact of large carnivores is highly polarised and politicised (e.g. Clemm & Hohenberg, 2022). The EU Nature Restoration Regulation, which narrowly made it through the EU ordinary decision process in 2024, demonstrates a paradigm shift, moving beyond conserving what is already there towards restoring biodiversity and ecosystem functions (European Commission, 2024). Concurrently, the European Commission approved the politically controversial proposal to reduce the protection status of wolves in the Bern Convention and the Habitats Directive (European Commission, 2025), causing celebration and outcry from different groups. As emphasised in a perspective commissioned by the European Commission (Linnell et al., 2025),

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the '*question of how far to let large carnivores recover beyond the minimum that is needed for viability is emerging as one of the main areas of conflict among stakeholders*'. Internationally, the Global Biodiversity Framework (adopted in 2022) now explicitly mandates efforts from its signatories to minimise such human–wildlife conflicts for coexistence (Target 4) and to ensure the equitable and effective representation and participation of Indigenous Peoples and local communities in decision-making (Target 22). This policy context presents challenges but also opportunities to develop a broader range of tools to reduce conflict and promote coexistence with and within HNV systems, together with pastoralists and other stakeholders (Pettersson & Von Essen, 2025).

Promoting carnivore-pastoralist coexistence is contingent upon a concerted effort to address the multiplicity of issues that can undermine the resilience of pastoral systems, yet such efforts are highly fragmented (if at all present) within agricultural, social and conservation policies. A contributing problem is that challenges related to HNV systems and large carnivore conservation have been analysed separately, by different disciplinary fields, and with different ontologies and methodologies. Similarly, the knowledge and evidence brought by pastoralists have often been disregarded as anecdotal or irrelevant (Molnár et al., 2023). Only in recent years has such knowledge started to be recognised as valuable in its own right, for instance by the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES, 2022), which has highlighted the need to weave traditional knowledge and more mainstream scientific approaches (Tengö et al., 2017). At the same time, the more-than-human geography scholarship emphasises that large carnivores themselves shape and reshape human–wildlife interactions through their agency, individuality, cognition, sociality and cultures (Edelblutte et al., 2022). Yet, despite a better understanding of the problems and their underlying drivers, a significant policy-implementation gap remains in Europe and elsewhere.

The collection of papers in this Special Feature offers the most comprehensive and interdisciplinary overview of coexistence in HNV pastoralist landscapes in Europe published so far. It grew from the shared acknowledgement among the editors, all involved in research on the topic, of the particularly challenging nature of large carnivore coexistence in pastoral systems, based on discussions within the EU Platform on Coexistence between People and Large Carnivores (European Commission, n.d.). The papers included in the feature present interdisciplinary scientific knowledge on the interactions between pastoral systems and large carnivore conservation in Europe. It includes 15 articles from diverse pastoral systems, countries and species. Contributions from the Americas, central and east Asia complement the collection and highlight similarities with the European situation in terms of the carnivore-pastoral system interactions, despite different political and economic contexts. The authors of the included papers come from various scientific backgrounds, including sociology, political science, agricultural science and conservation biology. Practitioners are included to the extent that many of the authors work directly with pastoralists and provide direct quotes from them in their papers, meaning that pastoralist voices are present through researchers' interpretation rather than direct authorship.

In the following perspective, we discuss the joint challenges, solutions and research gaps highlighted by the contributions. While access to knowledge cannot alone solve such a multi-layered and complex challenge, the collation of targeted large carnivore-pastoral research in one place can support more informed debate, for example, in the European or national parliaments. The insights and perspectives discussed here are also of broader relevance for HNV systems and pastoral areas across the world, since they encompass diverse socio-economic contexts and drivers of human–carnivore interactions. However, the contributions, individually and collectively, also highlight the extremely contextual nature of these interactions.

To illuminate this context dependency, a good place to start is the systems themselves, that is the landscapes in which the interactions are taking place. These are examined in the section 2, based on the examples in the Special Feature. We then go on to explore the threats to HNV systems in section 3, followed by their adaptive capacities in section 4. We conclude with recommendations for policy and for further research in section 5.

2 | WHAT ARE HIGH NATURE VALUE AND PASTORAL SYSTEMS?

Within this feature, Pettersson et al. (2025) explore the meaning of 'local' in the context of European pastoral areas. They describe how the understanding of who is encompassed by the term is important, to know who can contribute to locally adapted approaches to coexistence. However, as the authors point out, pinning down who is local is increasingly difficult given ongoing socio-economic and cultural shifts, including parallel processes of depopulation and abandonment alongside migration of foreign labourers and 'neo-rurals' to the countryside. The same conundrum applies to 'HNV grazing' and 'pastoral', in terms of systems, practices and people. Our call for this feature, which emphasised pastoralism-carnivore interactions, yielded European contributions encompassing reindeer herding in northern Sweden (Kaiser et al., 2025), various types of European livestock systems, for example in Austria (Marsden et al., 2026), France (Ouvrier et al., 2025), Italy (Salvatori et al., 2026), Romania (Salvatori et al., 2026) and Spain (Acebes et al., 2024) through to 'primary producers' (including beekeepers) in Greece (Hovardas et al., 2025). We also received contributions on seasonal cattle grazing allotments on federal land in the Western US (Anderson et al., 2024), private ranches within the Chilean Patagonia (Iranzo et al., 2025) and extensive grazing systems/rangelands in Tibet and Kazakhstan (Gao & Yu, 2025; Koshkina et al., 2025). Few of these papers provide a clear definition of pastoralism or HNV systems, although some authors distinguish between different types of animal husbandry, for example 'farmers' vs. 'cattle breeders' or 'livestock owners', see Acebes et al. (2024), Hovardas et al. (2025), Koshkina

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et al. (2025). This poses the question of how HNV pastoral systems can and should be differentiated from other types of farming in the context of carnivore management.

The concept of high nature value (HNV) farmlands (and HNV farming systems) was developed in the 1990s to distinguish low intensity agricultural practices supporting high levels of biodiversity, on which many of the EU's protected habitats (and species) are dependent. The most commonly used definition today is that employed by Varela et al. (2025) originally developed for the European Environment Agency: *'areas in Europe where agriculture is a major (usually dominant) land use and where that agriculture supports, or is associated with, a high species and habitat diversity or the presence of species of European conservation concern, or both'*. Varela et al. (2025) reported that most research to date has evaluated these HNV farmlands through biophysical approaches (juxtaposed with socio-cultural, economic or plural), and most focus on the direct drivers of change affecting them. This focus risks obscuring or downplaying the structures, institutions and indirect drivers that shape HNV farmlands and their abilities to produce nature-positive outcomes.

In Figure 1, we present a broader set of social–ecological components of pastoral systems, based on recent literature. From the contributions in this Special Feature, we further highlight their potential role in helping or hindering sustainable adaptation pathways to coexistence. However, as pointed out by the majority of the feature contributions, pastoral systems face multiple challenges and threats, and their ability to survive and thrive in the face of them is contingent on their ability to change, innovate and adapt. Thus, fixed ideas of how pastoral systems ought to look and function would undermine this natural and necessary process of evolution. Nonetheless, as Pettersson et al. (2025) describe a continuum of 'localness' and local knowledge in pastoral areas, the proposed components can help situate different systems on a continuum from conventional, sedentary livestock farming to HNV pastoralism and highlight their respective challenges for coexisting with large carnivores.

3 | THE THREATS FACING PASTORAL SYSTEMS

Inherent in pastoralism as a practice, and a prime cause of its convergent evolution across the world, has been the ability to manage uncertainty, including climatic, socio-economic and ecological change. In other words, pastoral systems have by nature and design been resilient. Their significant decline since the start of the twentieth century has primarily been driven by external forces: policy incentives, market conditions, changes in social and institutional structures and competition for land which restricts their activities (see Acebes et al., 2024; Pettersson et al., 2025; Salvatori et al., 2026; Varela et al., 2025). Here we explore key threats highlighted by authors in the Special Feature (see Figure 2, e.g., of the system types).

3.1 | Loss of mobility and common resources

A key strategy in pastoral systems to deal with varying resource availability has been mobility, moving herds continuously or seasonally according to climatic and weather conditions, and to avoid areas where risks (e.g. predation, disease) are particularly high (Figure 1). Constraints to this mobility, through land use-change and reductions to the extent of common land, have significantly reduced the resilience of pastoral systems. In Northern Sweden, Kaiser et al. (2025) describe how legacies of colonial policies (affecting land tenure and self-determination) in conjunction with ongoing 'green extractivism' (e.g. forestry, mining, wind turbines), infrastructure (roads, railways), and climate change have led to loss, fragmentation and altered composition of reindeer herding communities' pastures. Both reindeer and predators are squeezed into these shrinking fragments, with reduced redundancy and possibility to move herds between them. This results in elevated vulnerability to predation as well as heightened social conflicts, which are beyond the scope of the current Swedish payment system to address. Across many pastoral areas, the 'passive rewilding' that occurs in the wake of land abandonment has resulted in paths and infrastructure falling into disrepair while shrub encroachment and afforestation render areas unnavigable for people and livestock alike, increasing grazing pressure on the patches that remain in use. The changing frequency and spatial pattern of encounters between wildlife and residual farming activities resulting from this process are exemplified by Acebes et al. (2024) in Spain and Ouvrier et al. (2025) in France, illustrating that it has increased pressure remaining pastoralists to protect their flocks. Elevated vulnerability at habitat edges was also found in Anderson et al.'s (2024) model for the western US, which predicted that small or fragmented wildland (as is the case in most of Europe) increases wolf use of human-maintained edges, elevating predation risk for adjacent grazing areas. Larger connected wildland tends to retain wolves and wild prey within core areas, lowering spillover to livestock, a finding also found in Hawkinson et al.'s (2025) agent-based modelling.

3.2 | Shifting social–institutional contexts

Another defining characteristic of pastoral systems (Figure 1), and one of the most effective deterrents for large carnivore predation, is the presence, knowledge and skill of the herder. Yet, the socio-economic conditions for this form of labour are diverse and transforming, partly due to agricultural policies, demographic shifts and market pressures. For instance, in the US context, Anderson et al. (2024) describe how long travel times (due to remoteness), limited staff resources, rugged terrain and large allotments reduce the viability of herding and night corralling as preventative practices. Simultaneously, the remoteness increases reliance on nonlethal deterrents that require frequent maintenance, while agency jurisdictions and liability rules complicate rapid response to depredation events. In the European context, privatisation and depopulation

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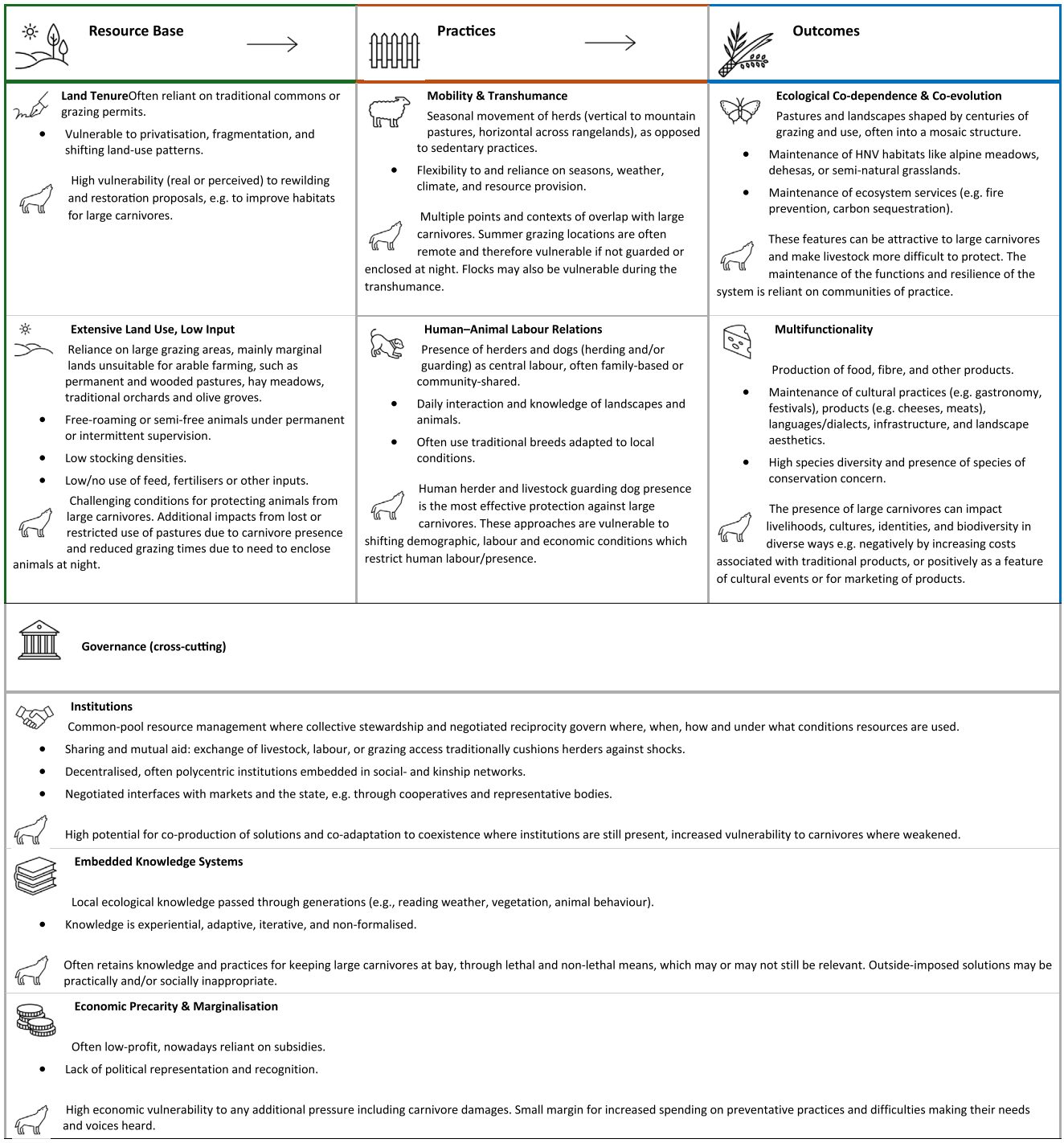

FIGURE 1 Range of archetypical characteristics and components of pastoralist systems of high nature value in Europe (bullets) and some of the ways in which they affect their coexistence capacity with large carnivores (wolf icon). Across European pastoral systems, many of these characteristics have been partially or fully lost or altered, increasing their vulnerability to large carnivores. Collated from Kerven & Behnke (2011), Nori & Scoones (2019) and Scoones (2023), definition of HNV farming from Andersen et al. (2003) and expanded through perspectives from the special feature contributions.

have eroded the institutions and sharing economy of many pastoral systems (Figure 1), while pastoralists' family members have become occupied elsewhere (e.g. children in school, spouses working outside the home). In combination with difficulties of finding skilled labour, pastoralists have become increasingly isolated, making active herding challenging and costly, and sometimes irreconcilable with contemporary aspirations of work-life balance (e.g. Pettersson et al., 2025; Varela et al., 2025). As the number of people engaged in pastoralism has decreased, so has access to knowledge exchange, peer-support, institutional representation and surrounding social networks. This not only increases workload, but also loneliness and vulnerability for those remaining, and reduces enjoyment in their

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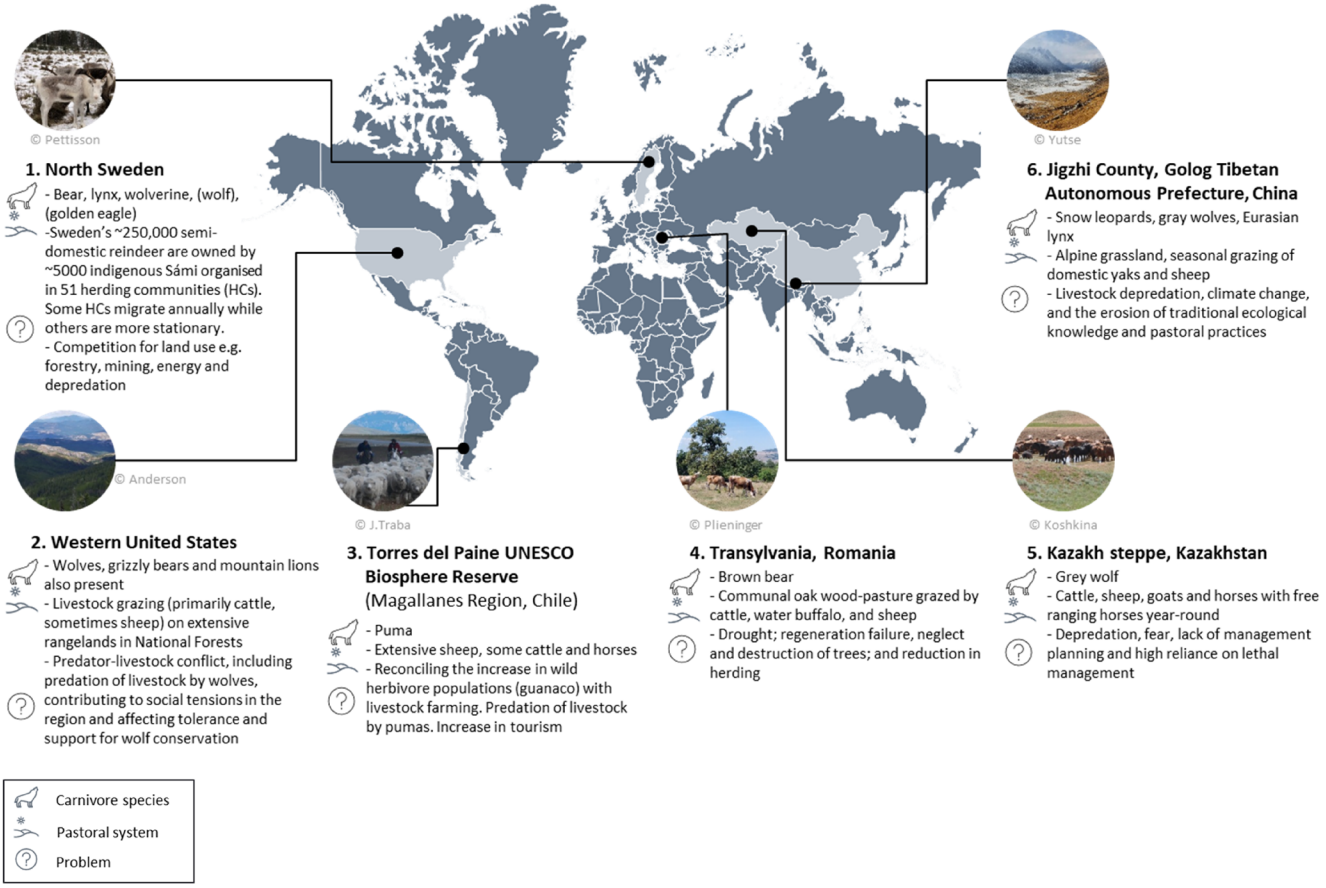

FIGURE 2 Types of HNV pastoral and rangeland systems that are showcased in the special feature. (1) as described by Kaiser et al. (2025); (2) Landscape focused on by Anderson et al. (2024); (3) case study of Iranzo et al. (2025); (4) one of the systems highlighted in Varela et al. (2025); (5) landscapes from Koshkina et al. (2025); (6) case of Gao and Yu (2025).

work, leading to a generalised sense of being neglected and uncertainty for the future (Salvatori et al., 2026). Many have adapted by decreasing time with flocks (e.g. relying on virtual or physical fences, GPS collars and/or guardian dogs), getting additional jobs to make ends meet, or shifting livestock systems (e.g. from sheep to cows), all of which affect the coexistence trajectory and outcomes in a given place. Ouvrier et al. (2025) illustrate this process in France, finding that pastoralists' responses to changing bear densities—which include a mix of preventive measures, negotiation with authorities and selective tolerance—were relational and depended on bear behaviour, community norms and experiences of sharing space, as well as material infrastructures, economic pressures and multispecies movements.

3.3 | Market and policy pressures

The market and policy support available to pastoralists is perhaps the most significant driver of change to these systems. Since its establishment at the end of the 1950s, the EU's Common Agricultural Policy (CAP) has primarily focused on increasing agricultural productivity. The CAP of the 1960s and 1970s emphasised price support mechanisms, modernising subsidies and structural adjustment, resulting in intensification, increased use of inputs and mechanisation, as well as farm consolidation and specialisation (Varela et al., 2025). Concurrently, in Sweden, Finland and Norway, domestic policies and climate change have driven increased emphasis on meat production, reindeer herd size and reliance on supplementary feeding (Kaiser et al., 2025), with resulting changes in traditional reindeer herding practices. For more recent EU members, as well as across central and Eastern Europe and former Soviet states, forced collectivism had similar impacts on their livestock systems (Koshkina et al., 2025). In recent decades, the focus of the CAP and national subsidies has changed from a purely production focus to including wider environmental and rural development aims. While more intensive farming systems still receive the bulk of the support, the remaining pastoralists are generally highly reliant on subsidies to continue their activities (Varela et al., 2025). Nonetheless, as Pettersson et al. (2025) and Kaiser et al. (2025) show, these are often poorly directed to support the continuation of pastoral systems, notwithstanding the broad acknowledgement of their environmental and social benefits. For instance, a significant share of HNV pasture is not recognised as an 'agricultural area', excluding them from area-based CAP subsidies (e.g. agro-forestry or the entire reindeer herding area), while some conservation designations are not automatically connected to financial rewards (Varela

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et al., 2025). Moreover, pastoralists are rarely represented in the political arena, either in terms of wildlife policy or agricultural reform. In the cases where they are organised, their organisations tend to act at the local level on specific issues and are rarely heard at the national or EU level (Varela et al., 2025). However, as pointed out by Hovardas et al. (2026), where given the opportunity, farmers and pastoralists are enthusiastic participants in local-level stakeholder processes and tend to be more willing to discuss coexistence issues than the large farming unions on the EU level.

Within these three pressures were highlighted throughout the Special Feature, multiple smaller threats are nested, for example conflicts with tourism (Salvatori et al., 2026), conflicts over data (Marsden et al., 2026), as well as changing public perceptions of both large carnivores and farmers/pastoralists and their role in sustainable food production and climate change mitigation (Hovardas et al., 2026). Interestingly, depredation by large carnivores was not frequently mentioned as a biophysical driver of change in the HNV research reviewed by Varela et al. (2025), while being consistently mentioned across the other works in the Special Feature, confirming the view that large carnivores and the challenges facing pastoralists have primarily been analysed separately.

Negative impacts from wildlife have existed since pastoralism began, and a wide range of coping mechanisms have developed to protect flocks and ways of life. However, many of these mechanisms were developed in and for a particular context that has now changed, reducing their effectiveness or viability (Pettersson et al., 2025). In contrast to the overarching and highly complex drivers of these changes (e.g. the market, demographic and institutional shifts we have described), large carnivore presence and impacts are highly tangible and (more) possible to address, through lethal and non-lethal approaches. For instance, Iranzo et al. (2025) illustrate how economic vulnerability and lack of affordable mitigation in Chilean Patagonia maintain a high demand for lethal responses, independent of the number of pumas. In combination with the flagship status of large carnivores and polarisation of conservation and farming interests (e.g. rewilding vs. HNV grazing), it explains why large carnivores have become a political lightning rod and a management priority, even though targeting other drivers could be more effective in preventing depredation or enhancing resilience of pastoral systems.

4 | ADAPTATION AND COEXISTENCE

Despite the pressures described above, pastoralist and HNV systems persist across the globe in very different political, social and biogeographic conditions (see Figure 1). Examining what has allowed them to adapt and survive in different contexts can be instructive for formulating policy responses to support remaining systems and their adaptive capacities, including the enabling conditions of coexistence. The Special Feature contributions highlight a number of such conditions, as well as some key considerations for working with and across these systems.

4.1 | Building on local contexts and practices

One key theme is the importance of acknowledging the significant place-based variation between pastoral systems, the different stages of persistence or return of large carnivores, and the associated coexistence conditions, which have and will shape very different pathways to coexistence. For instance, Gao and Yu's (2025) research from the Qinghai-Tibet Plateau demonstrates how mobility and strong local institutions allow herders to negotiate pasture boundaries, adjust spatial and temporal movements, and equitably share risk exposure from snow leopards across groups, such that no group is persistently overburdened by depredation. This illustrates the importance of safeguarding these system components for sustainable coexistence (Figure 1), and the importance of local perceptions of equity and fairness. At the other end of the scale, in the US ranching context described by Anderson et al. (2024), very few people are involved, and herds are left largely alone for significant periods of time, necessitating a higher reliance on technical solutions. There is also significant variation across the EU. For example, the differences between Ouvrier et al. (2025) description of the relationship between individual herders and bears in France, where bears were reintroduced relatively recently and pastoralists have had to reinstate protection measures, and Hawkinson et al. (2025) interviews with beekeepers in Greece, where bear populations have persisted and beekeepers have a continuous history of protecting their hives. While some authors in this Special Feature suggest that longer cohabitation times may increase tolerance of large carnivores (Koshkina et al., 2025), Kaiser et al. (2025) research from the Swedish reindeer herding territory (where large carnivores have persisted) illustrates that this tolerance is easily eroded by cumulative factors, unjust or ineffective management approaches and a lack of institutional accountability to agreed targets. However, individuals' own adaptation paths should not be overlooked, and research and practice should be wary of assigning a particular (often polarised or simplistic) position to certain groups (e.g. pro or anti). Although the circumstances are different, both Ouvrier et al. (2025) and Hovardas et al. (2025) describe how an individual's attitudes are impacted by a range of factors over relatively short periods, influencing their relationship and assessments of the circumstances and the individual animals.

4.2 | The role of local knowledge and practices under changing circumstances

This complexity illustrates why defining and categorising HNV pastoral systems, and coexistence within them, is so difficult. For instance, maintaining or reviving the traditional knowledge and practices that prevented large carnivore damages in the past is a topic of research interest, yet in some circumstances, these persist simply because of poverty and a lack of options. As Pettersson et al. (2025) emphasise, trying to fix knowledge or practices as they are or convince local people to revert to previous practices can be

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deeply unjust and socially inappropriate. Indeed, it can counter the very nature of pastoralism as an evolving practice. The clearest message from across the feature contributions is the need to build localised knowledge about coexistence capacities and implement adaptations from the ground up. Such place-based approaches can include new knowledge and innovations, for example new technology, as long as the elements of the systems that are instrumental to their core identity and function are retained. Given aims to maintain pastoralism in Europe and elsewhere, alongside large carnivore recovery, it is necessary to collaboratively define those core components and the outcomes that are valued by local communities and wider society (e.g. food production, landscape aesthetics, grassland biodiversity), and craft targeted policy instruments to ensure they are resilient to socio-political and ecological change (Ostermann-Miyashita et al., 2025).

4.3 | Improved approaches for dialogue and co-production

Many of the feature contributions highlight approaches and pathways to co-produced coexistence. Salvatori et al. (2026) and Hovardas et al. (2026) focus on the role that organised multi-stakeholder processes can play in bringing together different interest groups, including pastoralists, to discuss issues around large carnivore presence in pastoralist landscapes. They found that relationships had progressed from conflictual to collaborative as participants recognised common interests (Hovardas et al., 2026). However, they also highlight the importance of acknowledging power and scale dimensions in such processes (Salvatori et al., 2026). Marsden et al. (2026) argue that exchange and trust-building can and should occur during day-to-day management activities associated with large carnivore presence. They reflect on this in the context of the compensation system for predator-caused damages, where pastoralists' trust in the system is impacted by both interpersonal trust, for example their relationship with the damage inspector, and institutional trust, for example their experience with the reliability and rapidity of the compensation system. To increase trust, the authors suggest that authorities must acknowledge that their role is not purely technical, but also includes a social dimension. Salvatori et al. (2026) describe how in the cases they examined, this social dimension had been neglected and that trust in authorities was generally weak.

5 | CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH: LINKING SOLUTIONS TO DRIVERS OF CHANGE

This Special Feature has brought together researchers and practitioners from across disciplines and geographies to illuminate the complex realities of coexistence between pastoral systems and large carnivores. A central finding is that the challenges facing pastoral systems are not isolated or merely technical, but are deeply embedded in broader socio-economic, policy and institutional drivers. These drivers—market and policy pressures, loss of mobility and common resources, and shifting social–institutional contexts—shape both the vulnerabilities and the adaptive capacities of pastoralists (Table 1).

5.1 | Addressing market and policy pressures

Pastoralism persists in spite of, rather than because of, prevailing agricultural and conservation policies. The Common Agricultural Policy (CAP) and related frameworks have historically incentivised intensification and specialisation, marginalising HNV systems. As a result, many pastoralists are now highly dependent on subsidies, which are often poorly targeted and fail to recognise the full suite of ecosystem services and cultural values these systems provide. Policy reforms, such as the ongoing CAP revision and the introduction of the EU Nature Restoration Regulation, offer a critical window to redirect support towards systems that deliver public goods, including biodiversity, landscape management and climate resilience. However, this requires cross-sectoral coordination (e.g. between the Directorate Generals for Agriculture and Environment and equivalent national ministries) and mechanisms that ensure pastoralists' voices are heard in policy design and implementation.

5.2 | Safeguarding mobility and common resources

The loss of access to resources and mobility, through land competition, fragmentation, privatisation, loss of commons and land abandonment, has undermined the resilience of pastoral systems and increased their exposure to large carnivore depredation. Coexistence approaches should therefore prioritise the restoration and protection of mobility corridors, infrastructure and support for transhumance and seasonal grazing. This includes recognising and supporting the role of herders (e.g. through salary support) and local knowledge systems, which are central to both ecological management and coexistence with wildlife. Such needs should be considered in nature restoration efforts, for example in member states National Restoration Plans under the Nature Restoration Regulation.

5.3 | Acknowledging social–institutional contexts

The fragmentation of social networks and institutions, poor political representation and shifting public perceptions have left many pastoralists isolated and vulnerable. Building resilience requires investment in peer learning networks, multi-stakeholder platforms and participatory governance structures that bridge local, regional and EU-level decision-making. Co-production of knowledge, where pastoralists' experiential expertise and evidence is valued alongside scientific evidence, is essential for context-sensitive solutions and

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TABLE 1 Summary of recommendations for policy, practice and research regarding support to pastoralism.

Recommendation	Key actors
Policy	
Recognise and reward the ecosystem services and cultural values of HNV pastoral systems in agricultural subsidies, such as CAP.	European Commission Directorate General Agriculture (DG AGRI), national ministries
Use the current CAP reform and member states' Nature Restoration Plans as a window of opportunity to redirect subsidies towards public goods delivery, including those provided by extensive grazing	DG AGRI, European Commission Directorate General Environment (DG ENV)
Design spaces and processes for more direct participation of pastoralists in policy design, expanding representation beyond organisations representing conventional farming	EU institutions, national ministries, pastoral organisations
Practitioners	
Protect and restore mobility corridors and the infrastructure of transhumance and seasonal grazing	National governments, infrastructure developers
Integrate pastoral mobility explicitly into member states' National Restoration Plans under the Nature Restoration Regulation	National governments
Recognise and financially support the role of herders (e.g. through salary support schemes), local institutions and knowledge systems	National governments, CAP managing authorities
Invest in peer learning networks, multi-stakeholder platforms and participatory governance structures spanning local to EU levels	Governments, NGOs, research institutions
Embed co-production of knowledge, valuing pastoralists' experience alongside scientific evidence, in policy and management processes	Research institutions, management authorities
Embed monitoring and adaptive learning in policy processes so that local agreements and innovations inform broader strategies	Governments, research institutions
Research	
Improve understanding of trade-offs between land uses and how these may shift under different policy and climate scenarios	Research community
Build trust in large carnivore and damage monitoring systems, and increase confidence in the effectiveness of prevention measures, for example through involving stakeholders in the design and implementation of monitoring schemes	Researchers, management authorities
Assess the impacts of different types of lethal control and hunting (following wolf downlisting) on depredation, conflict and coexistence outcomes at different scales	Research community, wildlife managers
Track the outcomes of local dialogue and platform processes to assess whether they meaningfully inform regional, national and EU-level decisions (upward accountability)	Researchers, platform facilitators
Explore coexistence as an iterative, adaptive process, with learning loops linking local experience to policy refinement, instead of a fixed state or one-off solution	All actors

building trust in management institutions. Monitoring and adaptive learning should be embedded in policy processes to ensure that local agreements and innovations inform broader strategies and to continuously address issues as they arise.

5.4 | Research and policy priorities

To enable effective and proactive policy and management, better insight is still needed to understand conflicts between different land uses and how these may shift under different policy and climate change scenarios. A key area for further examination is contested information: how to build trust in large carnivore and damage monitoring systems and confidence in prevention measures. In the context of the downlisting of the wolf, a high priority is to understand the impacts of lethal control and hunting on livestock depredation as well as conflict, and coexistence with pastoralists and wider rural communities. Some of these questions are being addressed by current initiatives, such as the EU Stakeholder Platforms and the Horizon Cocreating Coexistence CoCo project [cocoproject.eu]. A concerted effort from stakeholders, researchers and policy-makers is needed to understand how and where different priorities can coexist, so that humans, grazing animals and wildlife can meet their respective needs without the costs falling inequitably on one sector of society. What is already clear is that coexistence should be approached as an adaptable, iterative process rather than a fixed state or solution, with learning loops that link local experience to policy refinement. Means to establish and maintain such processes in the long term and improve their policy uptake should also be a focus of future research. A related topic is what true co-production of knowledge entails, and how and where pastoralists' knowledge should be considered alongside or instead of scientific evidence. Additionally, researchers and managers should track the fate of local agreements from platform and dialogue initiatives to establish whether they meaningfully inform regional, national and EU-level decisions.

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The persistence of HNV and pastoral systems and their capacity to coexist with large carnivores depend on addressing the intertwined drivers of change and vulnerability. Solutions should tackle systemic problems rather than act as sticking plasters for individual symptoms. Given that large carnivore recovery and depredation have attracted substantial public and political attention, it could serve as a vehicle to highlight the current plight of many pastoralists and channel targeted support to HNV systems and pastoral activities. This, we argue, represents the most promising pathway for rebuilding coexistence capacities and institutional trust.

AUTHOR CONTRIBUTIONS

Katrina Marsden and Hanna Pettersson led the writing of the manuscript. All authors contributed with inputs from the papers they had edited. Juliette Young carried out a final review of the text and content. All authors critically reviewed multiple drafts of the paper, agreed the conclusions and gave final approval for publication.

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CONFLICT OF INTEREST STATEMENT

Tobias Plieninger is a Lead Editor for People and Nature, but was not involved in the peer review and decision-making process.

DATA AVAILABILITY STATEMENT

Information was drawn from the papers in this Special Feature. No additional data are used.

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