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PARTNERSHIP FOR RESEARCH AND INNOVATION
IN THE MEDITERRANEAN AREA

PASTINNOVA

The White Paper on Pastoralism in the Mediterranean Area

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This document is the result of a collective effort of the teams from the 20 PASTINNOVA project partners coming from 12 Mediterranean countries.

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FOR AN INFORMED AWARENESS OF THE DIFFERENT PERSPECTIVES
OF MEDITERRANEAN PASTORALISM AND THE SUPPORT IT NEEDS

The White Paper on Pastoralism in the Mediterranean Area

This synthetic document is an argued and documented analysis for policy-makers and stakeholders on innovations and policies related to Mediterranean pastoralism. It is based on the observations and collective expertise of the partners and participatory meetings during the 3 years of the PRIMA PASTINNOVA project.

The PASTINNOVA project has involved 20 partners from 12 Mediterranean countries, covering a broad scope of the pastoral diversity in the Mediterranean region. The holistic interdisciplinary approach proposed by the project is based on the Living Laboratories methodology to give a diagnosis and co–create solutions for pastoral farms, farmer organisations and value chains of pastoral products.

The work of PASTINNOVA has focused on Innovation and Business Models (IBM). Within PASTINNOVA, innovation is not necessarily linked to what is new in a specific place and at a specific time; it can also be the constant search for improvements to what already exists, e.g. local ecological knowledge or GPS tags.

The hypothesis of PASTINNOVA is that both social and technological innovations have the potential to reinforce the sustainability, profitability and resilience of pastoral family farms. PASTINNOVA has shown that pastoral business and organisational models can valorise their full potential as drivers of the agro–ecological transition in livestock production in the Mediterranean area. **They should therefore be supported by strong public policies** at transnational (including European), national, and regional levels. PASTINNOVA aims to shed light on what policies, strategies and orientations should be undertaken to operate drivers in favour of this transition and to recognise the multi-sectoral (social, economic, environmental) role of pastoral activities.

PASTINNOVA has studied a variety of IBMs implemented in the countries of the partnership, considered as potential drivers for the future development of pastoral systems in the Mediterranean basin. This White Paper has been elaborated from the learnings of these IBMs.

ALL INFORMATION AND OUTPUTS OF THE PASTINNOVA PROJECT ARE AVAILABLE ON THE PASTINNOVA WEBSITE AND ITS MULTIPURPOSE ICT PLATFORM

Keywords:

Agro–ecological transition; livestock production/agriculture; family farming and smallholders; short value chains; innovation, spontaneous local resources; traditional knowledge; training;
education and advisory; rural, local development; food security

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1 General considerations on pastoralism in the Mediterranean, questions and trends

The Mediterranean region has a unique, specific, cultural and historical heritage, as well as a wide climatic, geomorphological, ecological, economic, and human diversity. It is also a geostrategic contact zone between the Global North and South, between several civilisations and cultures, and a land of socio-political conflicts.

From a climatic point of view, the Mediterranean basin is generally characterised by hot and dry summers, mild and often humid winters. Despite seasonal problems of water availability, this characteristic is favourable to specific agricultural activities such as production of fruit and vegetables, citrus, olive oil, and viticulture. Mediterranean countries are major players in these sectors with consolidated and efficient economic value chains and strong export orientation.

However, the seasonality and high variation of rains and the fragmentation of resources in Mediterranean territories have always hindered the development of grasslands and other forage resources for livestock farming, which have either been developed in non-agricultural areas or integrated with crops in agricultural lands. Nomadic, transhumant and agro-pastoral systems, as well as practices associated with agriculture, have been widely used in Mediterranean areas to secure animal feed resources, adapting to seasonal constraints. With pastoralism declining across the Mediterranean region, together with the valuable services it provides to the human population, policies need to be developed to support and strengthen these pastoral systems.

The resilience of pastoralism to climatic variation and its capacity to provide ecosystem services and

healthier food should be a fundamental justification and driver of the policies adapted to pastoral needs. Nowadays, pastoral systems face irregular precipitation, higher frequency of droughts, degradation of rangelands, inadequate extensive farming policies, and rural depopulation or sedentarisation of once nomadic populations. Mediterranean conditions are generally conducive to more extensive forms of pastoral farming based on the mobility of herds (transhumance, use of rangelands), using local breeds selected for their high adaptive capacity and ability to valorise irregular and often-rare forage resources. For millennia, pastoralism has provided local populations with a number of quality animal products such as milk, cheese, meat, wool, skins and other services (i.e. transportation, work force, fertilisation, biodiversity) and pastoral systems are recognised for their role in the provision of Nature's contributions to people (NCP, under the IPBES conceptual framework) in mountain ecosystems and the Mediterranean. Conversely, since the 1950s, attempts to intensify ruminant livestock systems have had variable outcomes. Some positive results have been observed in sheep and goat dairy or meat production in identified regions of Italy (Sardinia), Greece (Thessaly), Turkey (Coastal areas), and Spain but in other cases attempts at intensification have led to economic, social or environmental failures.

Today, non-pastoral animal production systems in the Mediterranean have become **highly vulnerable to global economic and climate trends, with a strong dependence on imported feedstuffs and forage**. Some segments of pastoral dairy and meat sheep or dairy goat sectors in Italy (Sardinia), France (Roquefort), Greece, Turkey or Spain (Castilla, Aragon or Andalusia), and more intensive livestock activities (i.e. intensive poultry, pigs, or feed lots) are of economic relevance. Nevertheless, **livestock activities do not constitute a pillar of the Mediterranean economy** on a globalised world market: The southern countries of the region (Maghreb, Middle East) are becoming less autonomous in animal products and in cereals to feed their population, which could rapidly become a geostrategic security issue in case of crisis.

- → Livestock dependence on imported feeds and forages is increasing as the region faces global challenges;
- → climate change with several important zones threatened by frequent droughts, heat waves and desertification processes;
- → growing demography and migration patterns with overpopulation of coastal areas and abandonment and marginalisation of the hinterlands;
- → overused and rapidly decreasing water resources;
- → soil degradation, loss of biodiversity, rural abandonment, encroachment, and big forest fires, all related to poorly adapted policies.

2 Key problematic trends for pastoral systems and territorial dynamics in the Mediterranean European Union, Northern Africa and the Middle East

The main trends observed in each geographical and political Mediterranean area point to priorities and possible orientations for pastoralism and animal production in the region. The case studies analysed within the PASTINNOVA project give a relevant description of the situation and of the diversity of contexts, and shed light on common trends and differences.

Lack of economic profitability of extensive and semi-intensive livestock farms

Support to industrial and large-scale animal production, lack of bargaining power for pastoral products, land competition, lack of training and professional skills exacerbate these issues.

Incentives, subsidies and aid for specialisation

Very low subsidies and aids for extensive livestock breeding, forage crops and installation and maintenance of pastures, compared to support for agricultural industrialisation.

Lack of economic profitability of extensive and semi-intensive livestock farms

Support to industrial and large-scale animal production, lack of bargaining power for pastoral products, land competition, lack of training and professional skills exacerbate these issues.

Social, economic, and environmental issues in rural territories

In North Africa, Lebanon and Turkey, improving the social condition of a large rural population that has been marginalised for a long time is a main issue, together with the need for better access to services and education and professional skills to lift them out of poverty while contributing to national self-sufficiency. More globally, lack of services is a major bottleneck for the development of hinterlands.

Another major, urgent challenge comes from the general expectation of young people to have the same standard of living and quality of life as their urban counterparts, which makes it very hard to attract or to keep young people in pastoral activity.

The effect of generalised urbanisation and globalisation of standards of living with changes in consumer patterns and expectations

Some pastoral rural areas also face increasing competition for land with new residents, such as pensioners and residents of second homes with different opinions and expectations about rural areas and the role of pastoralism (spreading of urban values among rural and pastoral regions).

The decline in mobility, collective land use, and valorisation of pastoral resources everywhere and specifically in the Maghreb

Landscape changes and fragmentation due to land policy of privatisation of collective lands, land abandonment, scrub encroachment and enclosure of many areas, land grabbing, destructuring of collective traditional organisations of pastoralists and abandonment of long migrations in favour of sedentarisation of pastoral settlings, overgrazing and degradation of rangelands, restrictions on grazing in forests.

Other pressures are related to conflicting land uses

Nature and wildlife conservation, coexistence with wildlife and predators, multifaceted relationship of pastoralism with tourism, infrastructures (i.e. interfering with mobility routes, or reclaiming pastoral lands for irrigation projects).

Problematic technical regulations

Such as those concerning animal health, food safety, occupational health and safety, that might be better adapted to extensive and pastoral farming without neglecting their objectives. On the other hand, pastoralists find specific recent innovations very useful (GPS trackers for livestock, virtual fences and drones to improve livestock monitoring during grazing).

Across the Mediterranean area, the once pastoral rural areas face important changes and are developing various initiatives. In all cases, public policies play an important role in promoting or hindering solutions to these issues. The challenge extends beyond improving the economic profitability of livestock sectors, as public policies need to address environmental, social, cultural, and territorial issues. As livestock production faces increasing scrutiny in the context of climate change, these policies must prioritise low-carbon animal production systems and optimise use of livestock as sources of organic fertiliser and to recycle agricultural and agri-food industry residues. Enhancing pastoral practices in livestock production such as managed mobility, rational management of natural resources, and rearing more resilient local breeds could increase resilience to climate change. In this sense, pastoral systems offer a viable solution.

3 What are the priorities for public policies on pastoralism and their articulation with animal production?

General considerations about public policies and public action

- Public policies often include top-down measures decided by authorities but they should also emphasise the plurality of actors and the complexity of coordination processes.
- Public action addresses the social and political order, regulates tensions and integrates individuals and groups within society to facilitate adoption by stakeholders. Financial, regulatory and tax incentives are the main instruments of public policies.
- Services relating to environmental preservation are implemented by public authorities and also concern other sectors besides agriculture (public education and health). In some cases, they include interventions relating to ecological transition as a strategic priority although this is the case in still too few countries.

In this document we call on the public authorities to consider the perspectives of the **evolution of pastoral livestock systems in the Mediterranean as an innovative form of livestock production**. PASTINNOVA maintains that animal production activities in the Mediterranean have to respond to the challenges of the **transition towards agroecology** (food autonomy, resilience to hazards, diversity of activities, social and environmental sustainability, empowerment of producers).

Within this context, pastoralism can no longer be seen as an old, 'retro' and regressive form of animal production.

Pastoralism and family farming are not a problem for the Mediterranean but a solution to face these issues, and public policies should activate and/or support existing and new relevant technical and organisational innovations that support pastoral systems, some of which have been developed by pastoral populations themselves.

The **main priorities** that public policies must address and articulate with respect to pastoral systems and related activities in the Mediterranean include the following:

- To produce more, increase competitiveness and preserve food security and healthy human nutrition (autonomy and sovereignty).
- To preserve biodiversity, natural landscapes, environment and cultural heritage.
- To develop diversified activities and employment in rural territories.
- To prevent encroachment, forest fires and land degradation.

While these **main priorities have to be articulated with other priorities of pastoralism itself**:

- To guarantee a dignified livelihood for pastoral farmers.
- To ensure that pastoral communities are involved in the policy-making process.
- To respect and integrate traditional knowledge and practices.
- To improve animal welfare.

Public authorities are not monolithic; a number of sometimes conflicting objectives and interests may coexist at different public institutions or even within the same institution. In PASTINNOVA, we have identified more than **100 different Innovative Business Models in pastoral systems** that can be supported or implemented by different public authorities, depending on their main priorities and objectives:

- **For environmental services, the key priority is to preserve biodiversity, landscapes, soil health,** and develop protected areas in mountain areas or in Less Favoured Areas. For these services, production of food is not the priority but it has to be promoted to maintain the livelihood of farmers providing other ecosystem services.
- For the **services of land use, rural and territorial development, it is a priority to balance production, tourism, recreational activities, and cultural heritage.** One of **the sovereign functions of public bodies is to ensure the safety** of populations and territories. The prevention of natural risks is included in these functions and is generally articulated with both environmental and land use territorial services. Civil security also has to prevent disasters such as forest fires, landslides or flooding.
- **Agricultural services**, including those in charge of animal production, **often have an exclusive sectoral approach**, mainly with a **focus on economics and competitiveness**. However, due to the diversity and complexity of the challenges ahead, livestock production policies should articulate the environmental and rural development priorities, besides the expectations of the breeders in terms of productivity.

4 The main narratives for each public priority and the pastoral innovations associated to them

1. To produce more, increase competitiveness and preserve food security, autonomy and sovereignty

This priority is most commonly supported by agricultural public authorities as well as most of the farmer associations and unions. Policies must address market challenges whilst limiting the environmental impact of production systems and improve public perception of livestock production by reversing negative narratives related to animal welfare and greenhouse gas (GHG) emissions.

Due to the representations and world visions of policy-makers, global food security is often linked to individual productivity and performance but also at territorial level with specific objectives. However, it is certain that the issue of food security requires policy-makers to seek improvements in livestock performance at regional and national levels. The pastoral anchoring of livestock activities in the Mediterranean basin could largely contribute **to develop operational solutions for the re-designing of all livestock production systems** through operational measures. In PASTINNOVA we suggest approaches also at a territorial level within a variety of production models based on:

- **limiting external inputs and feedstuffs** as well as the use of pesticides and irrigation in grassland management;
- **improving the skills of farmers according to agroecological principles**, especially in terms of using technological innovations (e.g. virtual fences, GIS tools, hydroponic fodders) and managing pastoral fodder resources;
- developing a more **favourable environment** for pastoral value chains, that support innovations such as direct sales and digital marketing, connecting pastoral farmers with potential customers;
- enhancing the **accessibility of policy measures and incentives to pastoral farmers, simplifying procedures** and including specific arrangements to monitor them.

2. To preserve biodiversity, natural landscapes, the environment, and cultural heritage

For environmental public services, the priority is to preserve biodiversity and landscapes, and create protected areas, specifically in areas that once had a long pastoral presence and culture and nowadays have been abandoned to a large extent. Production of food and animal products is not a priority for these actors.

In these territories, agri–environmental agreements or actions in favour of silvopastoralism are innovations as a response to this narrative. A few active and passionate pastoralists still remain. To develop a coherent environmental policy, public authorities should improve the conditions of their activities, for instance by building infrastructures (roads for accessing summer pastoral areas, shelters, summer houses and facilities, water supply in rangelands), by promoting local architecture and by supporting them with relevant extension services, training and labelling their products. Pastoralism could support this priority by providing regulating and cultural ecosystem services.

3. To develop diversified activities and employment in rural territories

These policies are generally activated at regional and local levels although national initiatives do exist. In most parts of the Mediterranean, local communities and regional governments have the will to revitalise their territories through innovative projects and diversification of activities. Their global objective is **to create economic activity and jobs in rural areas in all sectors, including agriculture. New pastoral activities and livestock production could be associated to other activities such as service provision and agro-tourism. In these models, more**

attention is paid to inclusiveness and involvement of vulnerable actors (women, young people, migrants, smallholders and those at risk of poverty). Local policies could:

- enable a framework for projects that promote and support pastoral products and culture, through labelling, training, sale points, and communication about pastoral activities;
- strengthen local/regional authorities especially with specialised staff and flexible financing tools to foster territorial projects (e.g. territorial food projects bringing together diverse actors);
- preserve the working conditions and economic sustainability of farmers;
- re-design pastoral systems and make pastoral activity and pastoral areas attractive for young people;
- support the development of business incubators to boost agricultural innovations, personalised coaching for innovative initiatives, and thematic activities;
- implement capacity building to develop skills in emerging sectors such as digital tools and marketing.

Activities involving pastoral components could be a source of innovation and creation of innovative enterprises and start-ups, such as the creation of a camel milk value chain in Tunisia, the organisation of the donkey milk sector in Croatia, the development of by-product companies to provide feed alternatives for local farmers in Tunisia and Morocco, all of which have been co-tested in PASTINNOVA.

In all cases these IBMs **require specific, strong support in engineering, management and logistics**. This priority could lead to financial support from organisations such as business incubators in favour of innovation, personalised coaching of innovative initiatives, collective workshops and thematic activities, training on management and marketing, digital infrastructures and services that could support livestock innovations.

It is also important to **preserve both the working conditions of the breeders and their economic sustainability** as pillars of populated and vibrant pastoral areas.

Developing markets based on short value chains and direct sales are ways to develop activities in rural territories. One of the biggest issues involves all small-scale producers, not only pastoralists. In many cases, they cannot sell meat or raw milk directly. The requirements that producers must meet to set up a jointing plant or a dairy are extremely demanding and expensive, or stakeholders have to go through intermediaries and lose profit margins.

QUERED association is addressing specifically public policies on these issues and is developing information and awareness material within PASTINNOVA.

4. To prevent of encroachment, forest fires or land degradation

Public authorities are also responsible for sovereign issues and must ensure their civil protection missions. Prevention of forest fire hazards, generally related to encroachment, land degradation, landslides, and floods, are some of these safety risks. Rural abandonment, climate change and loss of traditional practices increase the frequency of these events. Very complex and costly measures (i.e. fire breaks, forest roads, fire outbreak monitoring devices, water reserves, natural protection zones, cleaning and shrub removal operations around inhabited areas) are implemented to control these disasters.

The (re)adaptation and implementation of pastoral practices to face these issues should be discussed and included more systematically in such prevention strategies. These measures generally meet the other priorities to keep rural territories alive, dynamic and competitive.

PASTINNOVA and many other projects and initiatives show that it is relevant to **promote pastoral activities and the use of pastoral resources to prevent encroachment, land degradation or forest fires**, and also to encourage the establishment of new farmers. This would also involve promotion of educational initiatives to attract new farmers by adapting training modules to include pastoral practices (i.e. shepherding schools), silvopastoral and agroforestry practices.

It would also mean that **public authorities should be willing and able to finance the associated ecosystem services and compensate or support pastoral farmers**. In order to do so, ecosystem services should be properly quantified and evaluated so that result-based measures can be developed.

5. Priorities and PASTINNOVA Innovations and Business Models

The PASTINNOVA project has identified more than 100 innovations developed by pastoralists around the Mediterranean, addressing one or more of these priorities. This shows that pastoral systems are highly innovative, contrary to the stereotype of being a regressive activity. The challenge for public policies lies in supporting those innovations whilst responding to several of the priorities of the agricultural and rural areas. The public policies should favour the adoption of support measures by stakeholders, the farmers themselves, or their organisations. Several priorities could co-exist coherently in one policy.

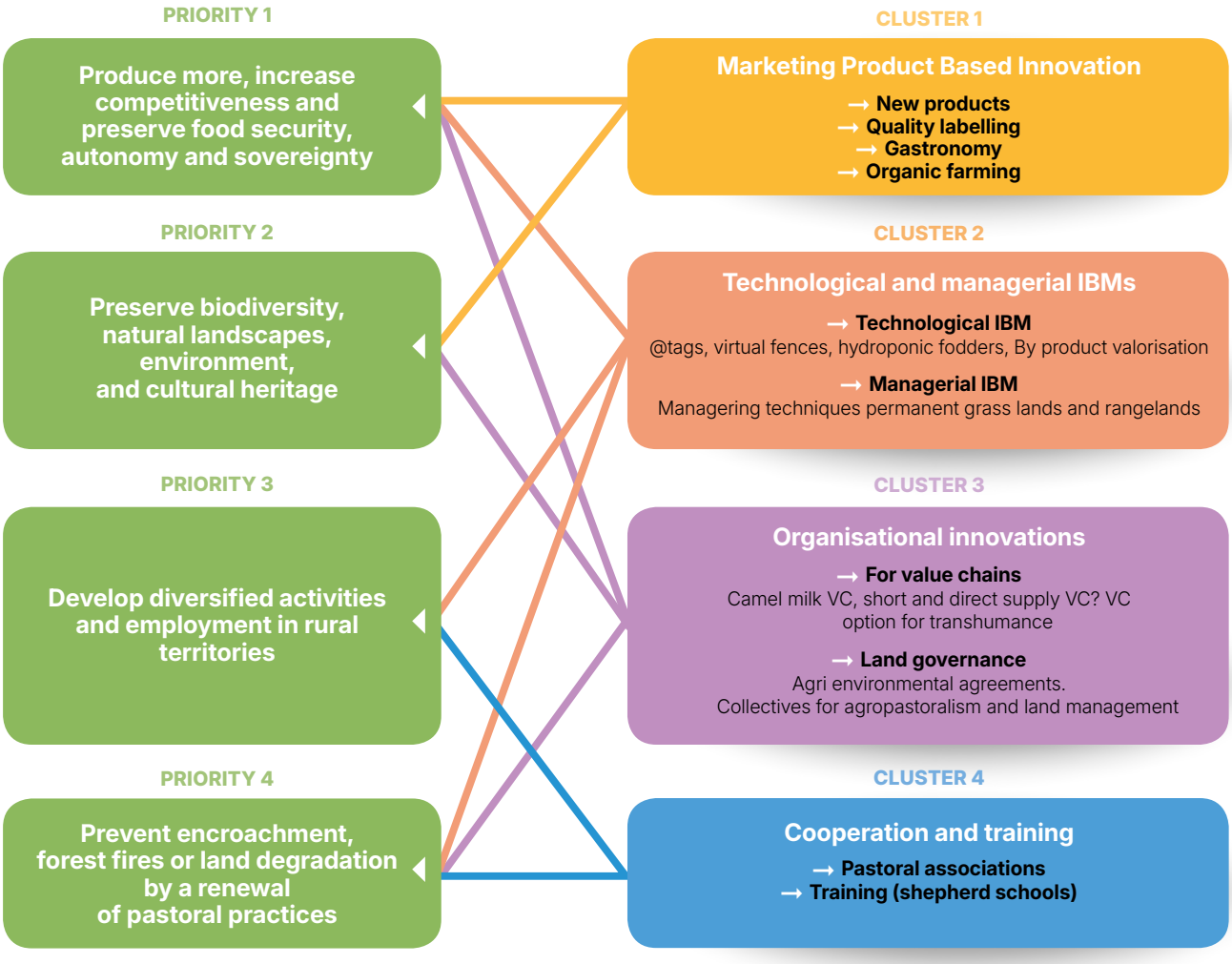

Fig. 1 MATCHING OF PUBLIC PRIORITIES AND PASTINNOVA INNOVATIONS AND BUSINESS MODELS (IBM's), GROUPED INTO FOUR THEMATIC CLUSTERS

5 Priorities and trends at transnational levels

In Europe, improving the Common Agricultural Policy (CAP) measures

The subsidies of the CAP and European regulations are main levers of the European policy affecting livestock sector.

The 2023-2027 CAP has 10 specific objectives (to ensure a fair income for farmers, increase competitiveness, improve the position of farmers in the food chain, combat climate change, protect the environment, preserve the biodiversity and the landscapes, support generational renewal, promote dynamic rural areas, protect food safety and quality, and foster knowledge and innovation). Recommendations made in this White Paper are all coherent with these objectives.

Until now, Pillar I single farm payments targeted exclusively agricultural lands and were based on a definition of grasslands which **excluded many non-herbaceous pastoral lands**.

However, many scientific results proving the production potential of these areas, and the new digital tools to monitor their use and prevent fraud, have made it more feasible to redefine the eligibility of these

- → The initial and founding objective of the CAP was to guarantee the security of food supplies and control the food market prices in Europe.
- → From 1962 to 1999, its levers were to support market prices and limit the import of food products including milk and meat from outside Europe. The consequence of such policies was that Europe produced more and more surpluses with a growing gap between supply and demand and high costs for the European budget.
- → From 1992 to 2003, the EU members introduced the first environmental conditions for granting subsidies, but also the strengthening of socio-structural and support measures, and a budgetary stabilisation through a strict financial framework.
- → Since 2003 and later in 2009, the EU has replaced the price protection system with a system of compensatory income aid decoupled from production, and a single farm payment focused on income stability.
- → The CAP is based on two pillars, Pillar I is dedicated to direct income support (75% of its budget) and Pillar II (25%) on the rural development policy with specific aids decided at regional and national levels (strategic plans at the Member-State level).

areas for EU financial support. In this framework, the possibility for **partial recoupling of income support with minimum stocking rate conditions** would potentially favour productive pastoral systems.

Managing the rangelands would depend largely on the future financial capacity of the newly introduced **eco-schemes of the CAP dedicated to environmental measures for rangeland and grassland management.** It is problematic that many **ligneous-covered grazed lands are still excluded** from income support although they can provide large quantities of forage for grazing livestock. Such measures should be decided partly locally or regionally so that local conditions can be reflected to the highest possible degree. This would require gathering much more scientific knowledge on the positive and negative impacts (i.e. GHG emissions, life cycle assessment, carbon and water footprint, biodiversity) of pastoral systems and how to improve their performance. Private and **collective rangeland management and associated investments could be supported through Pillar II** measures promoting cooperation.

There is no specific forest policy in the European Union, but other land-related policies are also crucial for pastoralism and silvopastoralism, e.g. the Biodiversity Strategy 2030, the Ecosystem Restoration Act, and Natura 2000. There are others related to product certification (Protected Designation of Origin, Protected Geographical Indication etc) or food safety, that have significant direct or indirect impact on pastoral systems.

In Maghreb and the Middle East

There is no transnational common agricultural policy in Maghreb and the Middle East. Nevertheless, we observe their **convergence to supporting, until recently, the costly import of feedstuff** and the move towards **privatisation of collective lands** (in Algeria, Tunisia, Morocco), affecting the productivity of the sector.

Food security, rural development and environmental protection are major challenges for these countries facing droughts, climate change, and decreasing water reserves. The development of more efficient **educational and extension** services such as those implemented in Morocco (Green Generation and "Plan Maroc vert") and Turkey should be strengthened at national levels.

These services should **acknowledge the traditional knowledge** of pastoral farmers, due to their resilience and adaptation capacity to the changing conditions in their closer environment. In some countries, such as Algeria, support for imported feedstuffs is seen as a land-use planning tool but this solution could be progressively replaced by an **integrated strategy to preserve and develop agro-pastoralism** (e.g. water resources improvement, rational use of rangelands and their preservation, training programmes).

The Mediterranean level and the need for integrated Mediterranean policies

When public authorities face complex issues and need interventions that transcend the boundaries of established and dissociated policy fields, it is necessary to define integrated and articulated programmes. Pastoralism in the Mediterranean region is a good example of a multi-dimensional issue that would require **coordinated actions between agricultural, environmental, social and territorial policies and between countries**.

The following Mediterranean organisations could potentially promote such integrated policies:

- The **Union for the Mediterranean** was founded in 2008. It is an intergovernmental institution bringing together the European Union Member States and 16 countries from the southern and eastern shores of the Mediterranean to promote dialogue and cooperation. The UfM action is based on a policy framework, expert dialogue platforms and projects to translate the policy dimension into regional impacts.
- The **PRIMA Foundation** that finances the PASTINNOVA project is a non-profit organisation made up of and co-financed by 20 Mediterranean states and and the European Union. The PRIMA foundation pursues a common research and innovation strategy addressing the challenges in climate change, population growth and food security, water scarcity and overexploitation of natural resources, sustainable agriculture, agro-biodiversity loss and reinforcing Mediterranean lifestyles.
- The **2026 International Year of Rangelands and Pastoralists**, will elevate pastoralism in public discussion and in the political agenda at global level. The International Year could be a starting point for putting into action some of the ideas on policies to support pastoralism outlined in this paper.

These initiatives have the **potential to reach common positions and declarations that would influence in pastoral policies at national scales**, and continue to support participatory research and development projects.

Integrated rural development programmes are typically transversal and locally driven. The LEADER (Links between Actions for the Development of the Rural Economy) methodology has been successfully implemented in European rural areas and adapted to other Mediterranean countries. Integrating pastoralism in these programmes offers sources of revenue (by remunerating multiple services) and support for innovations to pastoral farmers and their organisations.

Nevertheless, the opinion shared by all PASTINNOVA partners, is that development programmes should be predominantly financed for a considerably **longer duration than the short period of 3 years** that is usually assigned. In addition, more careful planning is required for a transitional period after conclusion of the programmes to secure their impact on the stakeholders. Another important conclusive point is the extreme importance of **training in pastoral resource management and in adding value to pastoral products.**

→ **Mediterranean pastoralism, with its rich heritage and proven public benefits, has a key opportunity to highlight its challenges and to demonstrate its vitality and ability to overcome its own problems as well as those widely affecting rural development, food security and environmental sustainability.**

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Annex

Country analysis and examples of Pastoral Innovations and Business Models

ANNEX 1 ALGERIA (Sétif)

Algeria's agricultural policy prioritises food security and sustainable development through modernisation, resource conservation, and support for rural livelihoods, with a focus on adapting to climate change and enhancing productivity.

Hydroponic barley to feed livestock

Coopssel cooperative dairy products

Traditionally, pastoral activities in Algeria relied on efficient resource management and herd mobility, but these practices were significantly altered during French colonisation. After independence, development policies prioritised modern paradigms, favouring herd concentration among a minority of settled commercial breeders. This led to overgrazing, reduced reliance on rangelands (less than 20 % of sheep fodder needs), and the decline of collective practices, replaced by increasing individualism and sedentary lifestyles.

In agro-pastoral areas like the Sétif region, livestock competes with subsidised cereal crops (wheat and barley). Although the state recently promoted growing legumes on fallow lands, these areas play a vital role in providing fodder, maintaining biodiversity, and protecting soils. Challenges such as climate change and frequent droughts demand a more autonomous and resilient agro-pastoral system.

PASTINNOVA project focused on two innovations for pastoralism in the Region of Sétif, regarding technical and organisational aspects

These innovation models (IBMs) aim to address the socio-economic and environmental challenges faced by agro-pastoralists, promoting innovative and sustainable practices to build resilience against climate change and resource constraints.

- **Hydroponic Barley Production**: This technology introduces a solution for precarious agro-pastoralists with limited land, providing high-quality fresh fodder, especially in winter or before mating. It involves using farm-grown barley to produce fresh green fodder through simple techniques. Adoption can occur individually or through collective organisations.
- **Agro-Pastoral Development Organisation**: This initiative is implemented within the COOPSSEL cooperative to train and support small-scale agro-pastoralists. It aims to facilitate the uptake of the first IBM and establish entrepreneurial projects focused on pasture management and product valorisation.

ANNEX 2 CROATIA (Istria)

Traditional methods of raising domestic animals, especially in pasture-rich areas, provide opportunities for extensive grazing systems that produce high-quality, native products. National policies in Croatia aim at preserving both local breeds and pastoral systems and focus on sustainable management and the conservation of natural habitats. Thanks to a strong legislative framework, subsidies and support, these policies are significant drivers of farmers' interest in utilising pastures and encouraging them to preserve their biodiversity, particularly through eco-friendly and/or extensive livestock farming practices.

Pastoralism in Croatia. General view

Croatia is a geographically diverse country. The lowland area is part of the fertile Pannonian Basin (55% of the territory, or approximately 30,800 km²); the mountainous region includes the Dinara, Velebit, and other mountain ranges (14 % of the territory, or around 7,800 km²); while the coastal (Mediterranean) region encompasses the Adriatic coastline and numerous islands, from Istria in the north, to Dubrovnik in the south (31 % of the total territory, approximately 17,400 km²). With a population of 3.9 million inhabitants, the density of population is only 68.4 people per km². A large part of the country is designated as protected areas (38.1%) and 25% of the habitats are composed of forests.

Historically, pastoralism was related mainly to transhumance of sheep flocks associated with goats and cattle, together with donkeys and horses as working animals. The herds were driven during the summer period to the higher mountains over 1000 metres. The shepherds had their permanent residence in the lowlands cohere the flocks stayed during the colder season but they lived in summer in seasonal dwellings and had small dairies where they processed milk into cheeses stored in wooden containers, or cured sheepskins. This transhumance was practised from Lika on high Velebit Primorje and from inland Dalmatia to Southern Dalmatia to the Dinaric Mountains.

Until the First World War, pastoralists of coastal Croatia regularly practised transhumance, grazing their herds on the open areas of mountain pastures during the summer months and then feeding them on Mediterranean pastures and maquis during the winter, supplemented with hay collected from Mediterranean meadows and pastures in early summer. Rural populations were dominant until the mid-20th century, with the number of livestock near the upper limits of ecological and biological sustainability. To protect

Transhumance in Croatia, current short routes and former routes interrupted after Croatia's independence

forests, the Austro-Hungarian administration issued a decree in 1883 prohibiting goat farming in the Istrian region, later extending this ban to Dalmatia (the ban remained partially in force until Croatia's independence).

Since the independence of Croatia and the fall of Yugoslavia, these traditional migrations, which were already decreasing, were stopped by the state borders. So nowadays, pastoral systems are mainly grazing systems of sheep, goats, cows or calves with only short-distance migrations.

Now, the rare examples of transhumance are promoted in the media, mainly as a tourist attraction in the Ucka Natural Park. Intensification of livestock systems, administrative constraints, and the standards of living of the breeders are the main causes for this near abandonment of transhumance.

Key data on livestock production in Croatia and in Istria (HAPiH, 2024)

→ According to official data, Croatia has approximately 415.000 cattle, 31.500 horses, 550.000 sheep, 75.000 goats, and 850.000 pigs. In **Istria**, in 2023, there were 7.922 cattle, 13.473 sheep, 3.167 goats, 1.362 horses, and 949 donkeys. Of the total cattle population, around 5.500 are dairy breeds (Brown Swiss, Holstein, and Simmental), 850 are beef breeds, and about 1.550 are the native Istrian cattle breed. In 2023, Istria had approximately 13.473 sheep, of which about 1.005 were of the native Istrian sheep breed. The goat population in Istria was 3.167, of which only 120 were Istrian goats.

The main challenges and stakes for pastoralism in Croatia

The main challenges to re-dynamise pastoralism in Croatia are:

- The lack of attractiveness for young people who prefer secondary and tertiary activities such as tourism.
- Insufficient inclusion of technological and organisational innovation in pastoral activities.
- The legislation that encourages the preservation of pasture ecosystems and pastoralism.
- Deficient management of areas exposed to ecological succession (maquis, shrubs, and brushwood), treating these areas as forested lands.
- The lack of qualified labour with skilled shepherds.
- The lack of connection between farmers' and consumers' expectations. All links in the food chain (from farm to plate) are not effectively connected.
- Raising awareness and promoting the benefits of preserving pastoral systems to society (landscape value, biodiversity, gastronomic identity, fire prevention, and more).

Pastoralism in Croatia: Legal framework and synergy of measures

The legal framework for pasture conservation in **Croatia combines national laws and EU regulations**, emphasising grasslands as key habitats for biodiversity and supporting their preservation through traditional livestock farming methods and sustainable land management.

Key national laws include the **Agriculture Act**, which promotes sustainable agricultural development and the conservation of grasslands and pastures by encouraging biodiversity-friendly practices through agri-environmental measures; the **Nature Protection Act**, aimed at preserving natural habitats and high-value grasslands; and the **Act on Sustainable Agricultural Land Management**, which mandates maintaining agricultural land in good condition, including preventing the overgrowth of pastures.

EU regulations and programmes, such as the **Common Agricultural Policy (CAP)**, encourage the preservation of grasslands through eco-schemes and rural development measures. Croatia leverages CAP mechanisms through the **Rural Development Programmes (RDP)** for 2014–2020 and 2023–2027, with measures such as support for maintaining high-value pastures

Herd of Istrian cattle on pastures

Dish prepared from Istrian beef meat

and payments for areas with natural constraints. The **Habitats Directive** establishes a legal foundation for protecting grasslands within the Natura 2000 network, identifying high-value pastures as priority habitats, such as dry and wet grasslands. Additionally, the **EU Biodiversity Strategy for 2030** aims to protect 30 % of Europe's land and sea, with a particular focus on grassland habitats, underlining the importance of a holistic approach to sustainable pasture conservation.

Box 1. **AGRI-ENVIRONMENTAL MEASURES IN CROATIA**

- In the Mediterranean region of Croatia, various support measures are implemented to preserve **karst Mediterranean (and mountain) pastures** through eco-schemes and national support programmes. One of the key measures is **Extensive Pasture Management**, providing annual support to farmers for maintaining pastures through livestock grazing. The support ranges between €90 and €100 per hectare.
- For preserving **high natural value grasslands**, farmers receive support through the **Preservation of High Natural Value Grasslands** intervention, with the amount of support depending on the region: (i) continental lowland region: €255/ha/year; (ii) mountainous region: €361/ha/year; (iii) Mediterranean region: €113/ha/year.
- In karst pastures and those located in **Nature Parks**, where extensive livestock production faces additional challenges, farmers can access specific subsidies per animal: up to €260 per head of cattle, up to €25 per sheep/goat, up to €260 per horse/donkey annually.

The legislative framework prescribing measures for the protection and sustainable use of grasslands is regulated by the **Agriculture Act** and the **Forestry Act**. Many pastoral systems in Croatia are part of the Natura 2000 ecological network, which promotes the sustainable use of grasslands to conserve rare and endangered habitats while controlling grassland succession into scrub or forest.

The **Natura 2000 ecological network** in Croatia covers **36.8 % of the terrestrial area** and is legally regulated under the Nature **Protection Act**. As a member of the European Union, Croatia implements the **Common Agricultural Policy (CAP)**.

Farmers can access support for extensive livestock farming and grassland maintenance through:

a) **Direct payments**: conditional on maintaining permanent pastures and implementing environmentally beneficial practices;

b) **Agri-environmental measures**: focused on protecting grassland habitats and adapting grazing to environmental needs (Box 1).

Innovative Approaches to the Conservation of Pastoralism and Local Breeds – Example of Istria region

Innovations and Business Models (IBMs) in agriculture, livestock production, particularly of traditional types, and the conservation of high nature value habitats (pastures) involve the modernisation and reintegration of traditional knowledge, practices, and values with current approaches to preserving economic, social, and cultural practices.

Herd of Istrian sheep on pasture

Cheese made from Istrian sheep milk.

Istrian buck

Dish from Istrian goat meat

In Croatia, as in many other European countries, local breeds have been marginalised due to their lower production potential. These breeds were often tied to pasture use, and their neglect has led to the ecological succession of such habitats. However, tradition and innovation offer opportunities to return local breeds to pastures, preserve habitats, enhance and modernise rural areas, and elevate traditional gastronomy by providing it with a premium value.

The added value generated by such programmes, when fairly distributed among all stakeholders, from producers (*farmers*) to consumers (*gastronomy*), strengthens these modern, short food supply chains.

A programme for the conservation of local breeds and pastures focuses on integrating traditional livestock farming into sustainable landscape management, with a key synergy linking the preservation of indigenous breeds such as Istrian cattle or/and Istrian sheep to the revitalisation of high-value pastures.

Although some practices such as transhumance have disappeared and are difficult to revitalise, grazing by domestic animals remains the most effective method for conserving pastures, particularly in Mediterranean and mountainous areas. Local breeds play a crucial role in the long-term conservation of pasture habitats, while financial incentives and education are vital for ensuring sustainability (Box 1 and Graph 1).

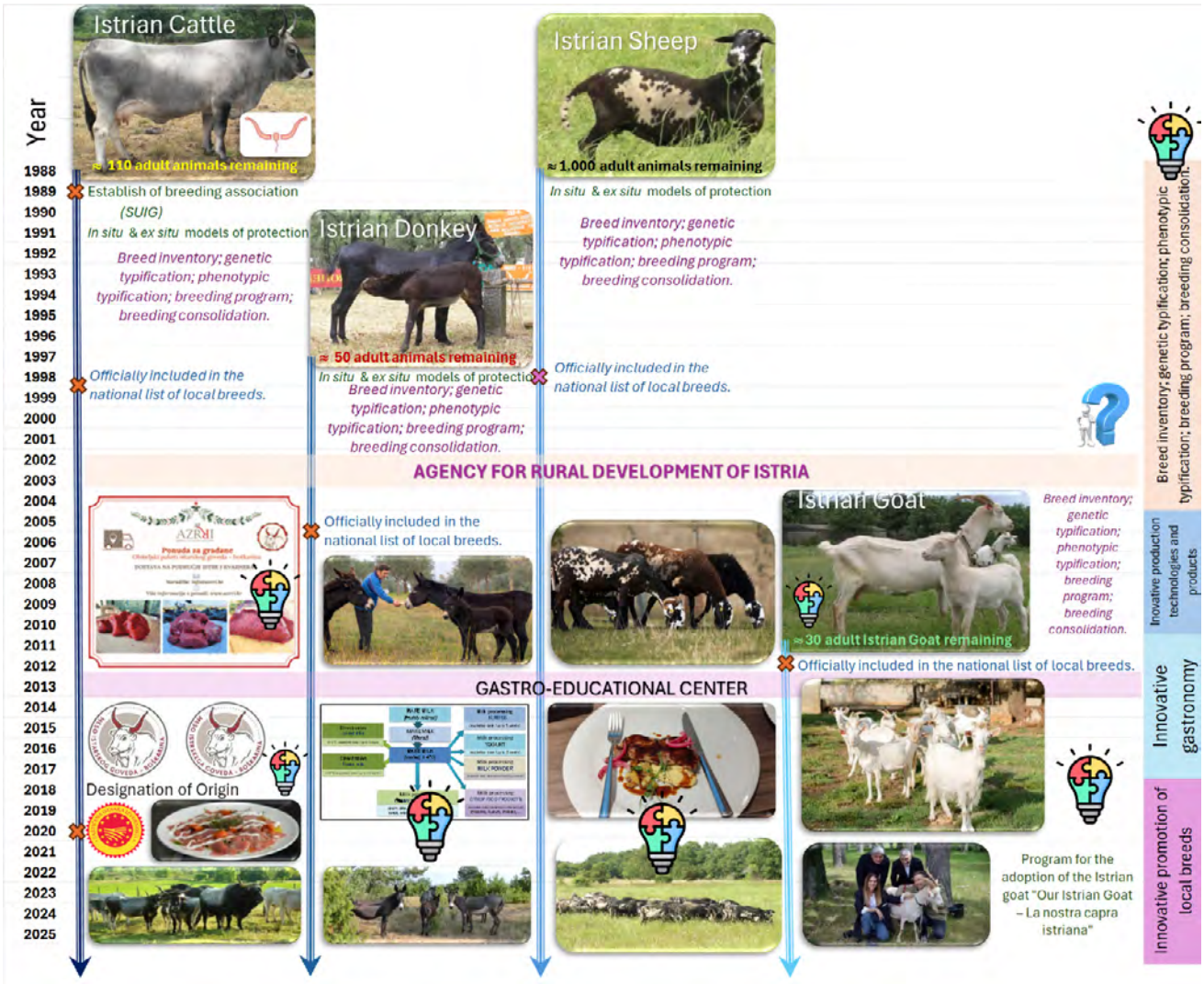
Box 2. **TWO INNOVATIONS TO PRESERVE AND VALORISE LOCAL ANIMAL BREEDS IN ISTRIA REGION**

- The **valorisation of meat and milk products by gastronomy** could answer the lack of connection between farmers' and consumers' expectations. Based on local breeds, this valorisation also serves other objectives such as increasing the attractiveness and the profitability of livestock farming, the management of pastoral landscapes, the conservation of breeds, and the strengthening of the collective organisation of breeders and other actors of the value chain.
- The **development of donkey meat and milk products** is a more exploratory innovation to change the image of pastoralism and diversify activities.

Istrian donkeys on pasture

Kumis made from donkey milk

Graph 01. **INNOVATION PROGRAMME FOR THE PROTECTION OF LOCAL ISTRIAN BREEDS WITHIN THE FRAMEWORK OF THE PASTURE-BASED LIVESTOCK HOUSING SYSTEM: A TIMELINE.**



ANNEX 3 CYPRUS

Pastoralism in Cyprus has a rich history, deeply intertwined with the island's culture, economy, and environment. Even though in the past pastoralism played a significant role in certain regions, particularly in remote semi-mountainous regions and rural areas, today pastoralism has become a rare agriculture practice.

The main challenges and stakes for pastoralism in Cyprus

The number of productive animals in Cyprus had been steadily increasing until 2011 when the scrapie disease hit the sector. In addition, the financial / bank crisis and the subsequent bailout measures leading to the forced economic liquidation of animals on many farms, resulted in a loss of 22% of the animal population by 2015.

Since 2019, the livestock population has been gradually rebuilding and expanding and in 2023, the animal population had reached nearly 422,000 sheep and goats producing almost 85 million litres of milk, 95 % of which is used to produce Halloumi cheese.

The local breeds of sheep and goats are being replaced by more productive crossbred animals with higher nutrition demands based on imported feed. Furthermore, the size of the permanent grassland area as a percentage of the total Utilised Agricultural Area is declining (Box 1).

Box 1. CYPRUS SMALL RUMINANTS BREED AND FEEDING SYSTEMS

- In 2023, the majority of sheep (74 %) are cross-bred, mostly Cyprus Chios x Assaf, while only 22.5 % of the population are Cyprus Chios, formerly the dominant breed on the island. The pedigree Damascus goat population, adapted to the conditions of Cyprus over 60 years, is also in decline (22 %), and crosses between the Cyprus Damascus and other breeds (73 %) are expanding. Local goat breeds, such as the Machaeras and Akamas (4 %), show a continuous fall in numbers and are considered endangered, partly due to their lower productivity.
- The feed ration is mainly based on 90 % of imported concentrates with barley, maize and soybean with an average consumption of 390 kg / animal per year. This feed dependence is mainly a result of the presence of 22 % of sheep and goats in livestock production areas with little or no grazing potential and the increasing tendency to create large intensive units with high-yielding animals that require concentrates. The size of the permanent grassland/pastureland area as a percentage of the total Utilised Agricultural Area is declining.

Table 1. **POPULATION OF ANIMALS, MILK PRODUCTION AND PRODUCTIVITY (2011 – 2023)**

Year	Nº of head			Milk production (x 000 l)			Productivity (l/ head)	
	Goat	Sheep	Total	Goat	Sheep	Total	Goat	Sheep
2011	214,720	255,540	470,260	27,823	26,818	54,641	130	105
2013	176,302	226,067	402,369	20,238	21,077	41,316	115	93
2015	153,725	213,381	367,106	22,937	25,853	48,790	149	121
2017	172,674	228,834	401,508	29,472	31,353	60,825	171	137
2019	167,283	232,383	399,666	33,133	35,119	68,252	198	151
2021	195,454	270,271	465,725	38,940	43,150	82,090	199	160
2023	166,936	254,814	421,750	36,192	48,174	84,366	217	189

The livestock sector in Cyprus is also facing overarching challenges due to national and global trends and changes

- Competition for grazing land due to urbanisation, agricultural expansion, and other land-use changes. This competition limits the availability of suitable pasture areas for livestock, leading to overgrazing in some regions.
- Land degradation in pasture areas, due to overgrazing and inappropriate land management practices. Soil erosion, loss of vegetation cover, and desertification threaten the long-term sustainability of pastoralism by reducing the carrying capacity of rangelands and degrading ecosystem services.
- Like in many other countries, rural depopulation occurs as young people migrate to urban areas in search of better economic opportunities. This demographic shift reduces the labour force available for pastoral activities and threatens the intergenerational transmission of traditional knowledge and skills.
- Cyprus is experiencing the impacts of climate change, including shifts in precipitation patterns, rising temperatures, and more frequent extreme weather events. These changes affect the availability and quality of grazing resources, leading to challenges in livestock management and health.
- Water scarcity is a serious concern, particularly during drought periods. Pastoralists may find it difficult to provide adequate water sources for their livestock, leading to lower productivity and more vulnerability to drought-related impacts.

Halloumi cheese export is an Innovative Business Model (IBM) adressing the challenges of the sector

The increase of exports of Halloumi cheese seems to be the driving force for the development of sheep and goat farming in Cyprus. The main challenge is to follow the increasing dynamics of Halloumi cheese exports, to ensure an adequate level of income for the

TABLE 2. **VOLUME AND VALUE OF HALLOUMI EXPORTS**

Year	Export volume (tons)	Export value (x 1000 €)	Av. Price (€/kg)
2011	8,790	54,412	6.19
2013	11,363	75,811	6.67
2015	15,253	103,913	6.75
2017	23,431	155,831	6.65
2018	29,378	194,900	6.63
2019	33,672	223,656	6.64
2021	38,717	262,485	6.78
2023	38,800	313,285	8.07

Halloumi cheese, fresh or mature, has always been the flagship of Cyprus' authentic cuisine.

→ Halloumi cheese, fresh or mature, has always been the flagship of Cyprus' authentic cuisine. For more than 1500 years, it has been a key component of the local diet, closely associated with the culture and traditions of its people. Halloumi cheese is made from Cypriot fresh sheep or goat's milk or a mixture of both, with or without cow's milk, rennet, fresh or dried mint leaves and salt. When used with cow's milk, there must always be a higher quantity of sheep or goat's milk. In 2021 the European Commission registered 'Χαλλούμι (Halloumi) / Hellim' as a Protected Designation of Origin (PDO), protecting the valuable name against imitation and misuse across the EU.

Chios breed sheep grazing

Halloumi is high in protein and calcium, both of which promote bone health

farmer and to maintain the overall diversity of small ruminant production systems within the framework of the new Green Deal and the Farm to Fork Policy.

The current EU agricultural policy recognises the essential role of ruminants and grazing in providing valuable ecosystem services. However, to ensure the sustainability of small extensive farmers — particularly those working with local breeds in remote and marginalised areas— there is a pressing need for policies that support their efforts and enable them to access markets under fair conditions.

In the absence of these policy interventions, the success story of Halloumi cheese risks undermining small ruminant extensive production systems, could ultimately lead to the decline of pastoralism and its associated benefits.

ANNEX 4 FRANCE (Corsica)*

The Corsican pastoral production systems and typical products with an ancient pastoral history are now threatened by low productivity, lack of attractiveness and the weak collective organisation of the livestock sector. The large subsidies and support through public policies (UE – CAP, regional funding) are not reverting this trend and may even make it worse.

Corsican cheeses (ODARC)

Corsican cattle (ODARC)

Pastoralism has always defined livestock production in Corsica and it is an important component of the culture and history of the island. After a long period of economic and demographic decline, the State has implemented a proactive policy to revive the economy, including agriculture. This support has mainly taken the form of support for tourist activities, viticulture and citrus growing in coastal areas. **Livestock production has been maintained but with radical changes: transfer of livestock farming to coastal areas, decline of transhumance, external purchases of concentrates and fodder with abandonment of rangelands and traditional practices such as pastoral burning**. Under the effect of CAP subsidies, in particular from the first Pillar, high-altitude pastures have been used by herds of cattle or by bands of pigs outside the usual traditional periods. The more accessible rangelands and pastures are now overgrazed and we are observing closure of scrubs and encroachment in many other areas. Local breeds have been widely promoted and make up most of the livestock.

Local farm products (cheese, charcuterie, kids) are highly appreciated but there is some confusion on the identification of local products with respect to other products made from imported raw materials. The animal sector is unappealing due to its lack of profitability and the demanding nature of the work. Studies and references on these production systems confirm the lack of connection between cultivated lowlands and rangelands.

The main challenges and stakes for pastoralism in Corsica

The main stakes for the future of pastoralism in Corsica are, on one hand, to reorganise and sustain the complementarity between agricultural and pastoral activities, and on the other, to effectively articulate pastoralism within territorial policies and coordinate pastoralists with local authorities and citizens' organisations. These stakes can be summarised in the following challenges:

- Reconnecting diverse and complementary uses (agroforestry, pastoralism, forestry) of different areas (grasslands, woodlands, maquis).
- Improving livestock farming's feed and forage autonomy.

*This annex chapter refers only to the Corsican pastoralism situation, it does not deal with pastoralism issues in mainland France.

A herd of Corsican goats (ODARC)

- Developing training and research strategies for achieving these objectives and attracting new farmers.
- Creating a socio-economic cultural and institutional environment to favour the renewal and improvement of agroforestry practices, silvopastoralism and governance of summer pastures.

Pigs grazing under oaks (J. P. Dubeuf)

PASTINNOVA has focused on two actions to develop innovations in Corsican pastoralism

- **Agro-silvopastoralism.** The Corsican development services (ODARC - Office de développement agricole et rural de la Corse) and the administration have supported several initiatives (farmers' association, economic and environmental interest groups, working groups) to engage different actors around agro-silvopastoralism. The aim is to work on agro-silvopastoral practices and the conditions for their renewal, while reconnecting various land uses and reconsidering how public policy and action can move away from specialised sectoral approaches.
- **Revival of the pastoral goat sector.** As a majority of goat farmers have few cultivated lands, their system is based on the use of scrubs, maquis and rangelands. A survey showed difficult living and working conditions, uncontrolled animal health problems and, above all, very low feed autonomy. One consequence is the lack of motivation of farmers, particularly the younger generation. The goat breeders association I Capraghji is developing initiatives that serve as an open collective innovation hub, exploring new perspectives of the goat sector. The association efforts aim to identify and test pastoral components that could be integrated in a renewed goat pastoral system.

ANNEX 5 GREECE

An enabling policy framework to improve pastoral livestock breeders' access to land and markets.

Pastoral activities have existed in Greece since ancient times and are part of the country's national identity. Among the pastoral practices, transhumance has been a very important component until now. Transhumant shepherds, driven by mild temperatures and abundant forage resources, keep their flocks and herds in the lowlands (Epirus, Central Macedonia, Central Greece, Thessaly) approximately from October to May, and then move them to the highlands during the warm and dry summers (Pindus mountain range, Peloponnese mountains and other mountains around the mainland and the islands).

Nevertheless, intensive rearing practices have increased, reducing grazing and leading to loss of rangelands and expansion of forest in many mountain areas. These trends have led to landscape degradation through both over- and under-grazing or loss of open habitats and biodiversity.

Most of the characteristics of pastoralism in Greece have been acknowledged through the recognition of transhumance as an Intangible Cultural Heritage by UNESCO, while endangered local breeds and their positive impact on biodiversity are supported by the Common Agricultural Policy through dedicated measures and a recently introduced eco-scheme that supports the grazing of mountain rangelands by transhumant flocks. However, the positive environmental externalities and socio-economic benefits of pastoralism are still insufficiently integrated into public policies.

- Greece has a census of around 15 million head of sheep and goats. In 2023, sheep milk production was 732 million litres (from about 40 thousand farms) and goat milk production was 160 million litres (from about 13 thousand farms).
- The number of transhumant flocks has fluctuated over the last decades, rising from 900 thousand head of sheep and goats in 2002, to over one million in 2011, marking an 11% increase.

The analysis in a typical area for transhumance in Greece through economic modelling has shown that certification could potentially affect all three pillars of sustainability (Ragkos et al., 2020).

The main challenges and stakes for pastoralism in Greece

In this context, one of the main challenges for pastoralism in Greece is to have guarantee of a fair competition for pastoral smallholders, taking into account the effect of continuous intensification and industrialisation of production, combined with the predominance of globalised supply chains and concentration of the processing and retail sectors. The higher quality of pastoral products is not acknowledged and not valorised through higher (or fairer) prices. In addition, technical and sanitary regulations enforced by the European Union (EU) regarding milk processing pose a significant obstacle for pastoral farmers, due to the high costs associated with meeting these requirements to market their products.

Besides, many pastoral farmers have to overcome barriers and occasional conflicts regarding mobility and use of rangelands – since the introduction and implementation of integrated grazing management plans has been postponed for a decade.

Innovations and Business Models (IBMs) adressing the challenges

Income support for transhumant farms is lower compared to crop farms but represents a vital part of farm incomes. The Farm to Fork strategy embedded in the EU's Green Deal and the eco-schemes could potentially benefit businesses whose products carry PDO (Protected Designation of Origin) and PGI (Protected Geographical Indication) labels, as well as those implementing sustainable land management practices within livestock systems. More can be achieved through the introduction of a grass-fed certification that would acknowledge the premium quality of pastoral products.

The initiative to develop the **value chain for transhumant livestock products** is a way to enhance and valorise the specific quality of pastoral products. The **certification of cheeses produced from transhumant farms** could help to address this challenge by enabling a special framework that facilitates the certification and labelling process for pastoral farmers.

Transhumant herd in Greece

ANNEX 6 ITALY (Sardinia and Marche)

Pastoral systems in Italy are distributed across the northern and central regions (spanning the entire Alpine and Apennine Mountains from Piedmont and Friuli to Abruzzo, including the Latium plains), the southern regions (from Apulia to Calabria), as well as Sicily and Sardinia. Historically, long-distance transhumance was a widespread practice dating back to the Middle Ages. Today, however, vertical long transhumance is limited to rare cases, while short transhumances or more localised movements are still practised. In general terms, pastoral sedentary systems became predominant in most of the Italian plain areas. Cattle and sheep farming are common across all regions, while goats are particularly prominent in hilly and mountainous areas of the Alpine regions, southern Italy, and Sardinia.

Grazing sheep in Sardinia (CNR)

Grazing landscape in Sardinia (CNR)

6.1. SARDINIA

THE PREPONDERANCE OF THE SHEEP MILK SECTOR

Livestock farming in Sardinia is and has always been agropastoral with sheep, goat and cattle activities. But there is a clear **preponderance of the dairy and sheep's milk cheese sector, which has been the main focus of the agricultural administrative services and the public authorities in general**.

Dairy sheep is the most dynamic sector of Sardinian agriculture (25 % of Sardinian agricultural income; 3 million sheep and 44 % of the national sheep herd). At a regional level in Europe, Sardinia is in second place for number of sheep, preceded only by Extremadura (Spain). Due to a series of factors, including the sharp cyclical decline in incomes caused by the variation in the price of milk and Pecorino Romano cheese, the difficult generational turnover, the tendency towards the intensification of inputs for fodder production, **in recent years the number of farms has declined but they have grown in size** and become increasingly concentrated in the plains.

Key data (2024)

→ Sheep milk production: 260,000 t; Number of farms: 15,432; Number of lactating ewes: 2.6 million head; Average flock size: 239 head; Industrial and medium-size cheese plants: 71; Share of lamb meat in the income: 20 % - 1.1 million lambs.

The dairy sheep farming system is **mainly grassland-based**. There is a large area of permanent grasslands **but the most marginal areas are abandoned** and hardly any flocks practise transhumance nowadays. Sheep often **graze beneath cork and holm oak trees**, contributing to both sustainable land use and high-quality cheese production. On the other hand, semi-intensive systems depend both on annual forage crops and natural or improved pastures, mainly by oversowing annual legumes such as clover and vetch to supplement grazing during periods of low forage availability.

Several internal (national and regional) factors exacerbate the negative impact of fluctuating market conditions, such as the high cost of energy (fuel), purchased forages (hay) and concentrates. Therefore, Sardinian **sheep farms cyclically have low or negative profit margins** with dramatic consequences on the Sardinian economy. Only in the last two years, do milk and cheese prices seem to remain high and constant, with positive repercussions both on market and income stability. As a matter of fact, the economic sustainability of Sardinian sheep farms nowadays depends on support from Common Agricultural Policy (CAP) payments, which account for more than 20 % of their gross income.

THE PERMANENCE OF GOAT FARMING

Although less important than dairy sheep production, Sardinia is also the main Italian goat farming region. Sardinian goat farms are characterised by a relatively low stocking rate, low productivity, widespread use of supplements, a high average weaning age and an overall low level of structures and investment.

Sardinian goat farms can be categorised in: (i) **traditional extensive farms**, the basic form of goat farming in Sardinia which is based on the breeding of Sarda goats, often with use of public rangelands and shrublands, and with the lowest productive and structural levels; ii) **semi-extensive farms**, which have higher productive and structural levels than the extensive farms, but lower than the dairy sheep farms; iii) **semi-intensive farms**, characterised by high reproductive and productive performances. Farm investments and infrastructures are low and located in remote areas for producing farm made cheese and selling kids.

THE CATTLE SECTOR

Some years ago, the cattle sector went into sharp decline due to the fall in meat prices. Nevertheless, **the sector engaged in an important process of valorising the meat of some rustic breeds**, through the activation of projects involving various producer associations: Bue Rosso of Montiferru, Consortium of Gennargentu Rustic Breeds Producers, Consortium of Gallura Cattle, Project Melina. Also, more specialised breeds, such as Charolaise and Limousine, adapt well to extensive pasture-based systems. Nowadays, the beef cattle system based on calf production still resists (linea vacca-vitello) and a **clear sign of the sector's vitality** is that many sheep farmers, given the increasingly low profitability of the typical dairy sheep farms, especially in marginal mountain or high hill areas, seem to be turning their attention towards the breeding of rustic beef cattle in the pasture-based systems, with lower working loads and costs than dairy sheep farming (which needs milking and more guided grazing).

The main challenges and stakes for pastoralism in Sardinia

- Revival and maintenance of pastoral activities in the marginal areas through recognition of the environmental role of pastoralism and financial evaluation of ecosystem services (support, regulation, social and cultural services in addition to food supply); levers and opportunities.
- Valorisation of pastoral product quality, considering eco-labelling as a lever for this revival.
- Identifying the indicators of attractiveness and resilience in each territory and the ways to activate them (pluri-activity; training programmes, etc.)

Innovations and Business Models (IBMs) adressing the challenges identified above

The **Certification of the Agnello Sardo PGI** (Protected Geographical Indication) is directly related to the valorisation of pastoral products. The PGI Agnello di Sardegna Consortium has initiated a process of adaptation of lamb meat production, as a by-product of the dairy sheep production chain, to the demands of the market and consumers by creating innovative lamb meat cuts and preparations, such as portioning, hamburgers and pre-cooked preparations, which are added to the traditional light lamb.

The **School of Shepherds** aims to support the relaunch of pastoral practices and improve the attractiveness of pastoralism. This innovation was possible thanks to a preliminary action developed by the National School of Pastoralism (SNAP), a multidisciplinary working group that provided elements

of training, information, innovation and dialogue and proposed a modular, itinerant and interactive school model. Direct expression of this preliminary activity were the four shepherding schools set up in Italy in the last four years (Piedmont, Tuscany, Sardinia and Sicily), in which about 50 young shepherds were trained.

6.2. MARCHE

The pastoral system in the **Marche Region still retains many extensive features**, particularly in the marginal areas of the mountains and high hills. In mountainous regions, grazing is primarily focused on cattle (mainly sedentary) and sheep (both sedentary and transhumant), which predominantly graze on permanent grasslands from April–May to October–November, following vertical seasonal movements.

The main challenges and stakes for pastoralism in the Marche

The depopulation of inland areas and the decline of the traditional agricultural system have led to the **abandonment of pastoral activities**, a trend that began after WWII and continues to this day. More recently, several strong earthquakes have further exacerbated the issue, deepening the isolation of mountain communities in the Marche Region.

As a result, in addition to a general decline in pastoral systems, reduced stocking rates and changes in traditional pastoral management have led to **widespread shrub and tree encroachment** into secondary grasslands across vast areas. Institutional and regulatory frameworks have further aggravated the situation, imposing **constraints on both the continuity of pastoral systems and the effective conservation management of grasslands**. Key issues include restricted land access, inadequate funding for grassland rehabilitation, conservation measures that prioritise shrubs over open pastures, rigid grazing calendars unsuited to evolving socio-economic and climatic conditions, and stocking limits that fail to reflect vegetation carrying capacity.

Public support to pastoralism in the Marche

In the Marche Region, the public authorities have identified various strategies to overcome the climatic, ecological, technical, institutional, and socio-economic barriers that hinder the development and continuity of pastoral systems.

Over time, various policies have supported pastoral systems, notably the **Regional Rural Development** Programme (RDP) from 2000 to 2022, now succeeded by the Rural Development Complements (RDC) for 2023–2027. Notably, these initiatives include targeted interventions for the conservation of permanent grasslands and local livestock breeds, support for the persistence of mountain farmers, compensatory payments for agricultural areas within Natura 2000 sites, as well as funding for training, innovation, young farmers' settlement, and the development of local supply chains.

The regional government promotes **quality labels for products such as PDO cheeses** *(Casciotta d'Urbino and Formaggio di Fossa di Sogliano)* and PGI meats *(Vitellone Bianco dell'Appennino Centrale beef and Agnello del Centro Italia lamb)*. Key initiatives include raising awareness of the ecosystem services provided by pastoral systems to justify public investment in sustainable practices and enhancing the identity and marketability of livestock products such as lamb meat and Pecorino cheese.

To support sustainable grazing management, which is essential for the long-term conservation of grasslands, the regional government has introduced **agri-environmental agreements for the protection of high-biodiversity permanent grasslands** within the Natura 2000 network. These agreements involve adopting site-specific practices co-designed with active stakeholder participation to address local needs and ensure effective, tailored solutions.

Key data (2024)

→ The potential grazing area is estimated at 1.400 km², roughly 15 % of the regional territory. In 2010, mountain areas in the Marche Region held approximately 16.000 cattle, 27.300 sheep, 1.600 goats, and 500 equids, with significant declines of up to 25 % since the post-war period. There are approximately 1.600 livestock farms in total, 40 % of which are landless resident farms, while the remaining 60 % are primarily transhumant.

Innovations and Business Models (IBMs) addressing the challenges

The PASTINNOVA project has analysed two innovative models of supporting the pastoral systems in the region of the Marche.

Meat quality labelling and promotion of direct selling

This IBM aims to enhance the identity and marketability of livestock products as a driver for pastoral development. It raises awareness of both the environmental value (e.g. biodiversity conservation, ecosystem services) and the socioeconomic benefits (e.g. support for rural communities, sustainable food supply chains) of pastoral systems.

Agri-environmental agreements for high-biodiversity grasslands

These agreements focus on conserving permanent grasslands within the Natura 2000 network, where most remaining pastoral systems operate. Their participatory approach, involving multiple stakeholders, is strategically important as it enables the development of shared and sustainable measures that are:

- Site-specific, tailored to local conditions;
- Conceived at landscape scale, applicable across wider territories;
- Practical, easing implementation by mitigating the constraints of strict regulations.

Agro-pastoral landscape in Marche (P. d'Ottavio)

Pastoral landscape in Marche (P. d'Ottavio)

ANNEX 7 LEBANON (Bekaa)

There is a need to update the national silvopastoral policies for sustainable rangeland management, preservation of natural resources, and valorisation of the shepherding profession to contribute to the resilience of rural communities and national food security.

The Bekaa region in Lebanon is the most important pastoral area of the country. It is a lowland valley at about 900 m altitude but most of the region includes the mountainous and dry foot hills of Mount Lebanon and Anti-Lebanon where the rangelands for grazing are located. In Northern Bekaa, the grazing season on the pastures starts in mid-October and lasts until mid-April when the shepherds move their flocks to a higher altitude. These marginal lands are managed by the municipalities and farmers pay a lease per head of livestock without prior assessment of the lands' carrying capacity. This causes frequent overgrazing and overstocking with negative effects on biodiversity.

Deir El Ahmar landscape (WADA)

Box 1. MAIN DISPOSITIONS OF THE 1949 FOREST LAW, LEBANON

- **Decision Nº 1/529 (2011)**: Registration of cow, sheep and goat farms intended for milk production.
- **Decision Nº 1/322 (2004)**: Authorised ratios of aflatoxins in food products.
- **Decision Nº 1/821 (2010)**: Health requirements for transport vehicles of milk and its derivatives.
- **Decision Nº 1/822 (2010)**: Health conditions required in milk factories and for milk derivatives to obtain the health certificate.
- **Decision Nº 1/1034 (2011)**: Regulations on the packing, packaging and display of milk and its derivatives.
- **Decision Nº 1/897 (2012)**: Health registration requirements of factories of food products of animal origin.
- **Law Nº 224 (2012)**: Technical regulations and related conformity procedures.
- **Law Nº 35 (2015)**: Food Safety Law.
- **Decision Nº 1/427 (2021)**: Process to grant the certificate of origin for agriculture products of animal origin produced locally and intended for exports.
- **National Agriculture Strategy 2020-2025**: Programme 4.2: Promote sustainable use of natural resources (soil, pastures, forests and fisheries).

Public policies and main challenges and stakes for pastoralism in Lebanon

The main challenges for pastoralism in Lebanon and in the Bekaa region include:

- Drought
- Overstocking and overgrazing
- Lack of human, technical and financial resources needed for proper protection and management of rangelands
- Lack of updated reliable information on the current local diversity of silvopastoral systems
- Scarce coordination among stakeholders, and
- Lack of adequate policy instruments for rangeland management.

The Forest Law, issued in 1949 by the Lebanese Ministry of Agriculture, is the first and main Act regulating rangeland management in the country (Box 1). It is based on centralised governance with regulatory measures which need to be upgraded to adapt to evolving farming systems and lifestyles.

Some key guidelines were proposed in 2014 to preserve the pastoral system (Sattout, 2014) by integrating the institutionalisation of collaborative management in forest and rangelands and mobilising human capacities resources for this purpose. According to the latest national agriculture strategy (2021-2025), the Lebanese Ministry of Agriculture has the mission of developing management plans to improve natural rangelands and increase their productivity.

National consultations offer the following solutions

- Establishing an updated legal framework for rangeland management.
- Adopting a participatory approach fostering negotiations with various stakeholders to ensure that local needs are considered in rangeland management.
- Empowering and building the capacity of the rangeland management authorities including forest guards.
- Empowering and building the capacity of municipalities and local authorities to manage and protect rangeland territories.
- Raising awareness among shepherds about environmental issues and the obligation to minimise illegal overexploitation of grazing lands, with respect to biodiversity conservation, regeneration, and their own sustainability.
- Promoting the shepherding profession.
- Developing marketing channels favouring local produce that respects the environment.
- Supporting biodiversity conservation (in accordance with the CBD), mitigating the impacts of climate change, enhancing sector resilience (UNFCCC) and contributing to SDGs: 2 (Zero Hunger), 13 (Climate Action), and 15 (Life on Land).

Grazing sheep and goats near the Bekaa valley

Innovations and Bussiness Models (IBMs) addressing the challenges

→ The WADA (Women's Association of Deir El Ahmar) and Istaytiyyah small ruminant farm are two business models selected to address these challenges.

WADA association is working on traditional dairy products and has started to consider the life cycle impact. Istaytiyyah farm is focusing on the comprehensive management of small ruminants with emphasis on environmental issues.

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ANNEX 8 MOROCCO (North)

Morocco prioritises sustainable agriculture and rural development through initiatives such as the 'Green Generation,' emphasising the valorisation of by-products such as olive cake to enhance feed alternatives, reduce costs, and promote a circular economy while strengthening pastoral systems and rural livelihoods.

Located in the northwest of Morocco within the Rif Mountains, the Chefchaouen Province is among Morocco's wettest regions, influenced by both the Mediterranean and Atlantic climates. This unique positioning results in extensive forest cover, making up 70 % of the province's total surface area. Predominantly rural, the population relies on traditional, climate-dependent agriculture on degraded soils.

Key agricultural practices include cereal cultivation (covering 33 % of arable land), arboriculture (with olive, fig, and almond trees), and goat husbandry, which represents 49 % of livestock in the region. These activities are carried out on rugged, often silvopastoral, landscapes.

Goat production in the Chefchaouen Province comprises two main systems

- **Extensive system:** Centred on meat production, this system relies on indigenous breeds and operates in remote areas with limited infrastructure.
- **Semi-extensive system:** Present in more accessible regions, this system supports both meat and milk production, often processed into the well-known local 'Jben' cheese. Crossbred and improved foreign breeds are commonly raised here, their diet supplemented by forest resources, agricultural by-products, and concentrates.
- **Farms in this region are generally small,** under 5 hectares, with fragmented and unirrigated plots. However, increasing land cultivation poses a risk to forest and silvopastoral areas, leading to decreased vegetation cover.

Grazing goats in northern Morocco (Y. Chebli)

The main challenges and stakes for pastoralism in northern Morocco

The primary challenges for goat production in the Chefchaouen Province include:

- **Expanding income streams.** Eco-tourism and improved marketing strategies offer potential alternative income sources for goat breeders.
- **Enhancing farmer knowledge.** Increased awareness of animal nutritional requirements and optimised feed management.
- **Reducing feed costs.** Employing low-input feeding strategies, such as using by-products and multipurpose shrubs, alongside improved management of forest resources can help to maximise profitability.
- **Incorporating quality control.** Developing feed analysis systems to ensure high-quality feed and nutrition for livestock.

Policy and support initiatives

- **Morocco's 'Green Generation'** initiative, launched as a successor to the Green Morocco Plan, aims to boost agricultural resilience, sustainability,

Labeling kid meat (Y. Chebli)

Preparing olive cake (S. El Otmani)

and social inclusivity. This initiative could help consolidate extension services and strengthen aggregators to improve the value chain for by-products, such as feed resources, and support the labelling of goat products. Aligned with 'Green Generation' objectives, which include fostering a new generation of rural entrepreneurs, supporting agro-industry innovation, and promoting climate-smart practices, these IBMs have the potential to transform local economies.

By enhancing extension services and providing sustainable feed alternatives,

→ **'Green Generation'** can support the broader value chain of goat products, strengthening the sector and empowering small-scale producers. Such integrated strategies could ensure that pastoral systems in Chefchaouen remain viable, productive, and resilient to climate changes, effectively aligning agricultural practices with the region's ecological resources. Through initiatives like this, Morocco is poised to reinforce sustainable development and rural prosperity, ultimately contributing to food security and environmental conservation.

Innovations and Business Models (IBMs) to support sustainable pastoralism

Two key IBMs hold promise for addressing these challenges and fostering sustainable pastoral practices.

- **Marketing and stabilisation of by-product processing (e.g., olive cakes):** Developing a reliable, stable supply chain for by-products such as olive cakes is an effective strategy to reduce feed costs sustainably. Processing and marketing these by-products would provide a lower-cost feed alternative, thereby enhancing profitability for goat farmers. Additionally, this could contribute to a circular economy by minimising waste from local olive oil production.
- **Labelling of Goat Products:** Establishing a labelling system for local goat products, particularly in the extensive system, can significantly enhance product value and recognition. This initiative would support the income of breeders by differentiating their products in the market, thereby rewarding traditional practices and quality.

Fig. 1 **THE GREEN GENERATION FRAMEWORK AND OBJECTIVES**

ANNEX 9 SLOVENIA

Although the protection of the natural biodiversity of Slovenia, the closure of forest landscapes, and big fires risk are major national challenges, the Slovenian national public policies still do not favour pastoral systems. The presence of regional or inter-municipality policies cannot compensate this lack of national support.

Slovenia is a small but very diverse country with both Mediterranean and Alpine characteristics (from the Alps to the Adriatic, from Karst and the Po valley to Pannonia) maintaining an old pastoral culture and associated practices. Grazing exists both in lowland areas ('log') and high mountain ('planina') pastures and rangelands, but today transhumance is no longer practised.

Historically, grazing in forests has been banned since the reign of the Austrian Empress Marie Theresa in the mid-18th century. This ban was permanent except for a brief period during the fascist era. Even after that, the subsequent communist regime did not support grazing in forests, lowlands or rangelands.

Today, mountain pastoral systems have decreased significantly and the experiments to re-establish them have not been successful in spite of real potential, for example in the Tolmin and Bohinj mid-mountain area where farm-cheese making could be developed near Triglav National Park.

Typical pastoral landscape in Slovenia

The main challenges and stakes for pastoralism in Slovenia

The protection of the natural biodiversity and the closure of forest landscapes to prevent big fires is a major national challenge for Slovenia and pastoralism certainly has a role to play. Nevertheless, the Slovenian national public policies still do not favour pastoral systems and the presence of regional or inter-municipal policies cannot compensate this lack of national support.

The first main problem for developing grazing systems in Slovenia is the fragmentation of the land with 5 million land plots for 20 000 pastoral farms. The second problem for grazing animals is protecting them from predators (bears and wolves) and managing competition for grass from wild animals like roe deer and deer.

But there is exist a movement of young, educated families returning from towns to settle in villages

- This is leading to the development of smart villages and internet infrastructures. Although rearing livestock is not generally considered an attractive business, some of these new rural inhabitants could be attracted by pastoral farming and adapt more easily to technological and digital innovations such as virtual fences or e-tags to manage the herds with cell phones.
- Goats could also be a solution to open up bushland, but first, a business plan is needed to promote high-quality products such as kid meat and excellent soft goat cheeses.

Slovenian heifers with GPS collars

Innovation and Business Models (IBMs) addressing the challenges

To attract more young farmers and address other challenges in Slovenia, the development of virtual fences is a promising innovation. It is well suited to managing herds on small plots without the need for expensive fences. Using **e-tags to manage the herds** with cell phones is also a solution for small plots but does not protect the animals from predators. Virtual fences were tested in Slovenia two years ago by the Biotechnical University in an EU Project on heifers. The heifers soon adapted to the virtual fence but some difficulties were observed when animals had to leave the e-confined area.

The PASTINNOVA project has been testing new technologies in small ruminant herds in Slovenia

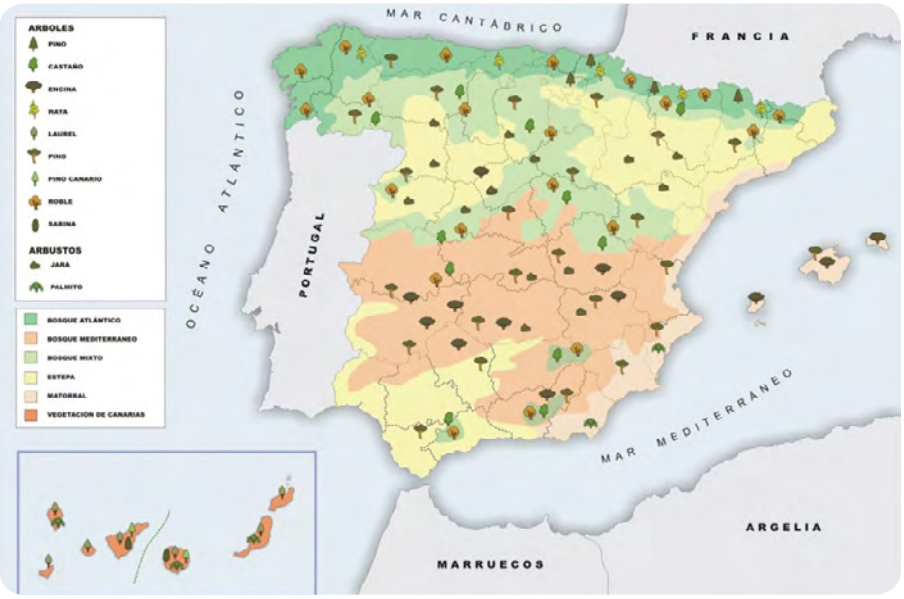
We successfully implemented an e-ear tag system on the Beka farm in Karst to monitor and count goats as they left the stall to graze and returned from pasture. The system consists of reading boards that transmit the e-ear tag data to a smartphone, an automatic weighing scale, and a digital stall book for herd management. The system has worked perfectly on this farm and is now in constant use during the grazing season; the farm serves as a demonstration point for other farmers who are interested in these technologies. They plan to use virtual fences for sheep in the near future, once commercial systems have been tested in Europe.

Grazing sheep in Slovenia

e-ear tagged goats entering the stall through the chute with the identification device

ANNEX 10 SPAIN ("Quered" association and Pallars area)

Undoubtedly, if no measures are taken, the livestock sector will continue to intensify, and pastoralism will gradually disappear. This is compounded by the widespread abandonment of rural areas and the concentration of both land and livestock in fewer hands. To prevent this, several key steps should be taken. First and foremost, there is a need to define extensive livestock farming nationally and establish a recognisable label for consumers, to increase profitability for farmers. Social recognition of shepherds and their crucial role in soil care, fire prevention, and environmental maintenance is essential.



The general context of extensive livestock in Spain

Spain is predominantly semi-arid, except for the northern region, where the humid climate favours dairy cow farming based on grazing, except in the Basque Country and the Pyrenees mountains where cows co-exist with sheep. Central Spain hosts the largest population of beef cattle and sheep (dairy and meat), while goats dominate in the southeastern part of the Iberian Peninsula.

- Spain's livestock census includes around 14 million head of sheep, 2.2 million head of goats and 6.4 million head of cows. Agriculture, livestock farming, and fishing contribute 2.4 % of the country's GDP, slightly higher than in the rest of Europe.
- **Unfortunately, there is no universal definition of extensive livestock farming,** and therefore no comprehensive census. Spain is crisscrossed from north to south and east to west by numerous livestock trails, which are falling into disuse as farming operations gradually become more intensive. The sedentary nature of shepherds and inadequate European policies that fail to reward extensive farming over more intensive practices and cropping are steadily transforming Spain into a semi-intensive or fully intensive livestock farming country.

The main challenges and stakes for extensive livestock and pastoralism in Spain

- **Reforming the Common Agricultural Policy (CAP)** is crucial, particularly to include forest and fallow areas as part of the territorial base for subsidy applications. It is important to differentiate the **degree of extensiveness** among farms and reward those with lower external input consumption.
- **Flexibility in animal health regulations** is needed, considering that current regulations are tailored for intensive or industrial farming practices.
- **Stricter control of wild ruminants** coexisting with pastured animals is imperative, along with coherent policies addressing issues related to large carnivores in specific regions of the Iberian Peninsula.
- Special protection in **animal welfare laws** and acknowledgement of the valuable work performed by herding dogs should be emphasised.
- Additionally, **tourism should be viewed as a support rather than an obstacle** for this type of livestock farming.

Spain is going through a **long-term crisis in terms of generational replacement and labour availability** in small-scale livestock farming and pastoralism, as a consequence of the **low profitability** of the activity and the general trend towards rural depopulation, similar to what is observed in many European countries. More ambitious, flexible and imaginative **policies are needed for access to land and capital resources** for new (or not new) livestock keepers, and **for training** them in pastoralism and in the use of pastoralism as a tool for land management. These measures should be integrated into broader policies for combating depopulation, rural development and environmental management, as well as labour legislation.

10.1. QUERED - ASSOCIATION OF SMALL-SCALE CHEESE PRODUCTION

A REALISTIC AND ADAPTED REGULATORY FRAMEWORK WILL MAKE IT POSSIBLE TO HIGHLIGHT THE VALUE OF PRODUCTS CRAFTED BY SHEPHERDS.

Artisanal food and other transformed products based on local resources have proven to help small farmers and rural inhabitants to increase and/or diversify their incomes, while satisfying a demand for products of high quality and with other attributes. Thus, a strong and well adapted policy support to **promote, differentiate and protect artisanal production based on genuine extensive livestock farming** is an opportunity to reverse the trend for Spanish livestock systems towards intensification.

This may require the creation of **new regulations or the adaptation of existing** ones concerning slaughterhouses and hygiene practices in cheese production. Establishing formal **training for shepherds and related artisanal food producers** is essential, covering not only effective herding practices but also providing skills to transform and market their products. Overall, a comprehensive approach is necessary to safeguard extensive livestock farming and ensure its sustainability in the changing agricultural landscape.

Traditional cheese press: pasture milk, wood, and human ingenuity and force
(M. Veiga Duarte)

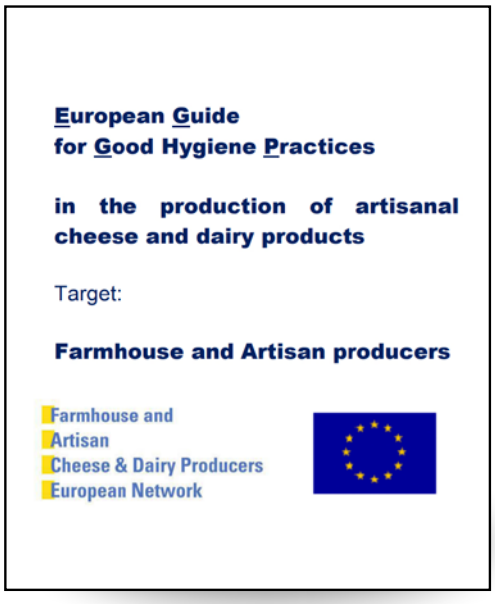
→ **QueRed (Red Española de Queserias de Campo y Artesanas, Spanish Network of Country and Artisan Cheese Factories) was founded in 2013 by smallscale cheese producers with the aim of being an intermediary on flexibility issues with the administration**. The association currently has more than 500 members, including cheesemakers, farmers, supporters (technicians, veterinarians, inspectors, specialised shops). It is not a requirement to produce cheese with pasture milk, but most of the members use it.

Artisanal cheese maturing on wooden shelves (M. Veiga Duarte)

The objectives of QueRed include **communication with the administration, training for members, fostering connections among them, and collaborating with other associations**, such as the Platform for Extensive Livestock and Pastoralism at national level or the Farmhouse and Artisan Cheese & Dairy Producers European Network (FACE) at EU level.

The way to add value to the foods produced by shepherds is by selling and marketing them as directly as possible. This is why we believe that associations like QueRed are essential to act as intermediaries with the administration, not only at the national level in Spain but also across Europe, **to achieve realistic regulatory adaptations for artisanal producers**. Thanks to this work, various achievements have been made, the most significant being the **European Guide for Good Practices in Artisanal Cheese and Dairy Production**.

QueRed provides training to producers, often delivered by the producers themselves, and has volunteers working on communication to reach as many people as possible. In recent years, it has been developing the **Cheese Route**: a training and tourism programme designed to engage the public and showcase the work done by small cheese dairies.



10.2. PASTORALISM IN THE PALLARS (CATALONIA)

AS THE NUMBER OF PASTORALISTS DECREASES, NEW ALLIANCES SHOULD BE BUILT AND DEVELOPED TO FOSTER MORE FAVOURABLE ENVIRONMENTS FOR PASTORALISM TO THRIVE

The Pallars territory is an historical, isolated mountainous district of Catalonia located on the Pyrenean borders of France and Andorra. With a total area of 2721 km^2 for 20,380 inhabitants, it is sparsely populated. Like in many other regions, **pastoralism (sheep, cattle, pig and poultry) and agriculture, once the traditional activities, are still alive today but have declined** over the last decades. Transhumance has largely decreased in magnitude and distance, and is now restricted to short transhumance routes between the valley bottom and alpine pastures.

As elsewhere in the same types of territories across Europe, **shrub areas have multiplied** by 2.4 and forested land by 1.17, with a slight fall in the number of farms over the last twenty years. The economy of the region has undergone a process of tertiarisation with significant development of tourism as more than 50 % of the territory is recognised as an area of natural value. The process to preserve the historical and natural heritage is very strong and leads to **conflicts between the multiple expectations** coexisting in the region as for instance the reintroduction of the brown bear (*Ursus arctos*).

Pastoral households in the region are following a variety of strategies to guarantee their livelihood in the face of changing conditions: (i) off-farm labour diversification, (ii) rural-tourism diversification, (iii) agricultural intensification, (iv) added value diversification, and finally (v) support from the elders of the family who provide skilled labour, family care and even financial security with their pensions. Pastoralism is being marginalised in favour of other economic activities.

The main challenges and stakes for pastoralism in the Pallars

Overall abandonment is the key challenge in the region, as observed in the whole Pyrenean area and other European mountains. Several studies have shown that abandonment is a complex multidimensional process of transformation and transition.

→ In the Pallars, the abandonment process is characterised by: (i) an increasing agroecosystem degradation, illustrated by processes of simplification of forage and pasture practices by pastoralists, while less and less labour is available in the sector; (ii) competition with other activities such as tourism and higher opportunity costs for land and labour; and (iii) the changing role of pastoralism in mountain areas as a whole, which tend to be more appreciated as landscape stewards than as producers.

Innovations and Business Models (IBMs) addressing the challenges of pastoralism in the Pallars

- **Direct selling.** The poor conditions for commercialisation is one of the main constraints for the pastoral sector in the region. An increasing number of pastoralists have adopted direct selling strategies (particularly for meat and cheese) to capture a larger share of the added value of the pastoral products. It also helps to rebuild the self-esteem of the sector.
- **Shepherd school.** The Catalan Shepherd School was created 14 years ago and trains new pastoralists whether or not they come from a farming family. The main challenge being addressed by the shepherd school is generational renewal, as well as all the specific associated constraints, such as access to land and lack of adequate training. The project is well consolidated but challenges such as funding still remain.
- **The women shepherd network.** Women Shepherds of Catalonia is a collaborative network of more than 60 women shepherds. It started informally in 2018 as WhatsApp, X-Twitter and Instagram groups working to defend pastoralism, food sovereignty and environmental awareness. They also provide mutual support to fight the discrimination against women that prevails in pastoralism, a traditionally male-dominated profession. The success of this initiative is due to its capacity to overcome the existing fragmentation and isolation in the sector, especially between women shepherds, thanks to the emerging possibilities of new technologies.

Livestock and skiing. Two economic activities in the same territory: complementarity and conflicts

ANNEX 11 TUNISIA (Médenine and Gabès)

As in other areas, pastoral territories in the arid zones of Tunisia have undergone significant changes since the 1960s, with the expansion of arboriculture (mainly olive oil production) and shifts in livestock management methods and rangeland system dynamics, transitioning from pastoral to agro-pastoral systems. Combating desertification and land degradation remains the main challenge for pastoralism in southern Tunisia, and the participation of pastoralists and the local population is essential for the success of any intervention in this area.

Camels grazing in a rangeland in southern Tunisia

The transformation of the traditional livestock production systems has brought **new types of investment in livestock farming**: breeders practising transhumance with big flocks, employing shepherds, using truck transportation and high levels of feed supplementation. The traditional long-distance transhumance has been abandoned, large tribal herds have been dispersed, traditional governance institutions have disappeared, and flocks are more sedentary and depend more on external feed resources. The transformation from pastoral practices to intensive irrigated and rainfed agriculture has accelerated the degradation of soils and rangelands. Regression of rangelands on the pastoral steppes is now a general trend.

At the same time, and feeding back into changes in livestock farming and pastoralism, **Tunisia has been developing legislation on rangelands, forests, and land use**, as summarised in Box 1.

We have observed a marginalisation in the economy of the pastoral territories simultaneously with institutional dynamics that have established new rules for access and management of natural resources. One of the most significant policies is the land privatisation policy.

For instance, in the Médenine Governorate (southern Tunisia), 42 % of the lands are now private and private rangelands cover more than 100,000 ha (18 % of the 574,600 ha total rangeland surface area), and 56 % are delimited and have been transformed to the forest regime through pastoral planning.

The main challenges and stakes for pastoralism in southern Tunisia

The **fight against desertification and land degradation** is the main challenge for pastoralism in southern Tunisia. In order to address this problem, the OEP encourages **more public participation and involvement of population and farmers in decision-making**. This is because several pastoral projects implemented in the past did not achieve the expected results, due probably to inappropriate design and unsuitable implementation methods, with no involvement of beneficiaries. Consequently, the contribution of rangelands to covering the nutritional requirements of livestock has decreased by 60 % (and 18 % in surface area). Food autonomy is another main challenge.

There are three main forms of governance in agricultural and rural lands in southern Tunisia

→ (i) public management by the administration for forestry and hydraulic public domains, (ii) management of collective lands by communities of rights holders (Collective Interest Associations and GDAs), and (iii) management of private lands by owners with the support of the OEP (Office for Rangelands and Animal Production) on private pastoral plots.

Innovation and Business Models (IBMs) adressing the challenges of pastoral livestock farming in the arid zones of southern Tunisia

To diversify the sources of animal feed, the first IBM consists of the **organisation of a value chain for agricultural and agro-industrial by-products to feed animals**. Considering that the average annual production of agricultural and agro-industrial by-products would be 2,803,300 tonnes, it could contribute efficiently to meeting the livestock feed requirements. In the Medenine area, olive tree, date palm and tomato or other vegetable by-products would help to cover a large part of the feed requirements of sheep, goats, camels, and cattle on a local scale. This first IBM consists of making a mixture of by-products from olive trees, palm trees and tomato leaves to produce feed. The feed manufacturing is still at the experimental stage and is not yet available on a commercial scale. Meanwhile, several tests of feed palatability have been carried out by IRA to test the acceptability of these ingredients and their impact on animal performance.

Based on the innovative conception of an agro-pastoral camel milk sector and the potential of the camel milk market, the **development of camel milk processing and organisation of its marketing** efforts would be a relevant innovation based on the development of new skills to stimulate agro-pastoral activities in southern Tunisia. In the IRA business incubator, a milk processing unit for pasteurisation and packaging called the CHAMELAIT Company was set up in March 2022 by a young promoter. This innovation is complemented with the creation of a milk collection unit managed by the SMSA (mutual society for agricultural services) of Sidi Makhlouf.

Industrialised camel milk to boost the agro-pastoral sector

Box 1. KEY DATES OF LAND GOVERNANCE AND POLICY DYNAMICS IN TUNISIA

- **1900s.** Rangelands were strictly managed and controlled by traditional institutions, called 'Myâad'. The Myâad was composed of tribal leaders (representatives of land owners), who met frequently to decide about grazing management arrangements and options to use collective rangelands (Decree of February 28, 1920 on grazing rights).
- **1935.** The Myâad changed into a more formal structure called a 'Land Management Council' (CG), which was mainly composed of land owners who met frequently to decide about rangeland access and use by different third parties (Decree of December 30, 1935 on collective lands of tribes).
- **1956.** Independence of Tunisia from the French occupation.
- **1964.** State policy of privatisation of collective lands through Law No. 64-28 of June 4, 1964, establishing the system of collective land.
- **1966.** Law 66-60 of July 4, 1966, promulgating the Forest Code integrating natural rangelands.
- **1988.** Forest Code revised through Law No. 88-20 of April 13, 1988.
- **1990.** Implementation of the 1st National Strategy for Pastoral Improvement (OEP). Rights holders and users of private rangelands were encouraged to adopt the resting (Gdel) technique by assigning compensatory subsidies in return for leaving the rested areas unused.
- **1999.** Implementation of the legal and institutional framework of Agricultural Development Groups (GDAs), through Law No. 99-44 of May 10, 1999.
- **2004.** Amendment through Law No. 2004-24 of March 15, 2004, which defined the operational framework and the responsibilities of the GDAs, removing any lucrative activity from their scope.
- **2003-2020.** Implementation of PRODESUD and PRODEFIL projects (first and second phases) in Medenine Governorate (Agro-pastoral Development and Promotion of Local Initiatives in Southern Tunisia). These projects are co-funded by IFAD and play an important role in rangeland restoration through the participatory approach.
- **2011.** Tunisian revolution.
- **2014.** Establishment of a new, more democratic constitution allowing citizens and local associations to participate actively in decision-making and manage their own resources.
- **2016.** Law No. 2016-69 of August 10, 2016, modifying and completing Law No. 64-28 of June 4, 1964, establishing the collective land system.

Source: Fetoui et al. 2021

ANNEX 12 TURKEY

Pastoral policies in Turkey focus on small ruminants. Turkey's small ruminant livestock policies aim to increase sector productivity, improve animal health, and promote sustainable production. Protecting native breeds, enhancing genetic diversity, and spreading modern breeding techniques are key priorities. Additionally, improving production processes in small ruminant farming is a strategy to support rural development, create employment, and strengthen local economies. Furthermore, increasing the production of high-quality meat and milk not only to meet domestic demand but also to enhance export potential is an important part of the country's strategy.

Public regulations and support related to pastoral farming in Turkey

Turkey is an important pastoral country for sheep, goats and cattle, but it faces significant changes and restrictions on grazing.

The Turkish government (Ministry of Agriculture and Forestry) supports the cattle, sheep and goat industry through several grants to structure the sector and encourage genetic improvement but not specifically for pastoralism:

- **Supporting investments in cattle and sheep breeding enterprises** (Grant number 3999, accepted 20.05.2021). 50 % of rural investment costs (55 % for young women) for more than 75 head of small ruminants and 10 head of cattle. Support is between 25,000 TL and 3,500,000 TL. A business plan has to be prepared by persons or legal registered entities. It includes investment for machinery, tools and equipment purchases.
- **Stud ram and buck purchase** (Grant number 31429, accepted 20.03.2021). Concession of grants takes place within the scope of the national genetic breeding project in 6 provinces. Grants for up to 5 animals per farm (at a maximum of 1 ram/buck per 30 ewes/goats), 4000 TL/head.
- **National animal breeding project at breeder level** (Comm. No. 2012/54). 125 projects in 81 provinces. Farms with a minimum of 80 head of pure domestic breeds. Breeding exchange takes place from registered animals in the herd. All required records must be kept and given to the project team at the end of each period.

Legal regulations on **animal health, animal welfare, and environmental protection** establish

Small family farm in Adana province (N. Koluman)

Awassi sheep flock grazing in a forest area
(N. Koluman)

Native hair bucks (ear-tagged) in a mountainous area
(N. Koluman)

conditions and restrictions for animal breeding. These include mandatory registration, ear tagging, passport issuance, monitoring of animal movement, vaccination checks, disease prevention measures, and notification of illnesses. Veterinary inspections must be conducted before transportation.

Legal restrictions are imposed by the Ministry of Agriculture on the **use of pastures and forests**: stocking rates, grazing periods, fences to prevent grazing in forest areas, with penal sanctions (20TL per animal) if animals graze forests with no legal permission, prohibition of fires and smoking near and within forests.

Transhumant animals must belong to pastoral human communities moving between highland and winter quarters. Nomad shepherds must follow migration procedures (goc.gov.tr), checking the health and vaccination status of animals, keeping the animals' ear tag numbers and ownership documents, ensuring that transport vehicles meet suitable conditions, planning animal transport routes in advance and obtaining necessary permissions, acting in accordance with animal welfare regulations during animal transport.

The main challenges and stakes for pastoralism in Turkey

In Turkey, pastoral farming faces significant challenges stemming from legal, environmental, and operational constraints, along with efforts to ensure farm sustainability in a modern context. PASTINNOVA has proposed some innovations that can contribute to address the challenges of pastoralism in Turkey. In summary, these IBMs can play a vital role in reducing bureaucratic burdens, facilitating sustainable land access, ensuring animal welfare during migration, and enhancing economic resilience for goat farmers.

By addressing these areas, IBMs can help secure the future of pastoralism in Turkey within a framework of regulatory compliance and environmental sustainability.

Innovations and Business Models (IBMs) addressing the challenges

- **Overcoming legal and bureaucratic constraints**

  Goat farmers are required to comply with administrative obligations such as animal registration, ear tagging, issuing passports, health monitoring, and veterinary checks before transport. Regulations on pasture and forest land uses, as well as restrictions on transhumant migration routes, create additional challenges for pastoral life.

  Solutions like **digital record-keeping and mobile veterinary services** could reduce the bureaucratic load on pastoralists. Technologies that streamline animal health and movement tracking would help pastoralists comply with regulations without disrupting daily activities.

- **Responding to environmental regulations and facilitating land access**

  Goat farmers face grazing restrictions in forest areas, stocking rate regulations, grazing period limits, and restricted access to forested lands. These challenges are particularly significant during seasonal migrations, as pastoralists need access to suitable pasturelands.

  IBMs focused on **grazing cooperatives or shared pasture agreements backed by legal support** can help pastoralists optimise land use.

  Models that **promote sustainable grazing practices** aligned with ministry requirements could open more pastureland to pastoralists while preserving soil health.

- **Improving animal welfare and transportation conditions**

  Transhumant goat farmers, especially nomads, must adhere to strict animal welfare guidelines during migration, including health checks, compliance with transport vehicle standards, and planning migration routes. These requirements are costly and logistically challenging for resource-limited, traditional pastoral communities.

  Business models that improve transport logistics could address this need. **Partnerships with transport companies that meet animal welfare standards or leasing certified transport vehicles** could make compliance more accessible and affordable for pastoralists.

- **Enhancing economic sustainability and market access**

  Pastoralism faces economic difficulties due to fluctuating market prices and rising compliance costs. Many goat farmers, who operate in remote regions, struggle to access competitive markets due to limited resources.

  Business models focused on **direct-to-market platforms or collective marketing** can improve income by connecting pastoralists directly with consumers, reducing dependency on intermediaries. **Quality certifications emphasising eco-friendly and animal welfare practices** could also help pastoral products reach niche markets.

PASTINNOVA, 2025. The White Paper on Pastoralism in the Mediterranean Area. Available at:

https://pastinnova.eu/white-paper-on-pastoralism-mediterranean
DOI: https://doi.org.10.5281/zenodo.15051790

PASTINNOVA

PRIMA
PARTNERSHIP FOR RESEARCH AND INNOVATION
IN THE MEDITERRANEAN AREA

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