

# 9 *Opportunities to Improve the Resilience of Extensive Sheep Farming in Huesca (Spain)*

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## 9.1 The Extensive Sheep Sector in Huesca

The extensive sheep farming system (FS) is located in Huesca, in the region of Aragón, North-eastern Spain. The region has a long history of ovine production (Navarro, 1992), although the number of farms and sheep have more than halved in the last twenty years. Nowadays, the province has around 521,500 head of sheep and 930 farms (Gobierno de Aragón, 2020; MAPA, 2020b) dedicated to lamb meat production (Figure 9.1). Farms are mainly medium-size (200–1,000 sheep) family businesses, diversified with almond orchards, olive trees, cereal crops and vineyards (Pardos et al., 2008; Gobierno de Aragón, 2020). The territory comprises a mountainous geomorphology in the North and a flat area in the South. This geographical characterization harbours different types of sheep farming: (i) specialized farms where animal feeding is mainly based on pasture lands to the North and (ii) mixed animal and crop farms where animals feeding is based on stubble fields to the South.

The FS embraces farmers and the actors who mutually influence one another (Meuwissen et al., 2019). In the centre of the extensive sheep farming system in Huesca are the farmers and farm households closely connected with the technical services providers (veterinarians), the cooperatives and farmers' associations. Crop farmers (as stubble fields' providers), local public administration, universities and research institutes, and distributors (slaughterhouses) are also closely linked to the farmers.

The following sections explain the main conclusions that can be drawn from the multiple research activities conducted in Huesca: farmers' surveys, farmers and stakeholders' in-depth interviews,



**Figure 9.1** Sheep in farms in Huesca.

*Source:* Universidad Politécnica de Madrid

workshops and focus groups (see Chapter 1 for a detailed outline of the methods used). The conclusions build on the perceptions of the actors in the FS, supported by official statistics and a literature review.

### *9.1.1 What Are the Functions Provided by the Extensive Sheep Farming System?*

According to actors' perceptions, the main functions provided by extensive sheep farming are guaranteeing sufficient farm incomes (gross margin), delivering high-quality food at affordable prices (number of sheep) and generating employment in rural areas (number of farms) (Annex 9.1). The provision of these functions exhibits a downward trend in recent years (Becking et al., 2019; Reidsma et al., 2019). In terms of farm income, the actors in the FS explained that gross margins have been decreasing since the beginning of the century, reaching almost negative values (tipping point) in current times. According to MAPA (2020b), the gross margins in Aragón was 47 €/head in 2017. The number of animals decreased by 43.7 per cent in the period 2005–2019 in Huesca (Gobierno de Aragón, 2020; MAPA, 2020b). The decrease has been less pronounced since 2010 (by 17.5 per cent) as the remaining farms acquired the herds of the exiting farmers. In fact, the number of sheep per farm increased by 50.2 per cent in the

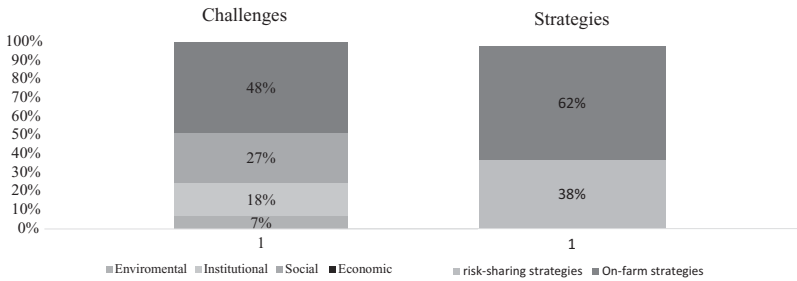
period 1995–2015 (Gobierno de Aragón, 2016). Finally, the number of farms decreased around 65 per cent in the period 2005–2019 in Huesca (Gobierno de Aragón, 2016, 2020).

The actors in the FS perceived that the FS also provides a range of public goods (Annex 9.1). Primarily, the extensive sheep sector maintains and preserves the natural resources. It contributes to maintaining the biodiversity of the region and the soil quality, and preventing forest fires by keeping the area clean from weeds and scrub (Casasús et al., 2007; Rodríguez-Ortega et al., 2014; Peco et al., 2017; Kok et al., 2020). Additionally, the extensive sheep sector follows practices that enhance animal welfare. The animal welfare in extensive production systems is challenged by some authors in the literature. Koidou et al. (2019) explained that animal welfare conditions can deteriorate due to variations in forage availability and nutritive value as well as the lack of infrastructure in grasslands. Munoz et al. (2018) found that the main welfare issues in ewe extensive production are under- and over-feeding, ewe mortality, lameness, ecto-parasites (flystrike) and mastitis. Finally extensive farming contributes to the attractiveness of rural areas, as this specialization requires farmers, families and workers to live close to the farms, to keep rural areas alive and in good condition (Kristensen et al., 2016).

It has become evident that there is a lack of indicators to measure the provision of the mentioned public goods. Indicators to measure the effect of the sector on the biodiversity are difficult to implement (Kok et al., 2020). There are no indicators to measure the contribution of extensive farming to fire prevention. Research and indicators normally focus on grazing effects on the reduction of wood biomass, the land use and cover change (Ruiz-Mirazo et al., 2011; Mancilla-Leytón and Martín Vicente, 2012; Oliveira et al., 2017; Castro et al., 2020). Indicators to measure animal welfare are not always reliable (Llonch et al., 2015) or are perceived differently by stakeholders (Doughty et al., 2017).

### *9.1.2 What Challenges Threaten the Farming System's Functions?*

The extensive sheep farming in Huesca faces interconnected economic, institutional, social and environmental challenges that threaten the provision of private and public goods. Most of the challenges



**Figure 9.2** Perceived challenges and strategies to deal with them.

*Source:* Fifty farmers’ surveys conducted in the CS. Percentages show the number of times the challenge nature (economic, social, institutional or environmental) on the left side and the strategy type (on-farm or risk-sharing strategy) on the right side have been mentioned over the total challenges and strategies mentioned, respectively (Soriano et al., 2020)

correspond to long-term pressures, but shocks related to stochastic variables (production, market price, disease outbreak, wild fauna attacks, droughts etc.) also impact on the FS’s functions (Annex 9.1).

Most of the challenges identified by the actors in the FS are related to the low profitability of the sector (economic dimension) (Figure 9.2), which is explained by the decreasing incomes. Lamb meat consumption decreased by 40 per cent in the period 2006–2017 (MAPA, 2018) leading to stagnated and low lamb prices (MAPA, 2020a). The decreasing consumption is in turn explained by changing consumers’ preferences (Martin-Collado et al., 2019) and the bad image of the livestock industry (animal welfare, greenhouse gas emissions, etc.). Downward pressures on market prices are also explained by the increased competence of imports and lower producers’ bargaining power in the value chain (Corcoran, 2003). On the other hand, the increasing feeding and labour costs and land prices reduce the farms’ profitability.

Social challenges mainly relate to the intense process of depopulation in the region that began in the middle of the last century (Bosque and Navarro, 2002). Depopulation has been accompanied by an ageing population and a reduced investment in public services (schools, medical centres, etc.), which in turn discouraged family succession and the availability of skilled workers (Bertolozzi-Caredio et al., 2020). Moreover, there is no interest in working in the extensive sheep sector because of its low profitability and labour intensity that hinders the balance between work and personal life.

Some institutional challenges are also threatening the FS. The decoupling from production of the Common Agricultural Policy (CAP) aids have resulted in a reduction in the farms' income since 2004, as the sector is greatly dependent on aids (De Rancourt et al., 2006; Bernués and Olaizola, 2012). Finally, farmers are facing environmental challenges, such as more frequent and severe droughts (Turner, 2005; Hernández-Mora et al., 2012), wolf attacks and animal diseases outbreaks.

## 9.2 Why Has the Extensive Sector Showed a Low Resilience Capacity in the Past?

The assessment of the resilience of the FS revealed three main reasons explaining the low resilience capacity of the extensive sheep farming sector in Huesca, which are detailed in the following sections.

### 9.2.1 *Mismatches between the Challenges and Implemented Strategies*

Farmers and other actors in the FS in Huesca have been implementing several strategies to face the challenges threatening the system (Soriano et al., 2020). Most of the implemented strategies are on-farm strategies (Figure 9.2), although farmers in the FS also pursued risk-sharing strategies involving other actors in the FS, such as participating in farmers' organizations and/or cooperatives and taking out insurances (liability and animal diseases).

Among the on-farm strategies, three groups of strategies can be differentiated: (i) strategies to ensure a sound financial situation, such as keeping savings, keeping debt levels low and adding extra income from off-farm jobs; (ii) strategies to improve production efficiency such as increasing herd prolificacy (improved genetics), improving herd management (e.g. use of chips, to invest in feeding systems and handling facilities, virtual or drone shepherds, and GPS), maintaining herd health (preventive measures, e.g. vaccines) and learning from other farmers' experiences (mainly through cooperatives); and (iii) strategies to reduce labour costs. Most of the farmers in the region decided to invest extra time and involve their family in farm management, instead of hiring external workers (Annex 9.1).

The low performance of the FS functions (Section 9.1.1) suggests that the implemented strategies have turned out to be efficient but not sufficient to deal with the challenges threatening the sector. Most of the

strategies are on-farm actions oriented to cope with the profitability from the supply side (reducing costs and increasing efficiency) while lower attention has been paid to the demand side to deal with the lowering of lamb meat consumption. Although cooperatives have already carried out campaigns to increase public awareness about the positive contribution of extensive farming to the environment and developed new prepared products to better meet consumers' needs, e.g. the *Hornear y listo* ('Bake and go') campaign,<sup>1</sup> the effort has not been enough. Involvement of other actors in the farming system is needed to reverse the downward trend of lamb meat consumption. For example, public administration and financial institutions could develop new finance products to support research on consumers' behaviour and new lamb products and implement new communication channels and marketing campaigns. Distributors in the value chain could open the sector to new markets and consumer niches to sell the products at competitive and fair prices.

Finally, greater support from the public sector could have helped to better deal with one of the greatest challenges of the sector that is the depopulation and low attractiveness of the rural areas. There is room to better tailor the rural development programme in the region as well as design legislation (sanitary /urban) that promotes businesses linked to farms (restaurants, direct sales, product elaboration) and avoids the current limitations it generates on the sector.

### *9.2.2 Misalignments between Agricultural Policies and the Farming System's Capacities and Functions*

In interviews conducted to assess the role of policy in enabling resilience in the farming sector (see Chapter 1 for details about the method), the actors in the FS assessed the impact of the CAP on the resilience capacities of extensive sheep farming (Feindt et al., 2019). The results revealed that the CAP instruments and goals are mainly tailored to support the robustness and adaptability capacities and to a lower extent the transformability capacity. Indeed, the CAP's basic payments scheme seems to constrain farmers' robustness. Farmers have seen their aids reduced since basic payments were decoupled from production (De Rancourt et al., 2006). The historical payments scheme has created

<sup>1</sup> [www.alimarket.es/alimentacion/noticia/256772/pastores-se-adentra-en-el-hornear-y-listo-de-cordero](http://www.alimarket.es/alimentacion/noticia/256772/pastores-se-adentra-en-el-hornear-y-listo-de-cordero)

distortions amongst the aids perceived by established and new entrants and unequal aids distribution. Additional related policies also seem to constrain the robustness capacity of the FS. Environmental legislation (wildlife and natural parks protection), sanitary (animal health and slaughter practices) and urban legislation resulted in farmers and other actors in the FS incurring increased production costs and having to comply with ever more complex procedures that hinder the FS's robustness capacity. For example, many slaughterhouses in the region were not able to meet sanitary legislation (transposition of the regulation (EC) No 853/2004 of The European Parliament) and were forced to close, followed by butcher-ies and other local retailers. As a consequence, farmers lost distribution channels to sell their products and bargaining power.

The limited CAP support to the extensive sheep farming resilience may be explained by the fact that the aids so far have been mainly tailored to support farmers' income instead of strengthening other relevant and specific functions of the FS, i.e. environmental protection and biodiversity contribution through pasture management (Casasús et al., 2007; Ruiz-Mirazo and Robles, 2012) and contribution to keep the rural areas alive (Kristensen et al., 2016). This is in line with Meuwissen et al. (2020), who found that many enhancing resilience strategies focused on the delivery of private goods.

### 9.2.3 *Weakened Resilience Attributes*

The resilience attributes are specific system characteristics which make socio-ecologic systems more resilient. Among the seventeen resilience attributes identified by Cabell and Oelofse (2012), some examples of the resilience attributes found in extensive sheep farming are resource availability (profits, human capital, natural resources, infrastructures), co-operation (intra and inter systems) and diversity of responses and policies.

We found that the scarcity of the mentioned resilience attributes in the extensive sheep sector also explains the low level of the resilience of extensive sheep farming. For example, as a result of the sector's low profitability, there is little economic leverage for undertaking investments, but also the workforce in the region is very limited, hampering the potential to grow. The lack of resources has resulted in farmers and other actors having low confidence in the sector and, thus, they are reluctant to invest. In addition, the cooperation between actors has been weak and indecisive, hampering the success of many strategies to overcome the challenges faced. It has been also identified that there is a lack of

diversity of policies in the system that resulted in a limited response of the policies to the singularities of the sector. For example there is no support in place to help farmers deliver environmental objectives. On the other hand, we found that there are resilience attributes that have positively contributed to the sector's resilience. For instance, farmers, their commitment, in-depth knowledge of the sector and love for animals improved the robustness of the farming system as farmers invest their time, savings and experience to keep farms running. Finally, the strength of commercial relationships with third countries helps the capacity of the system to adapt to the decreasing national lamb consumption.

### 9.3 It Is Time for Extensive Sheep Farming to Transition

#### 9.3.1 *Alternative Resilient Scenarios*

The actors in the FS sketched two alternative systems in which functions and resilience attributes could be improved. The first alternative system is a sustainable intensive system characterized by increasing the herd-stabling and animal-handling mechanization. There are several boundary conditions to implement this alternative system, such as bringing existing technologies closer to farmers, reinforcing training in handling (prolificacy and improved breeds), feeding and animal health issues in stables as well as investing in infrastructure and machinery, and diversifying activities to crop production to feed the herd. Additional conditions are strengthening market orientation (new trade channels and market niches) and reviewing sanitary legislation to regulate the new stabling. This alternative scenario would fit better in the southernmost and flat areas where pastures are scarcer and crop diversification is easier to implement. Moving towards this alternative scenario would improve the provision of private goods, i.e. increased meat production and improved labour conditions. It could also enhance some of the FS's resilience attributes such as investing in innovating infrastructure (through mechanization), improved profitability through cost reduction and enhancing the attractiveness of the sector, thus ensuring maintenance of rural livelihoods. But it could also constrain attributes such as 'production coupled with the local and natural capital' as feeding the herd will be coupled with pasture to a lower extent. This alternative scenario could lead to a deeper unbalance between the provision of private and public goods.

The second alternative system is the high-tech extensive system mainly characterized by an improved management of pastures and



stubble lands as the basis to feed the herds. To put this alternative scenario in place, innovation in herd geo-location, weather information and wild fauna surveillance are key aspects. New communication and network tools are also needed to boost farmers' collaboration to improve the coordination in pasture management. In addition, public support is essential to reach this system for three reasons. First, public aid is needed to support the provision of public goods; second, a legal framework is the basis to regulate and protect the access to pasture land and stubble fields for grazing purposes; and third, revised sanitary legislation is requested to increase the number of actors in the region (e.g. slaughterhouses, butcheries, retail companies, restaurants) and boost short supply chains and regional consumption. This alternative system would be more suitable in the northernmost and mountainous locations, where there are more pasturelands and the geographical features make other sectors less appropriate, reducing the pressure of land competition.

Putting this alternative scenario in motion would improve the provision of private goods. Although the production is not expected to increase, reduced feeding costs and increased support for environmental enhancement would increase the farms' gross margins. Simultaneously, better performance of public functions would be accomplished as it is based on pasture and stubble field management. Additionally resilience attributes to those identified in the sustainable intensive system could be improved in this alternative system, such as 'self-organization' as cooperation is needed to manage pasture lands and herds; 'production coupled with the local and natural capital' as herd feeding will be coupled with pasture land availability; and 'diverse policies' as new policy instruments and regulations will be tailored to support the provision of the public goods provided by the sector.

### 9.3.2 *Suggestions for Business and Policy-Enabling Actions*

The actors in the FS identified many opportunities that could turn the extensive sheep farming into a more resilient FS. For example, there is room for rural banks to reinforce their knowledge about the sector and farmers' profile. Banks are called to design improved long-term financing products (including grace payments, payments linked to cash flows and longer terms). Insurance companies are asked to improve grasslands insurance based on satellite data, to invest in improving data collection and modeling to better cover farmers' risk exposures and develop widespread insurance coverage for new diseases. Cooperatives have the opportunity to reinforce public awareness about

the public goods provided by extensive sheep farming, improve the labelling to better inform consumers (IT technologies, like blockchain) and increase transparency to reinforce farmers' trust.

Farmers need to balance their effort between on-farm activities and market activities such as being more pro-active in communication and awareness campaigns. Greater cooperation among farmers could help enhance resilience. Cooperation should span herd management to price sale negotiation. Finally, knowledge is a key variable to ensure the functioning of the farming system. Shepherding requires an in-depth knowledge of the region, pastures, habitats, weather and herd management. This knowledge is being lost and farmers are crucial to avoid losing it. Farmers should commit to keep, enrich and transfer shepherding knowledge and have an open attitude to learn from others' innovative techniques.

Finally, policy recommendations of the CAP post 2020 emerged to support the FS resilience capacities, mainly focused on strengthening cooperation, redefining basic payments tailored to extensive farming needs, fostering innovation, enabling access to new entrants, supporting knowledge exchange, training and awareness about extensive livestock farming, valuing the extensive livestock farming, increasing pasture availability, revitalizing rural communities and supporting commercialization (Buitenhuis et al., 2020).

The definition of eco-schemes devoted to grazing is one of the main policy recommendations proposed by the actors in the FS to support the provision of public goods of the FS. As explained, it previously requires a clear definition of the extensive farming system and its environmental, health and rural development contribution, to foster innovation for better pasture management and animal handling and to develop procedures to monitor the exploitation of grazing land. Aids should be strictly limited to effective extensive farming instead of land. The removal of historical rights is also a key priority among the actors in the FS.

Actors in the FS also proposed concrete policy recommendations to foster new entrants' access such as more in-depth research about the reasons behind the reluctance to enter the sector, relaxing the requirements of new entrants to be eligible for aids, easing the access to training programmes, defining measures to avoid the high rate of abandonment (improved business plans, ongoing advice, internships in farms) and sharing good practices.

Regarding cooperation, the actors in the FS proposed new measures to boost collaboration in production processes allowing farmers to improve their profitability and reduce their workload. Currently, the

effort is mainly focused on cooperation in commercialization instead of production issues. Innovation on collaborative apps is requested to boost farmers' contacts and knowledge exchange. Furthermore, this measure needs to consider cooperation not only among farmers' but also among different actors in the FS.

It was discussed with the actors in the FS that the policy proposals mainly foster resilience by enhancing robustness and adaptability and to a lower extent transformability. The robustness-enhancing policy recommendations are improving the coupled and basic payments schemes, supporting the commercialization of extensive farming products, valuing extensive farming and its positive contribution to the environment, health and rural areas. The adaptability-capacity-enhancing recommendations are fostering innovation, supporting knowledge exchange and training, strengthening cooperation, increasing the pasture areas and enabling access to new entrants. Finally, the recommendation referred to revitalizing rural communities clearly emerges as one of the main actions to strengthen the transformability capacity of the FS.

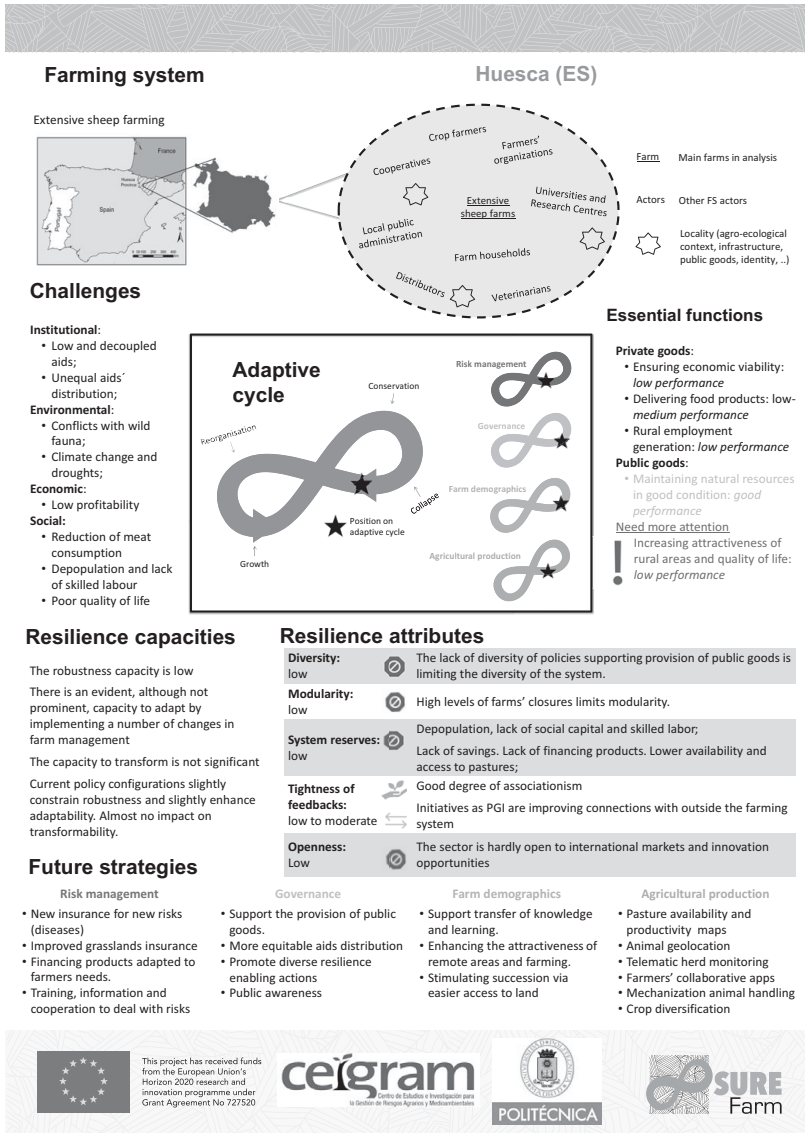
#### **9.4 Final Remarks: Lessons Learnt from the Past to Foster Future Resilience**

Through the active participation of farmers and other actors in extensive sheep farming we have been able to assess the resilience of the FS by identifying the major challenges faced by the sector, the strategies to deal with them and their impact on the provision of the FS functions. As a result, it can be concluded that the extensive sheep FS in Huesca has shown a low resilience capacity to deal with the multiple challenges it is facing.

There are encouraging opportunities for the FS to improve its resilience in which not only farmers but also farmers' associations, cooperatives, actors in the value chain, financial institutions, NGOs, research centres and public administration are called to be a part.

Instead of focusing just on farmers' income, policies should support the wide variety of the functions provided by the sector by adding the provision of public goods. In this way, policies should open the scope to broaden the support to adaptability and transformability capacities. Furthermore, there is no unique way to improve FS resilience and hence policies should be flexible enough to support equally the diverse resilience-enabling patterns and hence promote diversity into the farms but also diversity among farms.

Research about indicators to measure the provision of public goods, innovation to foster herd and pasture management and strengthened collaboration between actors in the FS have to accompany policy initiatives.



Annex 9.1 Factsheet synthesising resilience of the current farming system in Huesca (Spain).

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