MOVING
MOUNTAIN VALORIZATION THROUGH INTERCONNECTEDNESS AND GREEN GROWTH

Final set of Policy Briefs

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MOVING
MOuntain Valorization through INterconnectedness and Green growth

Contents

Austrian Alps: Sheep farming in the region of Weiz....3
Public Goods from High Nature Value (HNV) farmland in the Stara Planina, Bulgaria 7
High quality beef production in Šumava/Bohemian Forest....11
Corsica: Corsican chestnut flour PDO “Alpine Corsica”....14
Crete: Carob Flour VC “Central Rethymno....18
Cold Mountain Shelter – Transdanubian Mountains, Hungary....24
Lamb and sheep meat in the Drôme Valley....28
Alto Molise dairy value chain- Central Apennines....31
Eastern Alps: Trento Doc wines....35
Chestnut flour “Northern Apennines”....39
Rural Tourism value chain in Maleshevski Region economic driving force....42
Serra da Estrela PDO cheese “Cordilheira Central”....46
Maçico Noroeste: Alto Douro Vinhateiro wines....50
Certified ecotourism “Southern Romanian Carpathians”....54
Sjenica lamb PDO, Dinaric Alps, Sjenica – Pester plateau....58
Bio-honey from Slovak Carpathians....62
Organic Olive Oil “Betic Systems”....67
Sierra Morena: Iberico Ham “Los Pedroches” PDO....71
Vignerons de Huesca in Spanish Pyrenees....75
Mountain grain in the Grisons Alps....78
Tête de Moine cheese PDO....83
Greenhouse Tomato Beydaglari....87
Speyside Scotch Malt Whisky....91

List of Acronyms

MRR: “Mountain Reference Region” refers to large mountain areas, as defined in MOVING Proposal[1].

MRL: “Mountain Reference Landscape” refers to smaller, local areas, representative of the VC under analysis and where engagement of local stakeholders and creation of a local stakeholder network can be more feasible to undertake participatory activities. It refers to one or more administrative units, such as Local Administrative Units (LAUs), where one or more land use systems and natural assets that are key for the selected VCs are located[1].

CAP: Common Agricultural Policy.

PDO: Product Designation of Origin.

PGI: Protected Geographical Indication

TSG: Traditional Speciality Guaranteed

[1] Pablo González-Moreno (UCO), Javier Moreno (UCO), Teresa Pinto-Correia (UÉvora), Élia Pires-Marques (UÉvora), Guillermo Palacios (UCO), Nuno Ricardo Gracinhas Nunes Guiomar (UÉvora), Sherman Farhad (UCO) and María del Mar Delgado (UCO). (2022). Deliverable 3.2: Land use system vulnerability matrixes and vulnerability maps for the 23 reference regions.
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Introduction

This document provides the final set of 23 Policy Briefs (PBs). Those have been compiled building on the information collected along the MOVING project through consultation with the regional Multi-Actor Platforms (MAPs) in each case-study region. Each brief is referred to one case-study value chain analysed in the MOVING project and describe the key potential contributions of value chains to the resilience and sustainable development of the related Mountain Reference Region (MRR) and identify the actions and policy recommendation necessary to best exploit the potential of analysed mountain value chains.

In the first page, a short summary and key policy messages are presented, i) providing a short description of MRR and the case-study value chain, ii) highlighting the value chain contribution to the resilience and sustainable development of the MRR, iii) outlining previous policy options experienced in the value chain and the MRR, and iv) providing policy recommendations building on the knowledge and experiences collected along the project.

The aim is to provide policies recommendations at all scales (EU, regional, and local) that need to be accounted for to foster the value chain contribution to the resilience, sustainability, and development of the MRR.

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Austrian Alps: Sheep farming in the region of Weiz

Melanie Troppe, Sandra Karner, David Steinwender, Jürgen Suschek-Berger

Summary

Sheep farming on alpine pastures does not only serve the production of food but contributes to biodiversity, the preservation of cultural landscapes and heritage and is highly embedded in the regional development. Through cooperation and regional development, it is possible to preserve the small-scale sheep farming practices in the area. In the light of future challenges, frameworks need to be built and further expanded to preserve the viability of sustainable farming practices and to enhance the adaptive capacity of alpine pasture farming.

Figure 1: Typical small sheep herd, 20 dams in average, grazing on summer pasture.

Key Policy Messages

- ☞ Cooperatives strengthen collective efforts and innovation capacities.
- ☞ Diversification of marketing and products strengthens economic resilience.
- ☞ Cross sectorial integration stengthens value chains.
- ☞ Knowledge exchange and networking for integrated regional/rural development enhances value chains embeddedness.
- ☞ Contribution to biodiversity and preservation of cultural landscapes.

1. "What one cannot do alone, many can."

The value chain is situated at the south-eastern edge of the Austrian Alps, in the region of Weiz. The region of Weiz is characterised by an Illyrian climate. Summers are mostly hot and dry with a very high propensity for (thunder-)storms. The latter are supposed to become stronger with climate change increasing the number of lightning strikes, hail and the thread of floods.

In the mountainous areas of the Weizer Bergland region, pasture farming with cattle and sheep for meat, milk and dairy production prevails. The sheep are herded on alpine pastures or on meadows at an altitude of 400 to 1,270 metres above sea level. Sheep farming also contributes to the preservation of the cultural landscape by protecting it from encroachment especially at steep slopes. Consequently, pasture farming contributes to the touristic attractiveness of the region as well. Sheep farming in the region of Weiz has been a tradition for centuries, even serving as staple food until the end of the 19th century. After sheep

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farming became increasingly less important in the middle of the 20th century, some innovative sheep farmers pushed a revival of sheep products in the beginning of the 1990s, and they started to successfully market high quality lamb and sheep milk products cooperatively.

2. Value chain contribution to resilience and sustainability

The founding of the Weizer Schafbauern cooperative had been an important initiative to secure the persistence and viability of sheep farming, which is characterised in the region by small-scale extensive farming. Through the cooperative joint and professionalised processing, joint marketing product diversification and fair prices are guaranteed. Even though only 10% farms of the cooperative are certified organic, they are committed to high animal welfare standards and ecological sustainability characterised by extensive pasture farming, and domestic GMO-free feed, which is mainly produced on-farm or at least regionally. The extensive grazing of the sheep contributes to the stabilization of the vegetation cover and to the improvement of the water storage capacity of the soil. Furthermore, sheep are especially suitable to protect steep meadows from encroachment which fosters biodiversity rich meadows and the preservation of the cultural landscape. Those are also key aspects of the Nature Park Almenland which covers an area of 25.300 ha. The specific soil and climatic conditions result in a flora that is characterized by a great variety of alpine plants. Closely connected to the cultural landscape and the Nature Park Almenland, touristic activities around education and awareness are raising as well as the cultural identity in the Almenland region.[1]

3. Policy experiences

Historically the region faced various challenges such as bush and wood encroachment of alpine pasture areas, migration of workers, marginalised tourism, and bad infrastructures. Therefore, the 'Regional Community Initiative Almenland' was funded in 1995 within the LEADER II program. Since then, LEADER did and still does offer essential support for the regional development in that area.

The embeddedness in the joint LEADER region 'Almenland & Energieregion Weiz-Gleisdorf' is fruitful for the sheep farming cooperative in several aspects. For instance, the Local Action Group supports economic activities that contribute to climate protection and adaptation as well as environmental protection and ethics. Examples are funds for infrastructural investments, the support in the marketing of food quality products, such as the label "Määh" of the sheep farmers from Weiz. Additionally, Natura 2000 areas in the Nature Park Almenland were established to foster biodiversity and tourism. Furthermore, alpine farmers can apply for funding from a funds for forestry, the 'Waldfonds', equalisation supplement for disadvantaged mountain areas, direct payments including coupled support (Almauftriebsprämie) and funding for measures within the ÖPUL program like 'Alpine Pasture Management' and 'Animal Welfare Management'.[2,3,4]

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4. *Recommendation for future policies*

In the current LEADER period and the regional development strategy various strategies on EU and national level were considered like the Biodiversity Strategy 2030, ÖREK 2030, CAP 2023-27, Masterplan for Rural Areas, Plan T-Masterplan Tourism and the Alpine Convention. These strategies by strengthen several aspects: awareness for organic agricultural production, stronger coordination between direct marketers and producers and increased visibility of them, the development of new concepts for visitor guidance (incl. strengthening sustainable and active mobility), the preservation of Natura 2000 and nature park areas[5]. The relevance of these aspects can be supported by MOVING findings concerning the relevance of a soft tourism strategy as well as the need for supporting direct marketing of locally produced agricultural products. Regarding funding translated from the CAP, a stronger focus should be set on small family farms and alpine farmers. More concretely, within ÖPUL multiple services provided by organic and especially pasture farming should be more considered, e.g. through a further improvement of the pasture payment, which could stop the recent trend of increased stabling in the region. Furthermore, the compensation payments for disadvantaged regions should be further tailored to support small farms. This would contribute to a general appreciation and valuing of high-quality agricultural production and related ecosystem services. Also, the forest funds should be further developed to support climate change adaption. A stronger link of food production systems and their impact on ecosystem and natural resources is needed. Awareness raising campaigns as well as the integration of agriculture and food subjects into the educational system can support the recognition of sustainable farming practices as well as improve consumer awareness.

To increase the adaptive capacity, knowledge creation and exchange should be fostered through vocational trainings with experts, exchange within and beyond the value chain, adapted educational programs, and tailored consulting due to the heterogeneity of pasture properties and associated impacts of climatic change. Future policies should enable a framework for implementing the creation of a knowledge base, cooperation and innovation to deal with future challenges.

Acknowledgements

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Reference

[1] *Naturpark Almenland*

[2] *Waldfonds*

[3] *Informationsblatt- Almen und Gemeinschaftswiesen*

[4] *Zahlungen für aus naturbedingten oder anderen spezifischen Gründen benachteiligte Gebiete (AZ)*

[5] *Almenland& Energieregion – regional development strategy 2023-2027*

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Public Goods from High Nature Value (HNV) farmland in the Stara Planina, Bulgaria

Mark Redman, Yanka Kazakova and Vyara Stefanova

Summary

High Nature Value (HNV) farming in the Western Stara Planina region of Bulgaria has created and maintained a diverse range of valuable semi-natural habitats that are important for the conservation of many rare plant and animal species. Well-designed policies, especially the effective implementation of EU-funded rural development schemes and measures, have great potential to reduce the loss of HNV farmland and to maintain the supply of biodiversity-related public goods they supply. However, policymakers must have the willingness and persistence to understand the specificities of HNV farming to design integrated and innovative supporting schemes that are appropriate to the needs and realities of HNV farmers.

Figure 2: Abandoned pastures in Western Stara Planina, Bulgaria *Source: Yanka Kazakova, STEP*

Key Policy Messages

- ☞ The continuation of HNV farming is essential for the conservation of farmland habitats important for plant and animal species.
- ☞ Area-based agri-environmental payments will continue to have a role to play in farmland biodiversity conservation, but more integrated and innovative policy approaches are needed to support the profitability and overall socio-economic viability of HNV farming.
- ☞ Political willingness and persistence are needed to design, implement, monitor and adapt effective HNV support schemes.

1. Lessons learnt from support for HNV farming in Bulgaria

There are around 30,700 ha of Utilised Agricultural Area (UAA) in the Western Stara Planina (WSP), of which the majority is species-rich semi-natural grasslands, plus mixed cropping and arable land. Agriculture in the region is dominated by small-scale farming (both physical and economic size) and many farms are below the eligibility threshold for CAP support.

Depending upon altitude, the local farming systems are typically small-scale extensive grazing (sheep, cattle and goats) and low input/semi-intensive cropping, including cereals, rapeseed, perennial crops (fruit orchards) and some vegetables.

Over many years traditional farming practices in the region have created and maintained a diverse range of semi-natural

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habitats for valuable plant and animal species, including many rare plants and animal species included in the Red Data Book of Bulgaria and protected by international conventions (there are seven Natura 2000 sites designated in the region with significant areas of farmland).

The concept of "High Nature Value" (HNV) farming was officially adopted in Bulgaria with EU accession and the inclusion of agri-environmental support for the restoration and maintenance of HNV grasslands in the 2007-2013 and 2014-2020 *Bulgarian Rural Development Programmes*. This was a significant policy innovation at the time and established an entirely new mountain value chain involving the use of public money (EU funds) to secure public goods (biodiversity) from private providers (farmers and other land managers) via area-based compensatory payments for compliance with clearly defined management requirements.

2. HNV farming's contribution to resilience and sustainability

Local stakeholders have a clear vision for the future of the WSP that involves managing the biodiversity-rich landscape as the basis of a resilient and sustainable local economy. However, four main areas of constraint need to be overcome to enhance the viability of HNV farming in the region:

- **Social and institutional** – depopulation and ageing of farmers is a major constraint upon the continuation of HNV farming.
- **Regulatory** – frequent changes in legislation and uncertainties regarding access to support measures is a big problem, especially for livestock farmers managing HNV grasslands.
- **Product and market** – there is a huge potential to add value to the products from HNV farming, but farmers need more flexible legislation, accessible investments and relevant training and advisory services.
- **Technological** – new forms of nature-friendly mechanisation, plus other technologies, are needed to improve the management of HNV farmland.

3. Policy experiences

The results of almost 15 years of CAP-funded agri-environmental support to HNV farming in Bulgaria are not encouraging with a continued loss at national level of 500,000 ha of semi-natural grasslands because of abandonment (mainly in the mountains) and the conversion of additional 230,000 ha to arable land.

Numerous reasons exist for the poor performance of agri-environmental support to-date in Bulgaria, including administrative challenges, a persistent lack of specialised and targeted training and advice for farmers, and the absence of appropriate monitoring and evaluation to correct and enhance the schemes. Nevertheless, significant areas of HNV farmland remain - including in the WSP - and need to be supported wisely and considerately in the face of the pressure from land abandonment and intensification.

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4. Recommendations for future policies

There are many deep-seated challenges in the WSP (and other mountain regions of Bulgaria and south-east Europe) that require a more innovative and integrated approach in order to foster the profitability and overall socio-economic viability of the traditional HNV farming characteristic of the region.

Numerous options exist to develop targeted agri-environmental measures or eco-schemes to support HNV farmland; to promote innovation partnerships aiming to address specific production or marketing issue on HNV farms; to design consultation and advisory scheme for HNV farmers; to support investments in production or marketing of HNV products etc.

To be effective, these measures need to be appropriate to the needs and realities of HNV farms, and Bulgarian policymakers must recognise that HNV farming has several distinct aspects that need special attention, promotion and support.

HNV Farmland – Policymakers should insist on good assessments of where HNV farmland is, what exactly is the type of land use, what HNV farmland is eligible for support under the current rules and what is not eligible for support, what are the reasons for farmland being excluded from support, and what can be done to overcome these exclusions.

HNV Farmers - Policymakers need to understand the farmers who still maintain HNV farmland, their production systems and farming practices, their needs, their level of understanding of farming and nature, and the most effective way to support them.

HNV Innovations – innovations have a very important role to play in preserving and maintaining HNV farmland and farming. Innovations can help address problems with lack of workers, specific technological issues, small quantities and seasonal raw products, etc. However, innovations can easily trigger intensification that may reduce biodiversity values in the long term. Therefore, it is important to assess the impact of innovations on the high nature value of farmland.

HNV Partnerships – Collaboration with non-governmental organisations and researchers has proven to be highly beneficial for both policy-making and practical support to HNV farming in Bulgaria. Some of the most innovative and integrated approaches for HNV farming support are developed and implemented by nature conservation NGOs, for example in pilot testing support schemes, delivery and advisory mechanisms, as well as monitoring and control approaches. Policy makers need to open, encourage and get involved in partnerships with farmers, NGOs and researchers of both agricultural and environmental background.

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High quality beef production in Šumava/Bohemian Forest

Lukas Zagata and Jakub Husák

Summary

Historically, the natural resources of the Šumava Mountains have been primarily utilized for agriculture and forestry. Over the past 30 years, following the collapse of the socialist regime, the agricultural sector in the region has undergone significant transition. The Šumava region is home to unique natural ecosystems, safeguarded by its status as a Natural Park. One of the key challenges is balancing ecological preservation with economic activities. These local ecosystems are now facing new pressures from global climate change, including bark beetle infestations and extreme weather events. Therefore, it is crucial to develop a comprehensive policy that addresses these emerging challenges to protect and enhance the cultural and natural heritage of the Šumava region.

Figure 3: Extensive cattle farming on farm in Figure Železná Ruda (Author: Martin Jedlička)

Key Policy Messages

- ☞ Facilitate collaborative farming initiatives.
- ☞ Promote on-farm food processing and sales.
- ☞ Develop sustainable tourism infrastructure.

1. Highland Harvest: Balancing Ecosystem Health and Beef Quality

The Šumava Mountains are among the oldest mountain ranges in Central Europe, with peaks ranging from 700 to 1,400 meters above sea level. These mountains span the borders of the Czech Republic and Germany. Historically, the region's natural resources have supported both agricultural and forestry activities. The area was sparsely populated by German and Czech communities. However, after World War II, the German population was displaced, leading to a significant loss of the region's traditional inhabitants. During the socialist era (1948-1988), the region experienced substantial economic decline. Industrialized agriculture, managed by socialist collective farms, paid little heed to natural conditions. Conversely, during this period, large areas of the mountain region were closed off due to the strictly controlled borders with Western Germany. This closure allowed the development of unique ecosystems that are now considered the region's most valuable natural heritage.

Over the past 30 years, following the collapse of the socialist regime in 1989, the agricultural sector in the region has undergone significant transformation. Socialist farms were privatized, and their production methods evolved. The current approach to farming emphasizes the extensive use of natural resources, highlighting the high nature value of the mountain region. The Šumava National Park, covering approximately 68,300 hectares, is surrounded by a Nature Protected Area of about 99,500 hectares. Consequently, all economic activities in the mountain region are regulated to protect the natural ecosystems. Forestry has also been a traditional practice in the region, with forests predominantly consisting of spruce trees, along with some fir and pine. Recently, forestry has faced new challenges due to overpopulation of bark beetles and droughts, which have raised concerns about the sustainability of local forest ecosystems and the impacts of forestry practices.

2. Value chain contribution to resilience and sustainability

Currently, over 60 farms operate in treeless areas of the National Park, covering approximately 10,000 hectares, though these farms utilize less than 50% of the land. Ongoing discussions suggest that this area may be expanded in the future. Increasing farming activity in these high-nature areas, using sustainable approaches to protect and enhance the region's natural heritage, presents a significant opportunity. Given agriculture's profound impact on local ecosystems, one of the primary challenges is striking a balance between agricultural activities and natural conservation efforts. Current strategies for natural protection often conflict with forestry practices, especially in areas devastated by the bark beetle.

It is increasingly evident that mountain ecosystems are highly sensitive to global climate changes. Therefore, future utilization of natural resources, while respecting both natural and cultural heritage, will require sensitive and thoughtful regulation to balance the needs.

3. Policy experiences

Sustainable Visitor Management: Sumava has implemented sustainable visitor management by promoting "slow tourism" and improving communal transport to balance ecosystem preservation with agricultural needs.

Enhancing Cooperation: The region focuses on cooperation between farmers, conservationists, and tourism, promoting organic agriculture and highlighting its benefits for both productivity and conservation.

Adapting Subsidies: Subsidy programs are being adapted to support diverse agricultural activities and enhancing economic and ecological sustainability.

These policy experiences highlight the importance of integrated approaches that consider both environmental and economic factors, fostering a sustainable and resilient future for the Sumava region.

4. Recommendation for future policies

Enhance Cooperative Networks and Sustainable Practices:
Foster collaboration among farmers, conservationists, and tourism operators to create synergies that benefit both agricultural productivity and environmental conservation.

Promote organic and sustainable farming:
Introduce tailored subsidies schemes and support programs, encouraging practices that enhance both economic and ecological resilience.

Develop Sustainable Tourism and Transport Infrastructure.
Expand slow tourism initiatives by developing eco-friendly infrastructure and services, making tourism more sustainable and beneficial for local communities.

Integrate Ecosystem Services and Innovation in Policy Planning.
Incorporate ecosystem service valuation into agricultural and tourism policies to ensure natural assets are preserved and managed sustainably.

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Corsica: Corsican chestnut flour PDO "Alpine Corsica"

Marie-Noëlle Ottavi and Jean-Michel Sorba

Summary

Given the island's mountainous geography and the consequences of its pervasive rurality, Corsica's agricultural models and their value chains face unprecedented challenges in creating sustainable competitiveness.
The Corsican chestnut flour PDO value chain illustrates several of these challenges. Located in a rural mountain area, based on a shared natural and cultural resource (chestnut groves) and inhabited by small, pluriactive farms, the public action systems, while attentive, must now support the new challenges facing this sector. New issues are emerging: how to support a value chain grappling with the consequences of climate change on its resource, how to support forms of competitive coexistence in value chains using the same resource, how to ensure the sustainability of the resource and the competitiveness of companies and products.
The following text is intended to illustrate these issues and set out some recommendations for consideration.

Figure 4 : Difficult cohabitation between livestock (pigs) and chestnut trees

Key Policy Messages

- ☞ PDO product can be disconnected from their consumers and from collective et public food network.
- ☞ The rational and sustainable management of chestnut orchards is being jeopardised by a lack of regional public policy guidance for mountain agricultural activities.
- ☞ Incentives to silviculture and pastoralism require integrated policy approaches – forestry and agricultural – that perceive the territory.

1. *A PDO between existence and resistance*

Known as a mountain island, Corsica is crossed by an alpine massif, with 70% of its land at an altitude of over 200 metres and almost a third at over 500 metres. Considered to be the most wooded region in France, 63% of Corsica's territory is dominated by forest, of which 7.3% is chestnut orchards and groves.

Chestnut farming was at the heart of Corsican dietary practices until the 19th century. This was followed by a decline of more than a century due to demographic and dietary changes, which was countered by the *rinascita* "renaissance" cultural movement of the 1980s, that led to a return to traditional production methods.

In 1991, the professional association of Corsican chestnut growers was created, leading to the creation of the PDO Corsican chestnut flour in 2010.

This value chain, although modest, has been able to emerge, develop and withstand the various social, economic and ecological challenges of the last forty years. Even today, the number of producers is increasing, although production methods are mostly based on a family-run model.
The Corsican chestnut groves are also considered to be a resource-environment, as in addition to the PDO "Corsican chestnut flour" there are 4 other PDOs: 3 charcuterie PDOs and 1 honey PDO. In this sense, the values of chestnut groves are multiple and interdependent. Among other things, they are the focus of mountain agropastoralism, they are home to significant biodiversity, they are the focus of tourist activities, and they contribute to a mosaic landscape that helps fight fires.

However, while the PDO value chain is supported by several public policies and initiatives, the problems it faces, due to its multifunctional nature and the resulting competition or crystallisation of land use, are still insufficiently regulated by the public authorities, with consequences for both the resource and the value chain.

2. Value chain contribution to resilience and sustainability

As the only form of agriculture in the mountains, chestnut farming and its producers are the last guardians of practices that enable open spaces to be maintained, guaranteeing biodiversity, a bulwark against the risk of fire, changes to the landscape and the consequences of global warming. This silvicultural agriculture is also one of the last economic activities in the high mountains, despite the geographical constraints that limit farming systems and the social constraints that limit the development of production activities.

While the socio-technical organisation of the sector, through its professional defence and management organisations (the PDO syndicate and the professional group), has enabled a high level of resilience in the face of the arrival of the *cynips* pest in 2010. During the 10-years battle, these organisations had to put aside the processes of innovation, professionalisation and management of coexistence with other mountain value chain.

The result has been a technical setback, both in terms of the product, the price of which has risen sharply and production processes, which have not evolved towards greater economic and sustainable optimisation.

While during the *cynips* period, the regional authorities worked to put in place supporting schemes to preserve the farms, the adjacent issues of competing practices between silviculture and pastoralism, and the need to develop an agricultural policies system that understands the chestnut orchards as a resource environment, were put aside. Now, more than ever, faced with weakened chestnut groves and a value chain that has fallen back on old ways of doing things, we need to think about economic recovery measures and public policies that ensure the sustainability of a common resource.

3. Policy experiences

At regional level, ODARC (Office for the Development of Agriculture and Rurality in Corsica) has, almost since its creation in

1982, tried to support the structuring and development of modern Corsican chestnut growing. Particularly since the creation of the professional groups, which were then able to make specific pleas, ODARC has supported producers with subsidies for the planting and upkeep of chestnut orchards, as well as the installation of processing units. It has supported the professionalisation of the sector, providing human resources to set up quality labels and certification. It has supported the promotion and marketing of chestnut products and, more recently, it is working to set up research and development projects and environmental policies. This support has enabled the sector to structure itself and withstand the strong impacts of the bioclimatic and socio-economic events of the last 40 years. However, the industry's dependence on ODARC's financial and human commitments is becoming increasingly questionable as European funding dwindles. In fact, the technical and economic models used by the chestnut industry are still not competitive. The mountain farming economy is still grappling with unresolved demographic and land issues. Finally, the harmful and competing practices between pastoralism (mountain livestock farming) and forestry remain a blind spot in public policies and actions. At national level, castaneiculture is the poor relation of forestry. Despite the arrival of *Cynips* in 2010, national funding was made available to support the structuring of the sector at national level (creation of the national union - credit for salaries in the national union and the CTIFL). This specific support has dried up in the years that followed, implying among other things, a limited capacity for the sector to develop farming models adapted to a changing environmental context and increased global competition.

It should be noted, however, that since January 2024, at the initiative of deputies from the Ardèche and Corsica, the French Ministry of Agriculture has launched a project to renew support for structuring the sector and adapting it to the challenges of the future. A period of diagnosis and implementation of an action plan is underway, with the aim of adapting national calls for projects and launching research initiatives at the end of 2024 for a period of 5 years.

4. Recommendation for future policies

Concept of "mountain territory and common resources"

- For a reasoned and sustainable mountain agro-sylvo-pastoral system: a framework for practices combining forestry and pastoralism (pastoral incentives and control procedures); adapting administrative systems to multifunctional farms.
- Tax delimitation of an upland area to boost demographic dynamics and reduce the impact of geographical isolation: boosting investment by upland farming and pastoral businesses in their development.

Multiple public action schemes for local chestnut groves

- Increase the capacity of local mountain authorities (communes, town halls) to coordinate and implement schemes to rehabilitate and revive the use of public chestnut groves.

- Support for public bodies setting up schemes to preserve and exploit chestnut groves.

Relaunching the structuring of the Corsican chestnut-growing sector

- Structuring the sector: making major investments in the structures needed to develop the sector (mountain nursery, multi-stakeholder innovation centre, training centre).

Reduce financial dependence on subsidies and increase the economic resilience of mountain industries

- Set up economic recovery, insurance and financial independence schemes.

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Crete: Carob Flour VC "Central Rethymno

Charalampos-Nikolaos Piteris and Kondylia Skrapaliori

Summary

Central Rethymno, a semi-mountainous region of Crete, (Greece), was selected to study the innovative Carob Flour value chain. The carob tree (*Ceratonia siliqua*) is a species of flowering evergreen tree in the pea family. It is a drought-resistant and hardy species that has traditionally been interplanted in olive groves with low-intensity farming systems or spread naturally in terrain in Crete. Its cultivation has been highlighted in the literature for its importance in addressing climate change challenges and contributing as a vital component of environmental sustainability. The environmental, economic and social role of carob pod and flour production and processing in the rural mountainous communities of Central Rethymno is obvious by the growing interest and consumer demand for the products produced. The valorization and preservation of the carob flour VC is important for the local economic development and for the preservation and management of the semi-forest landscape and traditional village life.

Figure 5: Carob Flour Value Chain

Key Policy Messages

- ☞ Targeted and tailored policies and interventions for the region's mountainous communities.
- ☞ Alike for welfare, health and educational service provision.
- ☞ Incentives for young scientists.
- ☞ Support of entrepreneurship.

1. *Central Rethymno and the Carob Flour Value Chain*

Central Rethymno, a semi-mountainous region of Crete, (Greece), was selected to study the innovative Carob Flour value chain. The region of Central Rethymno lies between the two main mountain missives of Crete, Mount Ida or "Psiloritis" (2,456m.) and the White Mountains or "Madares" (2,453m.), it consists of a typical landscape of Crete, with steep slopes, mainly covered with shrubby vegetation, oaks, kermes oaks, olive trees and carob trees. Numerous small villages (with less than 500 residents) are scattered around this area where the dominant land use systems are agro-silvo-pastoral, and deeply connected to the traditional way of life of the inhabitants. The value chain of carob pods and carob flour has historically been important, either for human consumption in low quantities or as a significant part of animal feed.

Carob flour is used primarily as an ingredient of bakery and pasta products. Carob flour and other carob products are all sold both nationally and internationally. The expansion of the carob value chain during the last decade has allowed for carob flour to be

used as a food ingredient in several food products such as baked goods, pasta, dairy drinks, health bars, and dietary supplements and seeds to be exported abroad. The seeds are processed into “locus bean gum” which yields the highest contributor to the carob market due to its exploitation in the food, pharmaceutical and other industries. Pod prices vary greatly and are driven by the more valuable carob seed market. These price increases have valorised the interest in carob cultivation.

2. Value chain contribution to resilience and sustainability

The carob tree (*Ceratonia siliqua*) is a species of flowering evergreen tree in the pea family. It is a drought-resistant and hardy species that has traditionally been interplanted in olive groves with low-intensity farming systems in Crete or spread naturally in terrains which are more difficult to cultivate. Carob trees’ cultivation has been highlighted in the literature for its importance in addressing climate change challenges and contributing as a vital component of environmental sustainability. Carob farmers apply “holistic” approaches, which rely on indigenous and traditional knowledge.

Carob has been an important plant for economic, cultural, and social sustainability in the area. In times of great need, famine, occupation and the turmoil of wartime in World War II, Cretans processed carob pods into carob flour as a substitute for wheat and a source of valuable nutrients. By that time, production was so high that carob was also exported to northern Greece. After the 1960s, the carob production declined precipitously, and since Greece joined the European Union in 1981, the olive oil and olive tree subsidies led to intensive olive monocultures that replaced large numbers of carob trees and ultimately transformed the diverse land use mosaics, creating today’s less diverse agroecosystems and turning Carob into a socially and economically undervalued crop.

Carob flour is now used in traditional “Cretan diet” recipes and as a “superfood” for local and national bakeries and confectioners, contributing to the production of a long, yet narrow, chain of carob-based products. The bakery and confectionery products are valorized by the Crete’s tourism and hospitality industries (ELSTAT). Carob flour and other carob products are sold in supermarkets and health food stores all over Crete and in large cities in Greece and they are also marketed via e-commerce. The food industry plays a fundamental role in Crete’s economy and the country’s manufacturing industries and can retain its role as a key growth driver in the MRL, MRR and the country.

The environmental, economic and social role of carob pod and flour production and processing in the rural mountainous communities of the MRL is obvious by the growing interest and consumer demand for the products produced. The valorization and preservation of the carob flour value chain is important for the local economic development and for the preservation and management of the semi-forest landscape and traditional village life.

3. Policy experiences

Greece's policy regime is lacking in targeted policies for mountain areas and mountain value chains, at national or local level. On the contrary, there are many financial tools for mountainous regions and local self-government in Greece. It becomes necessary to distinguish mountain municipalities to mountain areas, as the latest must be treated differently due to the different challenges they face. Policies that have been applied or could be applied in mountainous value chains are mentioned below:

-The Common Agricultural Policy (CAP): The Ministry of Agriculture's Implementation of a program within the European Reg. **2080/92 and 1257/99 for Forestry Guidelines in Agriculture**. The program "*was not effective as an afforestation effort*" according to extension officers in the MRL, but several stakeholders planted large numbers of carob trees under the auspices of this subsidised afforestation program and renewed their production capacity. Currently there are no measures in place for those motivated to plant forest species, as carob trees.

-Agritourism (**LEADER** programs - it is possible to grant Community support in the form of integrated subsidies to enable local groups to implement the measures listed. Local groups are selected by the Member States and by the Commission of the European Communities)

-**Allowance for residents of mountainous and disadvantaged areas** is granted as part of social protection measures for vulnerable groups to support families with low incomes. This measure aims at preventing the risk of entire villages located in mountainous and disadvantaged areas being deserted. The characterization of areas as mountainous or disadvantaged is provided for by EU law and is based on European Union directives.

-**Greek Agricultural Organization** ELGO-DIMITRA implements targeted agricultural vocational training programs concerning new farmers/beekeepers, and certification on the reasonable use of pesticides. There is strong concern about the demise of agricultural cooperatives in Crete and the need for farmers to seek and pay for scientistic support.

- "*Agri-food tradition of carob in Crete*" was inscribed in the **National Inventory of Intangible Cultural Heritage** in 2019 - Convention for the Protection of the Intangible Cultural Heritage. "*Celebrations*": the "*Carob Festival in the Kato Pines of Elounda*", the "*Cretan Food Festival*" in Rethymno, the Pancretan Cheese and Grass Festival in the province of Mylopotamos - to promote the Cretan tradition and Cretan food.

-**PDO, PGI, TSG** registered products, governed by Regulation (EU) 1151/2012 "on the quality systems of agricultural products and foodstuffs". At the same time, other quality schemes have been added to this regulation, such as the optional indications "Product of mountain production", "Product of island agriculture", etc.

- **Agronutritional cooperation of Region of Crete**, a Non-Profit Company with the purpose of highlighting and promoting quality products which are produced within Crete's region and a part of the broader operational

and strategic project of the Region of Crete "**Basket of Agricultural Products**". The Partnership's field of activity focuses on connecting the primary and secondary sectors with the tourism sector by the brand "**Crete-Land of Values**" and the "**Cretan Gastronomy Center**".

-**Regional investment in scientific capital** has led to research exploring the varieties/genotypes of Cretan carobs, their production capacities, and how they can be utilized in food production industries. Producers, processors, and consumers develop specific knowledge about the dietary, nutritional, and nutraceutical properties of carobs and produce high-quality products and byproducts.

-There is great fragmentation of legislation on land registry (cadastral) processes, land use and forestry legislation.

-In order to address the issue of labour shortage and demographic changes in Greece 167,925 resident permits were issued to people of other countries between 2023 and 2024 (14,740 permits for the Region of Crete).

4. Recommendation for future policies

-The particularities of the mountainous areas must be taken into consideration in every national and European policy. The same values in terms of welfare, education, health, and employment must exist in mountainous areas as in the rest part of the country.

-Targeted policies for mountain areas. Regional policies adapted to agricultural products and practices. Translation of European policies to fit the local context of the region.

-The creation of an observatory of mountainous regions as well as the creation of a "General Secretariat" or "a deputy ministry of mountain policy" is imperative.

-The creation of a "Mountain Fund" that will operate at all levels that can be bolstered through tourism to enable the development of ecotourism and sustainable tourism practices. Regional policies must invest in alternative tourism models and in local production and processing by supporting alternative forms of tourism such as ecotourism and agrotourism and encourage the interconnection of economic activities (tourism, agriculture, livestock, etc.) and the promotion of regional products.

-The important role of continuous education and training of the mountain areas inhabitants is highlighted with an emphasis on the implementation of targeted interventions responding to their real needs. There is a significant shortfall in up-to-date skills and competences and this needs to be addressed more methodically via the provision of public education services. The improvement of the educational level of the inhabitants and the continuous improvement of their work profiles is integral for the development of the inhabitants of the mountainous areas.

-Need to change European subsidies and how they are applied (because of dependence of local farmers on EU agricultural subsidies). Reshaping subsidy regimes and continuous monitoring of agricultural policies. Regional offices must update and implement policies.

-Necessity to create a “toolbox of incentives” for the mountainous areas. Incentives must be given to the mountainous areas inhabitants or to those who choose to stay in mountainous areas (e.g. teachers, medical personnel, etc.). To give opportunities and work possibilities to young people to practice what they have studied in the mountain areas where they come from and want to stay.

- Strengthening producers and women's entrepreneurship in mountainous areas.

- Support the creation of cultural associations and environmental groups in mountainous areas. Creating collective spaces and dedicated community clubs and promoting cultural groups that can act as intermediaries between local communities and bureaucratic institutions.

- Strengthening the informal circular economy that was part of the traditional way of life and promoting the mountain identity of the Cretan people. To re-establish the "simisia" and other cooperation procedures for small farmers, so that the harvesting of carob and olives can become once again cooperative and communal activities.

- The creation of an active network of mountainous regions throughout Greece for the joint promotion of issues while concomitantly respecting the diversity of each mountainous region.

- Accessibility is a key factor for the development of mountainous areas. The State must support the transportation needs of the residents in mountainous regions.

- Promoting decentralized decision-making processes and empowering local communities. Creating more horizontal, decentralized decision-making processes at regional and local level, enabling local communities to make decisions that affect their way of life (e.g. installing renewable energy sources in mountainous areas).

- Regional policies that can address climate change and alternatives such as carbon sequestration.

- Energy policy should allow local context-aware regional authorities to manage their resources and decide on economic development projects and renewable energy projects, etc.

- Focus on the quality and not the quantity of Cretan products.

- Food policy: accessible policies that grant PDO/PGI certification to Cretan products and capitalize on their wider use and economic benefits.

- Spatial planning policy. Completion of the cadastral (cadastre) procedures, land use and forest legislation. There is a need to maintain and build infrastructure and increase accessibility in mountainous areas (Schools and educational centres, health care facilities and community centres).

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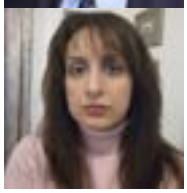

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Cold Mountain Shelter – Transdanubian Mountains, Hungary

Gusztáv Neme and Ferenec Papp

Summary

Our research delves into the Sustainable Knowledge Economy (SKE), focusing on how knowledge about sustainable living can be commodified and exchanged to promote ecological and social outcomes. The SKE enhances resilience and sustainability by promoting sustainable practices, integrating traditional and innovative knowledge, strengthening local economies, and fostering community engagement. Addressing regulatory, political, economic, social, and natural barriers is crucial for optimizing these contributions. Supporting the institutionalization of alternative knowledge systems and fostering a harmonized relationship between SKE and Agricultural Knowledge and Innovation System (AKIS) are crucial steps forward. Increase funding and support for SKE development, raising public awareness about SKE benefits and fostering collaboration among policymakers, researchers, and practitioners would be essential. By implementing these recommendations, the SKE can significantly contribute to an ecological paradigm shift, promoting a sustainable future in Hungary.

Figure 6 : Demonstration activity

Key Policy Messages

- ☞ Increase dedicated funding for SKE initiatives
- ☞ Establish a professional support institution for SKE
- ☞ Incorporate SKE topics into educational curricula (AKIS)

1. *Sustainable Knowledge Economy – catalysing the ecological paradigm shift*

We investigate the Sustainable Knowledge Economy (SKE), a system where knowledge related to sustainable living is commodified and exchanged. This hybrid system blends traditional understanding with scientific innovation and is driven by Communities of Practice (CoPs) to promote ecological and social outcomes, enhance financial sustainability for knowledge holders, and provide diverse, reliable information on sustainable practices.

We began our research with a specific Community of Practice, the Cold Mountain Shelter. This small community of young, educated lifestyle migrants lives off-grid on a steep hillside near Lake Balaton. Although they are farmers, their main product is knowledge on sustainable living.

In the second half of the project, we expanded our research to the national level, analysing the macro processes in the development of the SKE. We formed a network of around 40 knowledge holders, agricultural producers, researchers, policymakers, innovation brokers, and NGO

representatives. We organized participatory workshops, conducted assessments, and participated in knowledge days and cross visits. In these workshops, we identified key issues, outlined potential future scenarios, and discussed the steps needed to establish an 'alliance' to represent the interests of knowledge holders and a 'support institution' to provide them with professional assistance.

2. Value chain contribution to resilience and sustainability

The climate crisis and biodiversity loss highlight the need for an ecological paradigm shift, requiring scientific research and policy reform. Industrial agriculture has significantly damaged the environment, but value-based alternative food systems offer novel pathways to a New Ecological Paradigm (NEP), including regenerative production methods and elevating ecological, social, and cultural values alongside financial profit. Industrial agriculture benefits from a well-funded and institutionalized Agricultural Knowledge and Innovation System (AKIS), yet despite their potential, alternative food systems are only expanding slowly due to a lack of comprehensive knowledge infrastructure. Alternative systems also rely on knowledge but require expertise that combines tradition, lay knowledge, and innovation, which current AKIS covers poorly. Until recently, such knowledge was primarily shared voluntarily via personal networks and social media. However, this fragmented, often unvalidated knowledge system is increasingly commodified and institutionalized, greatly altering its dynamics.

The SKE contributes to the sustainability and resilience of local territories by:

- Promoting the dissemination and adoption of sustainable practices through knowledge exchange.
- Enhancing the ecological quality of the region by integrating traditional and innovative knowledge systems.
- Strengthening local economies by providing new income streams for knowledge holders.
- Fostering social cohesion and community engagement through shared learning experiences.

To optimize the contributions of the SKE, several barriers must be addressed:

Regulatory Barriers.

Existing policies may not adequately support the commodification of sustainability knowledge.

Political Barriers.

The agricultural lobby's influence can marginalize sustainable practices and alternative knowledge systems.

Economic Barriers.

Limited funding and investment in the development and dissemination of sustainability knowledge.

Social Barriers.

Public awareness and acceptance of SKE are still developing, requiring increased educational efforts.

Natural Barriers.

Environmental challenges can impact the effectiveness of sustainable practices promoted through SKE.

3. Policy experiences

Local and national policies have provided some support for sustainability initiatives, primarily through grants and subsidies not specifically aimed at SKE but utilized by Communities of Practice (CoPs) to enhance sustainability knowledge activities. Additionally, European policies, such as Horizon 2020, have funded projects related to sustainable development and knowledge exchange.

Successful Outcomes:

- Increased participation in sustainability training programs and workshops.
- Growth of community-based knowledge networks, enhancing local resilience and sustainability.

Unsuccessful Experiences:

- Limited impact of policies due to inadequate funding and supporting mechanisms.
- The dominance of traditional agricultural knowledge systems, overshadowing the potential of SKE.

While these efforts are positive, achieving significant results requires systemic changes. Supporting the institutionalization of alternative knowledge systems and fostering a harmonized relationship between SKE and AKIS are crucial steps forward.

4. Recommendation for future policies

Based on previous experiences and insights from the MOVING project, the following recommendations are proposed:

- **Enhance Funding and Support.** Increase funding for the development and dissemination of sustainability knowledge and integrate SKE into existing knowledge systems.
- **Promote Policy Integration**. Develop policies that align with sustainable development goals and support the institutionalization of SKE.
- **Foster Public Awareness.** Launch campaigns to raise awareness about the benefits of SKE and encourage consumer participation.
- **Strengthen Collaboration**. Facilitate collaboration between policymakers, researchers, and practitioners to create a robust framework for SKE.
- **Adapt to Local Contexts.** Tailor policies to the specific needs and characteristics of local territories to maximize their effectiveness.

The development of SKE in Hungary offers a promising pathway to achieving resilience and sustainability. By addressing the identified barriers and implementing the recommended policies, it is possible to support the ecological paradigm shift and foster a more sustainable future for the region.

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Lamb and sheep meat in the Drôme Valley

Anna Galmot

Summary

The sheep and lamb sector is a major agricultural, economic and ecological asset for the Drôme region. Constant dialogue between elected representatives, local authorities and breeders is essential to ensure its sustainability and meet new challenges. Several measures and policies are already in place to support the sector's stakeholders. However, specific policies for mountain areas, changes to the CAP, the recruitment of young people and women, and the competitiveness of local products are needed to ensure the long-term viability of this agriculture and avoid its decline.

Figure 7: A herd of sheep grazing on a summer pasture in the Drôme Valley

Key Policy Messages

- ☞ Supporting local and collaborative initiatives
- ☞ Supporting farmers to help them achieve self-sufficiency
- ☞ Make local products more competitive on the market
- ☞ Strenghtening the link between agriculture and environmental protection

1. *The lamb and sheep meat sector: an asset for the Drôme valley*

The lamb and sheep meat sector fits perfectly into the mountainous environment of the Drôme thanks to its extensive model. The value and quality of the final product is reflected in the healthy environment in which the animal has grown up, the spontaneous plant resources it has fed on, and the proximity of the slaughter and processing sites. Almost all the lambs are reared on grass.

The pastoral activity in this sector generates several positive externalities. Firstly, it contributes to the management of natural areas and the regulation of the environment, preventing overgrowth and forest fires. In addition, this practice promotes biodiversity by maintaining varied habitats and allowing numerous plant and animal species to coexist. The sheep industry is also a key economic activity, helping to create high-quality local products that reinforce the region's identity. The industry offers employment opportunities in the mountains, creating jobs directly linked to livestock farming, but also in the processing, marketing and tourism sectors. In this way, the sheep meat industry plays a crucial role in maintaining and developing mountain regions, where other activities are struggling to establish themselves.

2. Value chain contribution to resilience and sustainability

The sheep meat industry has demonstrated a great capacity for adaptation and resilience in the face of variations in its environment. The industry's players are aware of the constraints inherent to mountain regions, the impacts of climate change and the socio-economic issues affecting their activity and their region. This awareness is nurtured by the sharing of knowledge between breeders, the collaborative structuring of the industry, and the active involvement of local authorities in raising awareness of current challenges.

These territorial assets are reflected in the way of life of the local inhabitants, a dynamic governance structure close to the stakeholders, and an environment rich in biodiversity. This diversity encourages the adoption of new adaptive techniques, strengthening the resilience of the sector and the sustainability of pastoral practices in the region.

However, the sector faces several challenges, such as cohabitation with other mountain activities, increasing predation, the impact of climate change and foreign competition. For example, predation exerts significant pressure on breeders, sometimes leading to the abandonment of certain areas such as undergrowth. The economic crisis and rising energy costs are accentuating the sector's vulnerability. Breeders' incomes are fragile and largely dependent on public subsidies. What's more, climate change, with its unpredictable seasons, water shortages and frequent droughts, is altering the natural vegetation cycle, posing new challenges for the value chain.

3. Policy experiences

In the face of these many challenges, the region remains deeply attached to the industry and is demonstrating its inventiveness. Local authorities and breeders' associations are implementing a range of initiatives to raise awareness among the public society and schoolchildren, to help farms become more self-sufficient, promote the economic value of the sector's products, and support the acquisition of protective infrastructure. Concerted and collective initiatives at local level are essential to reinforce the resilience of the sector.

Local inter-municipalities have set up a slaughterhouse and processing facilities in the area to promote short distribution channels and strengthen the local economy. By integrating these facilities, they aim to support local producers and reduce the distances food travels, thus contributing to a more sustainable, higher-quality food supply.

As part of their agricultural and food strategy, these inter-municipalities play a crucial role in facilitating the integration of products from this sector into school catering. European policies, such as the European Agricultural Fund for Rural Development (EAFRD), which finances Territorial Pastoral Plans, and the Common Agricultural Policy (CAP), which supports the Compensatory Allowance for Natural Handicaps (ICHN) and Agro-Environmental and Climate Measures (MAEC), sometimes support these local dynamics.

Faced with the increase in predation, national policies such as the National Action Plan on the wolf support the farming profession in the face of this threat.

4. Recommendation for future policies

The collaborative work carried out as part of the MOVING project has highlighted future policy recommendations to ensure a sustainable future for the sheep industry and agricultural sectors in mountain areas:

- Implement a policy of welcoming young people and women and enabling young farmers and women to set up in rural areas.

- Set up subsidy programs for collective and local initiatives.

- Adapt governance in mountain areas.

- Modify the CAP to a) subsidize practices rather than surface areas, and b) take account of wooded pastures.

- Implement standards to make local products competitive on the market.

- Introduce legislation to impose a minimum quota of local produce in canteens, supermarkets and hypermarkets, thus encouraging the sale and consumption of local products.

- Changes and adaptations to agricultural practices should be encouraged to strengthen the resilience of ecosystems.

- Allocate specific funds within rural development programs or agricultural budgets to support the salaries, training and resources needed by local development agents to stimulate local and collective initiatives.

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Alto Molise dairy value chain- Central Apennines

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Summary

The MRR Central Apennines in Italy is known for its vast pastures and wooded lands that are closely linked to livestock farming and forestry products. The value chain of spun paste cheese is an important part of the economy of the area, reflecting traditional practices passed down through generations. These practices connect the landscape, environment, dairy products, and cultural heritage in a positive relationship. By combining with tourism and meat production, farmers can diversify their income since milk production alone may not be enough for the farm to survive. However, the spun paste cheese value chain faces various threats, such as drought, depopulation of rural areas and centers, rising raw material prices, and farmers' reluctance to accept EU agricultural policy reforms that focus on rural development issues. Consequently, the policy needs that emerge are related to technology, tackling depopulation, environmental protection, land organization and training.

Figure 8: Caciocavallo of Agnone cheese certified PAT (Italian traditional food product).

Key Policy Messages

- ☞ Resilience
- ☞ Participation
- ☞ Social innovation

1. The dairy Value chain and the MRR

The dairy value chain of spun paste cheese (e.g., fresh final product, such as stracciata, and matured final product, such as caciocavallo, which is typical product representing the identity of the territory), is historically rooted in the socio-ecological system of the Central Apennines. The local production system connects the environmental settings (i.e., permanent grasslands and meadows), livestock farming skills (in some cases linked to the traditional transhumance practice), the production of dairy products (still partially made with craft techniques), and socio-cultural heritage (mountain farming and artisan culture). The area is characterised by a strong tendency towards depopulation, lower average incomes compared with the regional, and very low population density. However, there is a tourist vocation that tends to strengthen, also because of the pandemic, cantered on village tourism and experiential cultural tourism which are increasing and represent a segment of tourist demand. There is a tendency for the area to intercept this demand and position itself in it (assemblage with tourist value chain) (Moretti et al., 2023).

At the production stage, pasture meadows are the main and strongly characterising elements. At the processing stage, dairy culture and reputation play an important role in production specialisation and relationships (both horizontal and vertical). The spun paste cheese obtained goes to the next stage to be purchased and sold (Ho.re.ca, farms shop, etc). After the products have been distributed and purchased, they are ready for consumption, a stage involving culinary traditions together with pastoral and rural culture. Consumption practices generate reputation feedback and involve actors like regulars and tourists.

2. Value chain contribution to resilience and sustainability

The value chain generates profits for companies and leads to investments, as well as income for families, generating employment (employment is also a result in socio-cultural terms) and wages. It also generates empowerment, i.e. growth in community awareness of a land resource that can be utilised, and from an ecological perspective, it contributes to the maintenance of the landscape and biodiversity. To improve the value chain contribution to the sustainable development of the MRR, the main barriers are related to the following aspects:

- Demographic decline and loss of functions and basic services (transport, health, education, rural extension services).

- Automation and risks loss of traditional practices.

-Risks of losing the link between production and territory (worsening reputation).

-Drought and risks of weakening the meadow-grazing resources (Scotti et al., 2023).

-Price tensions and less willingness to pay for quality products.

-Irrational meadow-grazing management.

-Difficulties in implementing the new "environmentalist" Common Agricultural Policy, as witnessed by the farmers' recent protests.

3. Policy experiences

In the area, the Common Agricultural Policy has been implemented through the first (Income aid) and the second Pillar (area-based measures, investment-based measures and the LEADER programme). These aids are essential for the survival of farms and the sustainable and organic processing of agriculture, for generational renewal and agricultural investment. Also, the habitats and the birds' directives have been implemented by national and regional institutions. At municipal level, concession of public assets (grazing lands) has been granted. Even if the implemented policies are relevant to dairy production and pasture maintenance, to the survival of farms and to biodiversity conservation, difficulties in their implementation have been observed. These difficulties are mostly related to the incorrect use of European subsidies (so-called paper pastures), to the complexity of new CAP aid mechanism, to design issues and access to measures and to adopt the approach.

4. Recommendation for future policies

Recommendations for future policies are divided into different themes:

- Market policies that stimulate the dissemination of local food systems and promote informal and territorial markets, advancing good practices in food production and consumption of food, including voluntary certification schemes for the strategic differentiation of products in the area. It is crucial improving value chain policies supporting the creation and dissemination of new markets (Belliggiano et al., 2024), to improve products placement and the resilience of the value chain, thus attracting the interest of young farmers to stem the depopulation of rural areas.

- Rural development policies supporting innovation towards 'new' (or local) breeds and innovative agroecological approaches in breeding and dynamic management of biodiversity based on the valorisation of local resources, including the recovery of abandoned lands and buildings through the active involvement of farmers and residents.

- Technology policies aim at upgrading of existing infrastructure and interventions for the digitisation of business processes and stables, including the provision of special training for producers and processors. These policies enhance the important role of universities and research centres, both for the sharing and implementation of research results and for the creation of spin-offs. Policies call for the dissemination of Operational Group-EIPAGRI and initiatives to stimulate return and tackling depopulation creating/promoting policies aimed at return to the area and the growth of social capital.

- From a social perspective, the need for training-related policies spans two axes: technical training to accommodate the participatory digitisation of business systems and processes; formal and non-formal training relating to the value chain practices, as well as the revival of traditions and values specific to the value chain and the Apennines.

- Regarding the environment, policies promoting the rational and sustainable use of natural resources in farming, such as grassland and water management plans and agroecological approaches in agriculture, since the quality of pastures, affects that of the main raw material.

- As for organisation, the policies concern both territorial governances, calling for inter-municipal and inter-institutions agreements in the area and the associated management of civic uses; and the financial sector, calling for policies that speed up the settlement of funding; and technical-managerial assistance, at company and territorial level.

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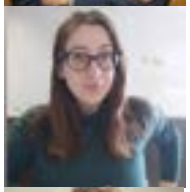

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Eastern Alps: Trento Doc wines

Cristina Micheloni, Ekaterina Kleshcheva, Gianni Trioli

Summary

The Trento Doc wines, in Eastern Alps, are all PDO/PGI and with a good share of organic, produced with grapes from slopes of the river valleys, grown with the traditional pergola trellising system. The farms producing the grape are more than 6300, 70% of them on less than 1ha. The grapes are processed by cooperative cellars, large scale companies and small private cellars. Partly consumed in the area, either by residents or tourists, it reaches National and International markets. Wine production shapes the landscapes and is an essential part of the touristic offer, that contributes back to agriculture either buying the wines and/or using the hospitality offered by multifunctional farms. Climate change is pushing viticulture uphill, with potential positive effects, but, on the other hand, creating some concerns of pollution, soil over-exploitation and water requirements. Policy should strengthen the integrated approach and acknowledge the cornerstone role of family farming.

Figure 9: Pergola vineyards in Trento. Source: vinideltrentino.com

Key Policy Messages

- ☞ Integration of policies is essential to reach fairness, inclusivity, resilience and sustainability;
- ☞ family farming is the cornerstone of sustainable mountain agriculture;
- ☞ ecological forms of farming (i.e. organic) must be supported not only with funds but also with knowledge (i.e. research, advisory etc.);
- ☞ a balance of power when negotiating the use of public goods (i.e. water) should be granted.

1. Trento DOC wines and landscape

To describe Eastern Alps Region, within the MOVING project goals, we focused on the Trento DOC wines value chain, a PDO production with a relevant share of organic, so applying two EU defined quality schemes on the grape production and following processing steps.

The value chain is based on grapes of international and local varieties totally produced within the province. Vineyards are located on the slopes of river valleys and are mainly managed with the typical pergola trellising system. In the Province, vineyard covers about 10,000 ha, located from 100 up to 1,100 m asl. Vinyards belong to about 6,300 farms, many of them of very small size, 70% below 1 ha. The grapes are processed in PDO/PGI wines by 15 cooperative cellars, few large-scale companies and several small-scale private cellars. The outcome is about 800,000 hl/year of still white, rosè and red wines, while the most iconic wine is the bottle-fermented sparkling PDO wine Trento DOC. The vineyards forge the landscape with the terraces that characterize the valleys, a key element of the touristic offer

that is mainly based on outdoor sports, health and wellbeing, gastronomy and culture. Viticulture is a specialized sector, but often intertwined with other farming activities such as fruit production, animal husbandry (mainly dairy cows) and touristic services in terms of accommodation and farm restaurants. In recent years, due to climate change, vineyards gained more and more areas in upper valleys, where for decades pastures were abandoned, and forest was progressively taking over. In the establishment of higher vineyards, large companies were the main actors (mainly due to high investment costs), but they are paving the way to small scale initiatives that benefit from the infrastructures and experiences of the first.

Trento wines are partly sold/consumed locally, by residents and tourists, but the largest share ends up on national and international markets. Most of the VC takes place in the province and large part of the revenues remain on site.

2. The contribution of the wine value chain to Resilience and sustainability

Trento wines make use of local material and immaterial assets:

a) at grape production level, it makes use of land and its structure in terraces, soil specific composition and its fertility, climate (climbing up mountains as temperatures become higher), road infrastructures, water (in reservoirs and through the irrigation system), disseminated network of multifunctional farms, high level knowledge of farmers and advisers supported by local University, research centres and consultancy;

b) at processig level, making use of structures, infrastructures and institutional support, qualified skilled personnel from local schools and innovation support from research centres;

c) at marketing and trade level, as the "image" of Trento province is a key aspect of wine communication, thanks to touristic qualification and world-wide acknowledgement as clean, nature-friendly and good gastronomy destination.

The main environmental threats for the value chain are extreme weather events and the efficiency of water use. On the social side, threads are social changes, scarcity of working force for seasonal work in the vineyard and for non-qualified working force in the winery. The actors involved in the value chain contribute to local resilience and sustainability with a continuous evolution of practices. The implementation of environmentally friendly agronomic practices (especially the increased share of organic) along with accurate choice of grape varieties (including resistant/tolerant new ones) and the delocalization of vineyards in higher areas significantly increase the resilience of the value chain in terms of soil quality and health, yield and quality of grapes and longevity of the vineyards. From the socio-economic perspective, the good profitability of grape production (for use in quality wines) allows farmers to maintain their activity and offers qualified jobs to young farmers and professionals. It also increases the attractiveness of the area for tourism and quality living. Overall, the fact that the value chain is almost completely located in the

province, leads to a large reinvestment of profits in loco, to the benefit of the whole community.

3. Policy experiences

In the province an integration among policies of different sectors and the acknowledgment of small farmers as a key element of the local development are common understandment.

Rural development policies have always supported to a good extent a) small producers and their collective initiatives (being them cooperatives or consortia or other forms); b) quality productions (mainly PDO and in most recent years organic); and c) research for the innovation of local agriculture accompanied by high level education and training. A real integrated system of agriculture, tourism and other economic activities is into place, even if there is large space for improvement.

Recent advanced experiences pertain the setting up of two organic districts where viticulture and wine production is the key activity (Biodistretto di Trento e Biodistretto della Valle dei Laghi), but the scope is to use organic farming as a tool for a broad integration of policies and activities focussed on sustainability and resilience in urban and rural areas.

4. Recommendations for future policies

The consultation with local actors allowed to identify the following points as relevant for further policy development:

- Further enhance the integration of policies considering agriculture (in its most sustainable forms) as a basis for tourism and other activities.
- Stronger support to ecological systems (i.e. organic farming and diversification also through multifunctional farming) with funds but also with knowledge.
- Preserve family farming as the cornerstone of mountain farming.
- Secure fair power balance in the use of water for different purposes.
- Secure investments in education, research, and innovation with a global approach to resilience and sustainability.

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See the complete documents on the Estern Alps wine value chain at https://www.moving-h2020.eu/

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Chestnut flour "Northern Apennines"

Tarek Allali and Michele Moretti

Summary

The chestnut flour value chain represents probably the most valuable heritage for communities in the Northern Apennines. This document summarises a few key local and European policies that have impacted the chestnut flour value chain and its surrounding territory. Additionally, we report a series of recommendations that emerged from the MOVING project. These recommendations were gathered from various stakeholders involved throughout the different phases of the project, that should be considered in future policies.
The recommendations are clustered according to their expected application up to the year 2050. They emphasise the preservation of this heritage through local communities' involvement, stakeholders' diversity, efficient knowledge sharing, and supporting local wellbeing.

1. *More of brown gemstones than ordinary chestnuts – A Tuscan heritage and a local pride:*

The very steep landscape in the MRR is crossed by a dense network of water streams passing through a diverse Mediterranean vegetation, where forests and shrubs (e.g., pine, oak, chestnut, etc.) occupy a large part of the territory.

It is noteworthy that despite the existence of more profitable activities (i.e., marble business and seaside tourism), people are still being engaged in the chestnut flour value chain. Their attachment to this activity in particular expresses their belief that chestnut represents a pillar for their identity, considering that the region has a long tradition with chestnut and related activities that dates to the 11th century.

Figure 10: Two processors inside a traditional drying building (metato), preparing dry chestnut for grinding.

Key Policy Messages

- ☞ Local farmers shall have a key role in preserving the territory: 'Custodians of the territory.
- ☞ Stakeholder diversity is crucial, more involvement of the regional parc is needed.

2. *Value chain contribution to resilience and sustainability*

The Chestnut flour value chain can contribute to the resilience and sustainability of the Northern Apennines in various ways. Form the economic perspective, the value

chain represents an additional source of income for local communities, especially for those relying on small scale agricultural activities. Moreover, involving individuals along the different stages of the value chain provide job opportunities; preventing population exodus, which is found as a major threat to the territory.

From the environmental perspective, cultivating and preserving chestnut trees prevent soil erosion, enrich biodiversity, and strengthen soil health. Additionally, the chestnut flour value chain contributes significantly to carbon sequestration and water retention, particularly at the production stage.

Regarding the social dimension, the chestnut flour value chain in the Northern Apennines can foster community cohesion and collaboration during crisis. It is to be highlighted that the practices conducted along the chain represent a very valuable cultural heritage and traditional knowledge that must be protected. For centuries, chestnut flour has been providing a locally produced nutritious staple food benefiting a range of vulnerable consumers (i.e., gluten intolerant). Therefore, chestnut flour could be an optimal solution contributing to food security.

3. Policy experiences

The Tuscany Region has been an arena to implement different European policies. For instance, the 'Cohesion Policy' implemented through the European Structural and Investment funds (ESIF)[1] showed significant returns, especially in terms of growth and employment.

At the Regional level, the 'Custodians of territory'[2] policy, which is a collaborative initiative aiming at improving territorial sustainability mainly through the direct engagement of local communities. It is based on agreements between farmers and local authorities to provide environmental services (e.g., biodiversity conservation). The core idea of the policy is to provide farmers with payments for maintaining and improving the natural resources in the area. In the MRR and for the chestnut four value chain, this policy is perceived as a successful experience for fostering a sense of community and responsibility, preserving the chestnut groves, protecting the environment, and enhancing the sustainability of the MRR.

4. Recommendation for future policies

Based on the outcomes that emerged from the exhaustive discussions and meetings throughout the MOVING project, we address here a series of recommendation considering the economic, environmental, and social aspects. The suggested recommendations aim at fostering the sustainability and resilience of the Northern Apennines mountains in Central Italy.

For the short term, policies should consider new incentives' frameworks targeting depopulated mountain areas. Furthermore, in future policies is highly recommended to integrate trainings, technical assistance, and extension workshops for farmers and their organizations (e.g., associations, cooperatives) to ensure knowledge sharing and information flows.

For the medium term, it is required to promote and assist small-scale farms emphasising agroecological practices, and quality standards focusing on crops such as chestnut. Additionally, it would be valuable to establish context-based communities for rural development, emphasising sustainability and quality of life.

In the long-term horizon, future policies are required to consider lowering taxes for mountain residents attempting to boost sustainable entrepreneurship initiatives. Moreover, new frameworks shall be applied to common resources management by local communities (water, pasture, forest, etc.). Stakeholders' diversity and engagement shall be encouraged, for this the 'Regional Apuan Alps Park' must be given a primary role in promoting and supporting the local community engagement.

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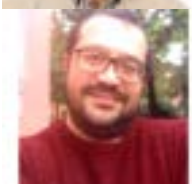

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Rural Tourism value chain in Maleshevski Region economic driving force

Merita Kuli and Nehat Ramadani

Summary

The Maleshevski Region is in far east of North Macedonia and has always been recognised for its natural beauty, exceptional dairy products and the organically produced vegetables and honey. The traditionally grown and produced food and beverages are cornerstone of the gastronomic offer of the region. Rural and gastronomic tourism began to flourish in last few years. The investments have increased, and the offer was enriched with hiking, biking trails, adrenaline park and increased offers of private accommodation. However, the weekend travellers and short-term visits cannot sustain the value chain.

The region is heavily affected by the climate change effects, manifested with high temperatures and droughts. Wildfires are devastating the nature and the pastures, and the lack of budget and human resources are challenging appropriate responses.

The depopulation and abandonment of the territory due to socio- economic turbulences represent hight risk for the sector and the sustainability of the value chain.

Coordination and lobbying with institutions on national level for implementation of policies, increasing budgets for the region, creating regional brand, investments in green economies and finding solutions to sustain rural tourism value chain are required.

Figure 11: Local products

Key Policy Messages

- ☞ Destination management and establishment of the Maleshevski brand is key for sustaining the rural tourism value chain and the quality of the services offered.
- ☞ Improved implementation of the law and procedures for claiming property rights.
- ☞ Integrated approaches from mininstries of agriculture, forstery and local governments to respond to the need of improving integrated forest managment and protect pastries

1. Maleshevski Region - rural tourism gem yet to be recognised and valued

Located in the eastern part of the Republic of North Macedonia (municipalities of Berovo and Pehchevo), the Maleshevski Mountains are characterised by natural and cultural richness.

Forests cover 52% of the region, while pastures cover around 20%. The lowest point in the Maleshevo region is 660 m, and the highest point is 1.932 m. Two years ago, the Maleshevski Region was declared a National Protected Area. The region is well recognized for its natural wealth: oceans of woods, pastures and traditional food prepared from locally grown vegetables, forest fruits, delicious dairy products and honey.

The Maleshevski Mountains cover the municipalities of Berovo and Pehchevo. They are known for their outstanding natural and cultural value. From an administrative point of view, the municipalities of Berovo and Pehchevo belong to the East Planning Region and are part of the catchment area of the river Bregalnica. The area is a plateau whose borders include three mountain massifs: Vlaina, Maleshevski Mountains, and Obozna. The direction of the Maleshevski Mountains is south-southwest to north-northeast, with a ridge 32 km long. The border between the Republic of North Macedonia and Republic of Bulgaria passes along the ridge of the Maleshevski Mountains.

The geographical position, the natural resources and the traditional vegetables grown in the area have defined the rural tourism offer, based on active tourism and gastronomic experience. However, it must be emphasized that most of these private accommodations are not categorised, and this may affect negatively the image of the region if not addressed by the institutions. Due to the proximity with Bulgaria and its well-developed rural tourism offer, which is as well financially mor appealing, the Maleshevski region is struggling with competitiveness in the region.

2. Value chain contribution to resilience and sustainability

The effects of the climate change are threatening the woods and pastures of this region. They are home to several animal and natural species and provide natural food for livestock, bees and pickers of the non-timber forest products (NTFP's). Wildfires are damaging forests, and they are affecting the attractiveness of the region. The pastures in high lands are decreasing due to lack of water and wildfires damages. The decrease of the pastures is affecting dairy producers who are feeding the sheep flocks with crops.

The rural tourism value chain is represented by: private forest owners, hotels and private accommodation owners, dairy producers, producers of traditional food and beverages from the vegetables and fruits, honey producers and representatives of the local government sectors for economic development and tourism. These actors are cornerstone of the rural tourism value chain and play a key role in the development of the region. However, these are small family businesses and have capacity only to employ seasonal workers.

The guests prefer short stays (New Year's Eve, Christmas, Easter) and during the summer at most for 4 to 7 days. While most of the tourists are still locals, just before the pandemic there was a rise of the foreign tourists visiting the area. This zone is not suitable for mass tourism as it is lacking accommodation facilities. There are three hotels only, although there is a rise in private

accommodation facilities. The region is struggling with keeping workforce in each segment in the sector and livestock owners are facing huge challenges as there are no shepherds while youth is not interested in continuing family business as a core activity.

The sustainability of the Maleshevski Region rural tourism value chain is endangered. While the gastronomy part and partially the accommodation segment has huge potential for development and attract tourists, the active tourism offer is limited. The guides and other professionals from the sector have left the region and moved to more advanced zones in Bulgaria.

The local government with the support from the donors has opened an incubator where producers of traditional food can gather, work together and share their experiences. Moreover, different sectors with their respective chambers and associations are using their power to lobby the national government for the needs of the sector they represent.

The rural tourism value chain is struggling, and it needs strategic support from the local and national government to sustain the offer and to attract more tourists in the region.

3. Policy experiences

On its path to join the European Union, North Macedonia is in process of alignment its laws and regulations to the European framework. The Country created the Strategy for Rural Tourism and through Ministry for Economy, sector Tourism and the Ministry of Agriculture is providing support to businesses for development of this tourism segment. A special measure targeting women in agriculture was developed by the Ministry of Agriculture. Women and youth are targeted as marginalised and they receive additional support for start-up business, purchase of equipment, renovation of accommodation, developing marketing and branding strategy.

Going back to the region, municipalities are struggling with luck of funding. Thus, they are unable to fully implement the laws and measures required to protect the region for climate change effects and socio-economic turbulences.

The region is struggling with lack of funding for protecting the forests and pastures from wildfires and employ enough firefighters in the department. This is affecting lack of capacity to protect the woods from pests as well.

Collecting funds from taxpayers and lack of local categorisation body is affecting those who offer private accommodation. Lack of control is resulting with low quality of private accommodation, and it is affecting the attractiveness of the region taking in consideration that there are limited accommodation capacities.

During the MOVING Project implementation, the Municipality of Berovo changed their policy in the Tourism Sector for renting promotion locations and boosting to local traditional food and beverage producers. They managed to lobby the local government to assist them in this manner to decrease their costs for promotion and marketing of their products. This measure will contribute towards increasing their sales and revenue and motivate them to remain best

ambassadors of the Maleshsvski Region traditions.

4. Recommendation for future policies

To establish and protect the Maleshevski Brand, destination management and the full implementation of environmental protection policies are priorities for sustaining the rural tourism value chain in this region.

Yet, these priorities depend on several other aspects related to protection of forests and pastures, responsible urban planning, infrastructural investments, investments in green solutions, innovative and digital solutions as there is lack of professionals in the sector. Achieving the priorities voiced by the rural tourism value chain will require committed, long term cooperation and coordination between local and national governments and its different sectors, moving beyond sector specificities.

Protecting the products from the region is highly required since there are fake ones on the markets, damaging the image of the producers. The process will be initiated from the local government and all producers who meet the quality standards will receive certificates. Institutions from the national level will be consulted and all quality standards will be respected.

Destination Management is recommended by the World Bank for North Macedonia tourism sector. However, the national government did not respond to the initiatives that are coming from the regions as well.

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Serra da Estrela PDO cheese "Cordilheira Central"

Catarina Esgalhado and Teresa Pinto Correia

Summary

Grazing in altitude pastures could be expected to link the Serra da Estrela PDO cheese to the mountain area. It has done previously. This PDO cheese is a highly valued product and is often considered as a development asset. Yet, socio-economic changes have led to a decrease in shepherds and sheep, and a move of summer grazing to lowland pastures, as well as a consolidation of family-based sheep producers into larger factories, and a fleeting connection between the value chain and the territory that gives it its name.

The depopulation and abandonment of the territory have led to shrub encroachment in previously grazed pastures, increasing fire risk, and a loss of the mosaic landscape and biodiversity value. Reconnection requires an integrated strategy that considers development, pastoralism, conservation, and fire risk management objectives. Cooperation among the six municipalities is crucial to establishing open paths, prioritising areas for intervention, and harmonising forestry and pastoralism practices.

Figure 12: Serra da Estrela sheep in common pasture on the central plateaux of Serra da Estrela

Key Policy Messages

- ☞ PDO products can be disconnected from their production territory and PDO branding does not secure the territorial assets related to the product.
- ☞ Incentives to pastoralism require integrated policy approaches – forestry and agricultural – that perceive the territory as a whole
- ☞ Extensive pastoralism sustains important services in mountain areas beyond provisional.

1. *Serra da Estrela PDO cheese and the mountain that gives it its name*

Cordilheira Central is a mountain range that extends over 700 km across the Iberian Peninsula. In Portugal, it forms its most important mountain range - Serra da Estrela. The landscape is diverse and influenced by human activities together with its biogeological characteristics. It holds high biodiversity, protected under a Natural Park, and is a popular tourist destination. Still, depopulation and abandonment of the territory have been leading to shrub encroachment on previously grazed areas, loss of the mosaic landscape and of important habitats, with increased risk of wildfires.

Serra da Estrela PDO Cheese is made exclusively with milk from autochthonous sheep breeds, produced in extensive or semi-extensive regime. Grazing in altitude pastures used to link the value chain of the

PDO cheese to the mountain landscape, but the production area extends well beyond the mountain area, to include lowland pastures in distances up to 30 km from the Mountain range.

The PDO certification is made at the cheese factory level. Socio-economic changes in the last decades have reconfigured the cheese value chain from a family-based operation, where men shepherded and women made cheese, to larger factories that buy milk from multiple milk producers. With a declining population, there are less shepherds and sheep, shepherds are scattered, and with increased availability of lowland pastures, transhumance is disappearing.

This PDO cheese is described in planning and strategy documents as the most important territorial asset of Serra da Estrela and is often sported as a key product for territorial development, with an increasing market value.

2. Value chain contribution to resilience and sustainability

Rural fires are a growing concern, and maintaining an open landscape mosaic is fundamental to contain fire risks and extreme fire events. Shepherds and sheep, through grazing and other clearing actions have been important actors in maintaining pastures and thus the landscape open. The historic connection and use of autochthonous breeds, well adapted to the Serra's pastures and terrain, created until a few decades ago, obvious synergies between the PDO cheese value chain and the territory. What is missing is acknowledging the landscape role of sheep grazing, related compensation schemes and creating an enabling environment for shepherds to continue to use altitude pastures.

Serra da Estrela cheese is a well-known and valorised product. Historically, it has been an important economic activity in the territory and production and demand trends, seem to indicate that it can continue to do so. There has been a trend of consolidation of the value chain, and larger cheese factories can dominate the market. There have been efforts by the producer associations and other entities for joint market strategies, but smaller cheese producers can have a harder time selling their product at a fair price. The value chain can create jobs and wealth for the territory but would likely benefit from mechanisms that better redistribute the added value along the chain.

3. Policy experiences

The PDO contributes to the preservation of autochthonous breeds and traditional knowledge, specified in the code of practice. However, since the PDO area includes lowlands and the availability of lowland pastures has been increasing due to declining crop production, its connection to the mountain area is weakening as transhumance declines. Currently, the PDO certification does little for the resilience of the mountain territory that names it.

The mismatch between the potential and actual contribution of the PDO does not go unnoticed. The municipality of Seia, one of the six within the Natural Park of Serra da Estrela (PNSE) and one of the 18 within the PDO production area, started in 2020 to support transhumance. This meant annual

cash support for those participating in the transhumance party. This connected the practice with tourism but also led a few shepherds to resume transhumance activities. This action involved identifying and talking with shepherds, as well as with landowners and commons to find suitable pastures and create access paths. A small, committed network emerged, led by the municipality officers. This initiative is still ongoing, and the municipality has recognized its relevance, increasing support each year.

The PNSE has been an important institution operation in the territory, contributing to the recognition of priority habitats and the integration of conservation networks. It was an important partner in the valorisation of the cheese, recognizing its relevance and connection with the territory. Nonetheless, the current sectorial policy approach led to a separation of conservation and agriculture, and thus of forestry and pastoralism. This has created tensions between the PNSE and residents and producers, namely concerning buildings and their restoration within the park area. Support infrastructures are crucial not only for the transhumance (such as shepherd's shelters), but also for the establishment of production units at medium altitude.

4. Recommendation for future policies

It is needed to reconnect the cheese value chain with the mountain area to preserve and revitalize altitude pastures and their characteristic landscape in Serra da Estrela. This can be achieved through direct incentives for transhumance, encouraging shepherds to use altitude pastures by implementing mechanisms like “altitude surcharges” or payment for results.

Yet, this should be within an integrated strategy that considers development, pastoralism, conservation, and fire risk management objectives. A landscape-based strategy for the entire mountain territory is crucial, moving beyond sector-specific policies and individual municipal efforts. An integrated approach should include:

- Integration between forestry and pastoralism: Most altitude pastures fall under the jurisdiction of the Natural Park or commons associations, which are primarily forest-focused, creating barriers to grazing. Harmonizing forestry and pastoralism practices is necessary to ensure these pastures are accessible for grazing, and thus maintained as open pastures.
- Territorial cooperation among the six municipalities in Serra da Estrela: Ensuring open paths for shepherds and animals to move within the mountain is crucial. Municipalities must collectively decide on priority areas to keep open, develop a network of paths and services, and establish market integration strategies. This cooperation will facilitate the movement of people and livestock, reducing land abandonment and encroachment.
- Dedicated compensation schemes that compensate shepherds for the ecosystem services they provide habitat preservation, fires risk control, landscape quality.

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Maçico Noroeste: Alto Douro Vinhateiro wines

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Summary

Wine has been produced by traditional landholders in the Alto Douro region for 2,000 years. Since the 18th century, its main product, port wine, has been world famous for its quality. This long tradition of viticulture has produced a cultural landscape strongly linked to the wine value chain, acknowledge by UNESCO.
The steep slopes that characterize the valleys and where grape is grown in terraces or vertical rows are part of a mosaic with woodland, olives, almonds and other fruit trees. In such a rich environment, wine production is intertwined with tourism.
Demographic changes are hampering the rural vitality of the area and the switch in grape production from family activity (in cooperatives) to large companies does not contribute to create qualified jobs. Therefore, qualified youth move out and migrants or commuters, cannot mitigate the loss of rural vitality.

Figure 13: Vineyards in the Alto Douro region. Source: https://www.cm-fozcoa.pt

Key Policy Messages

- ☞ Integration of policies among sectors and geographic scale is needed to reach inclusivity, resilience and sustainability.
- ☞ Material and immaterial infrastructures are need to allow young families to remain.
- ☞ Balance of power in using common goods should be assured.
- ☞ Investment in knowledge are essential to reach resilience and sustainability.

1. Alto Douro Vinhateiro wines and landscape

The study area is the Alto Douro Vinhateiro and the value chain is the wine of the Douro Demarcated Region (Alto Douro is part of), the eldest demarcated region in the world, since 1756. Alto Douro is also acknowledged by UNESCO as "World Heritage of Humanity" for Cultural, Evolutive and Living Landscape since 2001, together with another UNESCO World Heritage, linked to the cave engravings of Vila Nova de Foz Côa. This shows how relevant wine production is and used to be for the region, as the landscape has been moulded by winegrowers. On the other hand, this also shows the potential for synergies between wine production and cultural tourism, as well as the growing outdoor sport and leisure tourism, that can well be harmonised with agriculture and the enogastronomic offer. The Alto Douro Vinhateiro Region includes about 10,000 ha of vineyards, part of them still traditionally grown on steeply sloping terraces, large

enough for one or two rows of grapes, buttressed by walls of schistose stone. Most recent vineyards are grown in larger but steeper terraces or in vertical rows (up to 35%) that allow a certain degree on mechanization. In the valleys' landscape, vineyards (about 40% of the total surface) are part of a mosaic together with woodland, olive groves, spontaneous vegetation, almond and other fruit trees. Biodiversity is of value in the region, with several endemic species. The grape varieties grown are often autochthonous, with a share of international varieties. The farms are traditionally very small, but in the last years while small family scale winegrowers stopped their activity, large companies from the lower part of the Demarcated Region took over, buying large surfaces and creating large wine estates. The grape is processed into wines of acknowledged PDOs: Porto wine and Douro wine. The processing takes place in few cooperative cellars (fewer compared to the past), some private medium scale cellars, but the majority goes to large scale companies' cellars often outside the Alto Douro. Wines are marketed internationally.

2. The contribution of the wine value chain to Resilience and Sustainability

Alto Douro Vinhateiro wine production is strongly linked to natural resources (soil, water) and climate, as well as to the ecological infrastructure that enhancing biodiversity facilitates grape production. The increase and a relative intensification of vineyards on one hand causes concern for air and water pollution, due to pesticides and fertilisers used, on the other hand it is a tool to preserve terraces and vineyards landscape, even if different from the traditional one. To mitigate environmental impact, several winegrowers started to apply agroecological measures, with the aim to preserve functional biodiversity within and around the farm, decreasing the use of chemicals. Larger farms are investing also in precision management tools. Organic viticulture is growing.

Much more difficult is to face the demographic changes that are rapidly leading to fewer residents and the massive migration of youth, especially of young professionals who hardly find a qualified job in the region. Wine production is not offering many opportunities for local qualified professionals, as large companies make use of their own competencies (from the lower Douro area where the companies have their headquarters), while small companies or cooperatives have limited possibility to invest in qualified personnel. For medium and low qualified jobs in the vineyards, large companies employ seasonal commuters and/or migrants (often from Portuguese speaking countries) who live in the Region only during the growing season. On the other hand, in small scale grape production, profitability is limited and does not allow to create jobs. In both cases, manpower availability is already a problem that risks increasing in the coming years.

The fact that part of the value chain, especially in the case of large companies, takes place outside the region means that also large part of the added value goes outside the region, with a very limited sharing of economic benefits within local communities. It, at turn, depauperates local communities of basic services and further

increases the outmigration of educated young families in other regions/cities. The interaction between wine production and tourism may offer new perspectives to young professionals.

3. Policy experiences

Despite the demographic trends are clear since years, it seems that no large area territorial policies to react was put into place. There have been some private initiatives, from wine companies, to facilitate the integration of migrants into rural villages, often renovating traditional houses to host them. Nevertheless, the initiatives were not successful in the long-term since migrants, on average, moved out after few years, due to the lack of social services and the difficulties to integrate the whole families.

As a reaction, companies invested on commuters, providing transportation services and short-term accommodation. But also in this case, residents are not increased and, therefore, rural vitality continues to fade.

On the environmental perspective, the main policies impacting the area are the European CAP, especially the Rural Development Programme measures to support low impact management. Training and advisory are mainly provided by private initiatives, often implemented collectively by large companies.

4. Policy recommendations

The following points were identified as relevant for further policy development:

- Integration of policies considering agriculture together with tourism and other sectors and also integrating the National, Regional and local scales;
- Improve material (e.g., schools, hospitals) and immaterial (internet) infrastructures, to allow young families to remain.
- Strengthen the role of collective actions, through consortia, cooperatives or other forms of collaboration within and between sectors.
- Stronger support to ecological systems with funds but also with knowledge.
- Create a system to balance powers in the use of land and water.
- Secure investments in (environmental) education, research and innovation with a global approach.

Man's work in this landscape of rare beauty made the settlement of populations possible, and resulted in an evolutionary and living reality, proof of the past and a driving force for the future, strongly anchored in the optimization of natural and human resources and in the preservation of the environment.

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Reference

See the complete documents on the Maçico Noroeste wine value chain at https://www.moving-h2020.eu/

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Certified ecotourism "Southern Romanian Carpathians"

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Summary

Certified ecotourism is a form of sustainable tourism where the main motivation of the tourist is to observe and enjoy both nature and traditional local customs regarding nature. Well-suited for the sustainable development of mountain areas, certified ecotourism is effectively implemented in Romania by the Association of Ecotourism Romania.

The Zărnești-Piatra Craiului eco destination resilience and sustainability is threatened by a series of socio-economic issues: depopulation of the mountain area, land and traditional agricultural practices abandonment and uncontrolled and chaotic building development.

Territorial and inter-institutional cooperation are crucial for a better connection between diverse mountain value chains, for stronger mountain communities and for more resilient and sustainable mountain areas.

Figure 14: Măgura village – the focal point for the certified ecotourism value chain in Southern Romanian Carpathians

Key Policy Messages

- ☞ It is necessary to improve the connection between diverse, but complementary mountain value chains (e.g. certified ecotourism and the agri-food value chains).
- ☞ Fully operationalisation of the policy infrastructure is needed (i.e.: the Integrated Mountain Strategy, 9 Massifs Committees and the Mountain National Council).
- ☞ Supporting traditional agricultural practices and traditional local architecture is key for preserving the mosaic landscape.

1. *The first certified eco destination in Romania*

Southern Romanian Carpathians are one of the largest wilderness landscapes in Europe. Also known as the 'Transylvanian Alps', they host more than 1 million hectares of protected areas, and they have large areas of mosaic vegetation largely shaped by traditional farming and grazing practices.

The Piatra Craiului National Park is a high-quality tourist destination, characterised by a 25 km long limestone ridge (highest elevation 2.238 m) with deep gorges and caves, creating a unique mountain landscape highly appreciated nationally and internationally.

Traditional farming and grazing practices have been contributing to preserving the mosaic landscape, which together with the local traditional architecture, local agri-food

products and local cultural traditions represent the main natural, economic and cultural assets of the area However, depopulation and abandonment of traditional land and traditional agricultural practices, as well as uncontrolled and chaotic building development, impose a serious threat upon the resilience and sustainability of the area.

Zărnești – Piatra Craiului is the first certified eco destination in Romania and one of the 10 national eco destinations promoted by the Association of Ecotourism Romania (AER) under the 'Discover ECO ROMANIA' brand. Within the Zărnești – Piatra Craiului eco destination, a range of ecotourism services are offered locally in partnership with local businesses that have been certified by AER and the Piatra Craiului National Park Administration (PCNPA). These services include eco-tours with experienced local guides for observing the local biodiversity (i.e. large carnivores and local flora), specialist hiking trips for nature photography, low-impact mountain bike trails and small-scale/low-impact accommodation.

2. Value chain contribution to resilience and sustainability

Certified ecotourism is a concept based on nature and local culture in areas located inside or near protected natural areas. The main motivation of the tourist is to observe and enjoy nature and local customs.

Certified ecotourism services have been contributing to the sustainability and resilience of Southern Romanian Carpathians for the last 18 years through the conservation and protection of the natural environment (including here the large carnivores, that have an important role in this value chain), encouraging the development of small-scale businesses and the use of local human resources and contributing to the well-being of the entire local community.

The emigration of the local population and the ageing mountain population are greatly contributing to the abandonment of the agricultural land and of the traditional agricultural practices that are an integral part of the tourist experience: either by creating the mosaic landscape which represents the main asset of the area, or by providing the agri-food products necessary for an authentic tourist experience, which includes the element of understanding the local gastronomy. Furthermore, the depopulation of the area is threatening the safeguarding of the local traditions and customs of the Zărnești – Piatra Craiului eco destination.

These issues are further triggering the uncontrolled and chaotic building development in the area, including both buildings for touristic activities or 'second-homes'.

3. Policy experiences

The area studied is a hotspot for mountain tourism in Romania. The traditional rural identity of the area is threatened by the 'urban-type' over-development, which began in the early 2000s, once with the Special Accession Programme for Agriculture and Rural Development (SAPARD) programme financing of accommodation units in the area.

The Piatra Craiului National Park Administration was established in 1999 to protect and conserve the natural and

traditional values of Piatra Craiului National Park. However, the establishment of National Parks and their administrations was a top-down decision taken at the ministerial level, with little regard for the local communities' perceptions and/or understanding of the role of these administrations, which led to tense situations between the local community and the National Park administration. To address these conflicts, the PCNPA has been working with the local community for the last two decades to improve the relationship between the PCNPA and the local stakeholders through information, awareness, consultation and the development and implementation of an educational program for youth. Furthermore, PCNPA had a detrimental role in safeguarding the traditional local architecture, by developing and implementing a sustainable development guide that provides the regulations and standards that new buildings must comply with to ensure the perfect integration into the natural landscape. The guide is part of the Management Plan of the National Park, which recognises the important role of sustainable forms of tourism for the sustainability and resilience of the area.

4. Recommendation for future policies

Future policies for mountain areas should consider a better connection between the certified ecotourism value chain and the agri-food value chains, especially with the Mountain Product Optional Quality Term (OQT) and the Local Gastronomic Points concept.

The Mountain Product OQT is a quality scheme certifying the mountain origin of agri-food products (including both the production and processing stages). Romania has one of the highest numbers of registered products within this quality scheme, however, the scheme still needs to be better promoted among agri-food producers in more isolated and remote areas and among consumers, to ensure full benefits for both sides.

The Local Gastronomic Points (LGP) concept allows rural households to serve homemade dishes with ingredients from primary production, based on traditional recipes, to maximum 15 people per sitting. The concept provides an alternative stream of income for rural households and contributes to the safeguarding of traditional agricultural practices and local gastronomy while developing a stronger and more united rural community. As in the Mountain Product OQT, the LGP concept needs to be better promoted among rural areas that have tourism potential, as well as among national and international tourists.

These two specific actions should be an integral part of an integrated mountain strategy. Romania still must effectively implement its Mountain Integrated Strategy and fully operationalise the 9 Massifs Committees and the Mountain National Council, that should coordinate the sustainable development of mountain areas in Romania.

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Sjenica lamb PDO, Dinaric Alps, Sjenica – Pester plateau

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Summary

Sjenica sheep, autochthonous breed of the Sjenica/Pester plateau is a well-adapted breed for the harsh climate conditions of the region. It is characterized by quality meat, good milk yields and fine wool. The production of Sjenica lamb meat (PDO) is traditional, and it is one of the key value chains of the region, interconnected with other high quality product value chains – Sjenica cheese and stelja, both PDOs.

The Sjenica lamb value chain is deeply rooted in the tradition of the region, due to different social, economic and natural aspects. Being already a very important economic activity, the production of Sjenica lamb has a potential to be the driver and bring Sjenica to the international map of high-quality products. Still, many aspects bring vulnerability to this value chain – from endangered natural resources to high migrations, delicate political situation, and centralized national policies, not adequate for this specific region.

Figure 15: Picture of Sjenica/Pester landscape with natural pastures and sheep flock.

Key Policy Messages

- ☞ Sjenica lamb meat (PDO) and the interconnected products, are the main potential for regional development
- ☞ Co-creating policies and better living conditions with and for young people of the region is crucial for its survival
- ☞ Reaching sustainability of natural resources should be a long term goal
- ☞ Relevant actors from the local and regional level to be involved in co-development of important policies that can withstand "mountain proofing" of these regulations.

1. Harsh climate and rich natural resources shape the quality and reputation of Sjenica lamb PDO

The Pester plateau/ Sjenica, are well known for its natural beauty, tasty food and harsh living conditions. Highland of Pester is the largest and the highest karst field in the Balkans, and the life is marked by isolation, natural pressures, temperature extremes (from -35 to 40°C), but also cultural and national diversity of Muslim/Orthodox and Bosniak/Serbian communities, which make the unique blend of features. Although the area is rural and underdeveloped, its population is young compared with the rest of the country. Families are multi-generational, and the prevailing economic activity is agriculture, sheep and cattle production.

Sjenica lamb is a PDO. The fresh lamb meat from Sjenica sheep, a local autochthonous breed, its quality properties are rooted in transhumance pastoralist practices that take the best of natural environmental conditions, by nomadic/free range livestock system.

Three PDO products are protected from the area, beside the Sjenica lamb PDO, also the Sjenica sheep cheese PDO, and Sjenica stelja PDO (dried sheep meat).

In the last couple of years, the area became more popular as a touristic destination, especially for nature-based tourism, hiking, cycling, etc. However, the lack of infrastructure (especially the absence of regional waste management sites), the uncontrolled exploitation of peat, the uncontrolled illegal construction, and water supply problems are becoming significant threat to this area of a high natural value.

2. Value chain contribution to resilience and sustainability

The Sjenica sheep high resilience to the harsh weather conditions, and the suited natural resources, resulted in livestock husbandry remaining the main agricultural activity in the area.

The overall family and community dynamics was set to sustain livestock husbandry. Sheep farms, sometimes organised in family cooperatives, are the main units of production, registered as agriculture households. There are few meat processing companies, and small dairies in the Pester plateau and Sjenica. On-farm processing is traditional and the level of know how is high. Products are mostly sold on local and regional markets (South Serbia, Kosovo* and Montenegro), while there is a rising interest for export that used to be very prominent. The lack of registered processing facilities and undeveloped market information, product development and market presence, provide leverage to intermediaries and often leave farmers in a very vulnerable and passive position.

The Pester plateau is rich in natural pastures with different species and medical herbs, where sheep graze. This and the properties of autochthonous breed, results in high quality sheep meat and milk, as well as meat and dairy products.

The three PDO products are interconnected and part of the same production system. However, the value chain is insufficiently integrated and communication throughout different levels is weak, as well as cooperation and integrated management.

The main value and logic of the local community and production system is “resilience” – surviving the hardships to sustain the production and expanding the flock. There have been improvements that boosted the efficiency of the production (better fodder and stables), but the extensive nature of production, that is not dependent on externalities, enables sustainable agriculture in tune with natural dynamics. The overall logic is “resilience” includes:

- activation of external solidarity mechanisms,
- adaptation of agricultural practices to reduce pressures of pasture use and water deficiency,
- push for the development of the PDO effects through connections and synergies with other value chains in the same region.

3. Policy experiences

Along with the long-term declining number of Sjenica sheep, there are year to year fluctuations in the size of the flocks,

depending mostly on the prices, market demand, and feed supply (hay and fodder for winter). To provide the boost for the livestock sector, and to reverse the impacts of several risks, the national agricultural policy and rural development measures have been established. These measures are providing direct payments for the high-quality breeding sheep, granted for the animals with registered pedigree, (min 30 and maximum 150 heads) as well as fattening lamb. Only a in few years, the number of sheep doubled, as a response of direct payments per head (75 € per high quality sheep and 25 € per fattening lamb).

These measures resulted in the quick increase of the sheep number, as noted by the agricultural census of 2023, however, to ensure sustainable trend, this must be coupled by other structural improvements.

The collective intellectual property rights in the form of geographical indications/products of origin (GI/PDO and PGI), coupled with food quality policy have been established by relevant institutions, and is still in ongoing reform. This regulatory frame should suit to support better labelling and quality communication of high reputation food products and its intrinsic quality properties. Though there are three products with protected designation of origin (Sjenica lamb, Sjenica cheese and Sjenica stelja-dried meat), none of them are certified and controlled. This is related to the weak collective action and lack of coordination and integrative action capacity of the value chain.

There have been little activities and policy interventions aimed at organisational development and cohesion of value chain actors. Flexible food safety rules have been established for meat and dairy processing on the farm and in small establishments, but due to lack of information and investment support the effects of these measures are insufficient. This leaves Sjenica farmers and the overall value chain in the inferior role of supply of raw materials (mostly live animals) or, due to lack of the registration, out of the formalised market channels to valorise its premium products.

Farmer organisations that have been formed within the donor projects are not showing sustainability and lack continuous advisory and mentorship support. Overall, knowledge transfer facilities and infrastructure (particularly the Centre for the agriculture and rural development) have not received committed local support and are therefore unable to support the farmers community.

Little or no diversification efforts and ideas were strategically identified to link livestock production, nature and rural tourism and outdoor activities, with nature and cultural resources of the pastoralist lifestyle. These assets are not actively used for territorial branding and attracting visitors.

4. Recommendation for future policies

Overall awareness and attention to mountain regions need to be adopted by the policy and research framework.

Data is important - Interest in research and data collection needs to be established, to illustrate and justify the policy proposals and development scenarios. Data collection on all aspects of mountain socio-economic indicators and value chain organisation should be integrated in wider research

frame, joint with the specialised data collection.

Knowledge, skill building and training programs need to be continuous and structural, supporting established centres /institutions. Along with production and resource management, entrepreneurial capacities and mindset need to be nurtured through continuous learning and vocational trainings.

Interventions that support collective action can raise engagement – This includes development of organisational and business models that reflect the needs of mountain areas, support the leadership and facilitation in initiatives such as machinery investments based on collaboration, product certification and internal control, market information, strengthening group rules, management and collective dynamics. These models also should rely on wider mechanisms for exchanging ideas, solutions and good examples (through citizen forums, rural development, LEADER initiatives, or similar networks)

Facilitate improved access to investment support to optimize production and resolve the lack of manual labour in the future. Local authorities can improve access to rural development investment mechanisms by providing technical assistance, while simplified procedures for mountain areas can be considered by national and donor programs.

Improved space planning and usage that would further recognize such production as valuable despite its extensiveness and keep the space to nature and agriculture, but also acknowledge vulnerability to the management and extensive use of resources and climate change,

Sustainable land use practices to promote climate change adaptation and focus on improved feed supply, improve soil health, and enhance biodiversity is key for addressing climate change effects. Donors and national level need to build awareness of the fragility of mountain ecosystems and eco-pastoral practices.

Support establishing market mechanisms that can valorise product quality, biodiversity, tradition and other stakes of mountain areas etc. Foster social innovation and linkages with those who can open new marketing channels and direct communication to public.

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Bio-honey from Slovak Carpathians

Diana Surová

Summary

Honeybees are an essential component of the environment as pollinators of several food-producing plants and as contributors to biodiversity. Their disappearance would significantly threaten global food supply and human health. Honeybees are kept by beekeepers in Europe mainly to produce honey and other bee products that have been in demand for human consumption since ancient times. Due to the growing consumer demand for healthy foods, high-quality mountain honey is a popular product. Honey production is a traditional activity in Slovak rural areas and brings monetary and non-monetary benefits to local communities and society. However, honey production is susceptible to climate change and other ongoing changes. Solutions to these growing problems should include innovative and long-term strategies on the side of beekeepers and at multiple territorial and political levels. The MOVING project, located in the Slovak Horehronie region, helped identify numerous policy recommendations that could increase the sustainability and resilience of the high-quality mountain honey value chain.

Figure 16: Slovak Carpathian Mountains

Key Policy Messages

- ☞ Specific “mountain” policies
- ☞ Support biodiversity, ecological systems and practices
- ☞ Territorial planning
- ☞ Multi-sectorial, multi-level and long-term collaboration
- ☞ Innovative solutions for resilience and sustainability of mountain value chains
- ☞ Awareness

1. Bio-honey – a sweet challenge

Slovak Carpathians are part of the Carpathian region, Europe's second most extensive mountain system besides the Alps. In Slovakia, the Carpathians form a living environment for unique wildlife with vital biodiversity, important freshwater sources, and human culture. Agriculture and forestry, mainly, play a substantial part in the landscape of this region. Over the last decades, crop and livestock production has declined, and abandoned cropland lies fallow. Pastures in the Carpathians are especially vulnerable to the combined impacts of climate change and socioeconomic dynamics. Forests cover a large part of the Slovak Carpathians and are susceptible to drought and windstorms, triggering pest outbreaks. In this region, drought-induced problems can be expected to increase, adversely affecting agricultural and forest production, biodiversity, and other ecosystem services.

The value chains related to the Slovak mountains include mainly agricultural products such as cheese and meat, forest wood and non-wood products, medicinal herbs, horse breeding, and beekeeping. From the non-production economic activities, tourism and recreation are vital in the region. Apart from the popular active winter tourism, other recreational activities report an increasing demand all year round.

Honey production in the Slovak mountains and other rural areas is a long tradition. Compared to lowlands, the honey in the mountains gets higher quality due to extensive agriculture, pastures, meadows, forest land covers, clean water, and rich diversity of autochthonous plants, flowering in different periods of vegetation time and not being chemically treated. Bio honey production involves manual bee panel preparation from local resources, bees' winter feeding by their honey, and natural medicines for bees instead of conventional ones. These conditions result in lower honey yields than conventional production, making bio-honey relatively expensive and rare. All these specificities simultaneously bring low intensive practices of honey production and higher quality of all honeybee products.

One of the specificities in the Slovak mountains is honeydew honey, produced only in years with specific weather conditions, on average every five years. Its exclusivity allows the higher price of this honey on the market.

The honey value chain faces multiple challenges affecting bees' health and production. These challenges include drought, extreme weather, land use, and land management changes linked to socio-demographic changes, global biodiversity decline, and pollinator decline, among others.

2. Value chain contribution to resilience and sustainability

Bio-honey or high-quality mountain honey from Slovak Carpathians contributes to resilience and sustainability in multiple ways, among others:

- Presents a demanded quality product based on high-quality local environmental conditions.
- Represent a short supply chain due to direct sales from producers to consumers, involving a beekeeper and his family.
- Provides additional income to mountain rural families.
- Helps to promote mountain rural localities for tourism and recreation.
- Preserves local skills and traditions and development of new knowledge and skills adapted to local conditions.
- The main actors of the value chain are small – and medium-sized beekeepers, which contribute, among others, to the territorial spread of beehive colonies across a territory.
- Ensures lifelong environmental education and awareness about territorial interconnectedness between biodiversity, bee health, and environmental changes.
- Allows feelings of close contact with nature (e.g., positive effects on mental health) and valuable “way of life”.

- Safeguards the local genetic basis of bees.
- Contributes to multiple essential ecosystem services, particularly pollination and biodiversity.

3. Policy experiences

Some of the already existing and successful strategies in beekeeping in Slovakia are:

- national plan for beekeeping support,
- registration of bee colonies,
- production control and product quality control, compensations for damages on beehives caused by wild animals,
- education of beekeepers - beekeeping journals, seminars, and workshops,
- beekeepers' associations helping with educational activities and administration work regarding some subsidies for beekeepers.

Unsuccessful experiences mainly relate to agricultural legislation created without consultation with beekeeping experts. For example, rules for meadow moving procedures and time schedules often go against bee-friendly practices.

Occurring climate and other global and local changes bring new challenges to beekeeping and require new approaches and practices that beekeepers need to adopt if they want to succeed.

4. Recommendation for future policies

Future policies should:

- Recognize the specific environmental, economic, and social conditions for living and producing in mountain territories. Mountain areas offer conditions for multiple high-quality products, services, and benefits valuable to society. At the same time, the quantity of production is often lower than in the lowlands.
- Develop strategies for water retention in the landscape, e.g., slowing down water outflow from slope areas, creating water reservoirs, etc.
- Attract all generations and diverse professions to live and produce in mountain areas and support communities' creation and maintenance.
- Support biodiversity and monitor its quality and efficiency; support landscape diversity through small-scale farming, ecological farming, pastures, meadows, and nature-close forest management, resulting in rich undergrowth for bee pasture.
- Encourage multi-sectoral and multi-level collaboration to increase mountain dynamics.
- Support public awareness about bees, beekeeping, local quality products, and their certification, and build consumers' trust in local products.
- Support elaborating on a national "help scheme" for periods of drought or other unfavourable conditions causing insufficient forage for honeybees. These extreme conditions are expected to be more frequent due to climate change. Like agricultural production, honey production depends on weather

conditions; not all years are favourable for honey production.

- Progress in certification of honeybee products, create regional brands, fair trade practices including small producers, bio-production, and fair prices.
- Support multi-functional, ecological, and small-scale beekeeping. Small-scale beekeeping, in practice, better adapts to an ecological way of beekeeping, can also contribute to more evenly distributed bee colonies across a territory, and can be favourable also for the cultural ecosystem services, such as an increase of public awareness about the bees' importance, by activities involved in agrotourism, bee-farm educational visits, workshops and so on.
- Territorial planning and management should collaborate with beekeepers to choose adequate locations and density of honeybee hives according to forage availability for bees. A good collaboration between farmers, foresters, and beekeepers to achieve accessible and diversified fields for bees would be helpful locally. For this goal, all involved actors need to be educated about the importance of bees.
- Encourage local beekeepers' cooperation in simultaneous medical treatment of bee colonies to avoid the transfer of diseases.
- Create a collective brand that guarantees quality, distribution, marketing, and fair price.
- Support direct sales and short supply chain – "traditional" breakfasts (local honey, butter, and bread) in kindergartens and schools – joining consumption with education.
- Veterinary assistance and frequent health checks of bee colonies during the summer
- Safeguard the genetic adaptation of honeybees by allowing only local bee mothers.
- Preparation of new legislations (e.g., agrotechnical practices) that could somehow interfere with honeybees or other pollinators should involve beekeeping experts.
- Improve awareness of existing supports and subsidies for all beekeepers; simplify administration.
- Support innovation in beekeeping to be resilient to climate and other changes.
- International collaboration in research and practice in eco-beekeeping; tutor young beekeepers; monitor bee pasture quality.
- Set rules for honey origin indication on products to safeguard consumers' awareness and to prevent the transfer of adulterated and imported honey to the market.

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Organic Olive Oil "Betic Systems"

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Summary

The olive tree is a crop with a long tradition in Andalusia. It has a notable presence in the mountainous areas of the interior of the provinces of Jaén and Córdoba. The characteristic traditional management of these crops, with steep slopes and high varietal diversity, has seen in recent decades how organic and origin schemes certifications attempt to compensate for the high production costs and inherent management difficulties with their valorisation measures. Betic Systems have seen a constant increase in the production of olive oil certified as organic over the last two decades. Together with others that may be tried, both strategies can alleviate the risks of abandonment of crops in mountain areas with steeper slopes and mechanization difficulties. They can contribute to the development of more sustainable agricultural policies and the fight against climate change.

Figure 17: Olive trees in a typical Betic System landscape.

Key Policy Messages

- Organic production
- Land abandonment and sustainability loss
- Depopulation and social crisis
- Rural tradition
- Landscape territorial identity
- Common Agriculture Policy

1. Organic Olive Oil the driving force of a unique territory

The Organic Mountain Olive Oil Value Chain describes the activities from olive cultivation to processing, distribution, and marketing. It also involves soil maintenance, biodiversity, and creating by-products like compost and energy as part of the cultivation process having a direct impact on the local way of life in the area. The value chain analysis focuses on three municipalities in the Betic mountain ranges of Spain: Carcabuey, Priego de Córdoba (both in the Priego de Córdoba Olive Oil Designation of Origin), and Zuheros (in the Baena Olive Oil Designation of Origin). Andalusia, particularly the south of Cordoba and the Jaen province, are significant for organic olive farming. The mountain olive groves in our area, located on steep slopes (25-30% and up 35% in some cases) making accessibility and mechanization more complicated, and at high altitudes, face challenges from climate change, leading to reduced rainfall, temperature changes, and difficulties in managing traditional practices, which threaten biodiversity and the environment. These challenges are not only affecting the cultivation process but also the social and

economic aspect as the aging population is increasing which leads to an inevitable abandonment of the crops and because the costs of production are not compensated the market access and the price premium for organic certification. These problems lead to severe depopulation trends especially in the municipalities of Zuheros and Carcabuey.

2. Value chain contribution to resilience and sustainability

To optimize the contributions of the value chain to the MRR, several potentialities require attention. Key to preserving the unique environment of the Subbéticas Cordobesas is maintaining and improving environmental practices. Improved land-use and water management policies, coordinated by local and national authorities, can prevent soil erosion and help preserve scarce water resources, contributing to the preservation of biodiversity and ecosystems. Despite these benefits, some challenges, such as inconsistent policy application across territories, have led to varied compliance levels among farmers.

Economically, the diversification of the value chain is crucial for local communities to create new opportunities. Market access and certification of mountain products are essential to enhancing profitability and competitiveness for smallholder farmers, who must navigate market fluctuations. Although these initiatives have bolstered economic resilience, obstacles like fluctuating market demands and the high costs associated with maintaining organic standards have limited broader involvement from local communities.

Socially, rural areas benefit from strong community ties that support collective decision-making, social cohesion, and cooperative structures. These facilitate environmental actions such as circular strategies for by-product use and foster collaboration across the value chain, reducing costs and enhancing mutual benefits. Such collaborative efforts can also empower young and women producers through capacity building and training resources implemented through CAP mechanisms.

Innovative solutions and collaborative approaches are essential for overcoming these barriers and fully exploiting the potential of the organic mountain olive oil sector in the Sierras Cordobesas. By implementing climate-smart practices and fostering economic diversification through collaborative and short-circuit collaborations, the value chain can continue contributing to the resilience and sustainability of the Sierras Subbéticas Cordobesas.

3. Policy experiences

The CAP provides crucial subsidies to support financial stability for olive growers in Andalusia. These subsidies include direct payments, rural development programs, and market measures to enhance competitiveness and sustainability in agriculture. Additionally, Andalusia benefits from local and regional development funds, stimulating economic activities and improving infrastructures for local olive producers.

Successful outcomes include increased financial security for olive producers through CAP payments and improved infrastructures

from regional development programs, reducing post-harvest losses. However, heavy reliance on subsidies reduces innovation initiatives and self-sufficiency among local producers, while administrative burdens can also limit access to funds for smaller producers.

Social policies focus on rural development programs to enhance quality of life in rural areas, with impacts on social stability. At the EU level, CAP policies address social concerns such as gender equality, support for young farmers, and improving living conditions in rural areas.

Environmental policies at the local level promote sustainable farming practices and biodiversity conservation, leading to increased biodiversity and soil preservation. However, resistance from farmers due to perceived higher costs of sustainable practices poses challenges. National environmental policies align with international commitments to combat climate change, resulting in reduced use of harmful chemicals and growth in the organic olive oil market.

Policy changes could impact the olive grove value chain, such as reduced CAP funding potentially leading to job losses for smaller producers. Enhancing administrative efficiency and investing in education and health could improve outcomes. Overall, coordinated and well-implemented policies are crucial for long-term sustainability and prosperity in the olive sector; therefore, continuous monitoring, evaluation, and adaptation of policy measures are necessary to address the emerging and enduring challenges, ensuring resilience and sustainability of the MRR.

4. Recommendation for future policies

As described previously, there are some important leverage points that EU policy makers can act upon to foster sustainability and resilience for mountainous regions.

First, there is an urgent need for policies enhancing organic practices to mitigate challenges due to climate change such as drought and erosion. As so, capacity building inducing innovation through training programs and organic-focused research should be supported by CAP policy adjustments allowing producers to adapt to higher possible costs of soil maintenance including subsidies for water-saving technologies, soil conservation methods, and biodiversity preservation efforts.

In terms of economic resilience, specifically for smallholders, there is a great need for the recognition of Optional Quality Term for mountain products, to ensure a specific mountainous certification and therefore a better recognition for smallholders and globally for mountain producers to be able to access the market in a more stable way. Provide financial incentives, such as subsidies and grants, to encourage the development of value-added products and diversification into tourism activities related to olive farming, helping to stabilize rural incomes is also of great importance.

Furthermore, improving accessibility and mechanization in mountainous olive groves by investing in infrastructure improvements, such as better road networks and advanced agricultural machinery designed for steep and challenging terrains would help farmers in the value chain.

On the local level, regional agencies need to implement continuous monitoring, evaluation, and adaptation of policy measures to address ongoing and emerging challenges, ensuring the long-term viability and prosperity of the region.

Another potential recommendation would be to promote community engagement by funding community-led environmental projects and supporting local cooperatives through the development of cooperative structures and collective decision-making processes. As well as implementing continuous training programs on modern, sustainable agricultural practices, business management, and product development to empower farmers, particularly youth and women.

Finally, establishing a robust system for monitoring and evaluation to assess the effectiveness of policies and practices, facilitating timely adaptations based on empirical data and emerging challenges in the sector.

These policy recommendations aim to address both the immediate and long-term challenges facing the value chain, ensuring its growth and sustainability within the MRR.

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Sierra Morena: Iberico Ham "Los Pedroches" PDO

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Summary

Los Pedroches PDO Iberico Ham value chain has been analysed in the Sierra Morena Mountain Region. Iberico ham is produced with Iberico breed pigs raised in dehesas and fed with acorns and natural products during the fall season. Feeding and exercising derive into (unsaturated) fat marbling, providing a delicious and healthy product that reaches a very high price in the market, being considered a luxury product consumed during special occasions (Christmas, weddings) and fine restaurants. The sustainability of the Dehesa ecosystem and ham production depends on consumers' willingness to pay a premium price. Climate change (affecting acorn production), generational renewal, and lack of skilled workers might impact the future of this value chain and, consequently, the dehesa ecosystem. Policies must recognise dehesa's singularities and subsidise it accordingly, ensure fair PDO labelling, prevent frauds, raise consumer awareness of the unique ham characteristics, and enhance the attractiveness and wellbeing of these mountain areas.

Figure 18: Iberico pigs in Sierra Morena Dehesas . Credit: Javier Moreno

Key Policy Messages

- ☞ Flexible policies
- ☞ Recognition of the uniqueness of the landscape and product
- ☞ Willingness to pay premium prices
- ☞ Transparent labelling and fraud control
- ☞ Recognition of the public goods and services provided

1. *Iberico Ham: Taste the Flavor, Sustain the Dehesa*

Sierra Morena is a medium-high altitude mountain range located in the South of Spain. Dehesa is one of its most distinctive landscapes, forming unique savannah-like pastures as a result of a long history of traditional management practices. This multifunctional agro-silvo-pastoral system, with holm and cork oaks as the main tree species, can combine agriculture, forestry, and grazing sustainably (Bélair et al., 2010) and is considered a High Nature Value (HNV) farming system (Pinto-Correia et al. 2018). Iberico ham is produced in these dehesas from Iberico-breed, acorn-fed pigs. This high-quality product value chain is the most profitable dehesa product, being nationally and internationally recognised for its health benefits and exceptional taste.

MOVING has analysed the value chain of PDO Los Pedroches Iberico ham in depth. The Iberico PDO certification ensures the product's territorial identity and specific standards related to sustainable livestock density on land and the pigs' genetic breed. For the ham, to achieve premium quality, it is

essential that the pigs are primarily fed on acorns and pasture during the fall season while freely roaming in the Dehesa. Meeting these conditions ensures a top-quality product and maintains the ecosystem's balance.

To be labelled as PDO Los Pedroches, the pigs must be 100% Iberico breed and extensively graze in the Dehesa. The highest quality is the black label (100% pure breeding, 1 pig per hectare and 2-3 months feeding in Dehesas). The final product's quality depends on the pigs' wellbeing and the landscape's sustainable management. Dehesas and Iberico ham production is associated with animal welfare, scenic landscapes, sustainability and collective identity.

2. Value chain contribution to resilience and sustainability

Los Pedroches PDO Iberico ham is a very regulated sector. The production is organised in small farms, small-scale ham drying plants, and a big cooperative that also owns the slaughterhouse. This social fabric is essential to maintain social sustainability. The PDO regulation limits the number of pigs per hectare, ensuring environmental sustainability of dehesas. The premium price maintains economic sustainability by providing jobs and incomes, supporting traditional practices, and anchoring the population to the land.

Traditional cultural practices deeply rooted in the territory, and across generations created a sustainable relationship between the product and ecosystem conservation. Given the long history of co-development with the HNV system and the unique socio-cultural and biophysical interconnections, the Iberico ham value chain is essential for dehesa sustainability and socio-economic development, generating significant economic benefits for the region.

However, future resilience is affected by several factors. Iberian breeds are less productive than other breeds, dehesa is a very special ecosystem that cannot be reproduced anywhere, and an extensive rearing system means a low carrying capacity by hectare. In addition, quality hams need a long curing process (up to 4 years), meaning long turnover time and high risks of the drying and maturation of a natural product. Other threats derive from climate change effects (droughts, rising temperatures and diseases affecting tree health, density, and acorn production); overgrazing in non-PDO farms; and social problems such as a lack of generational replacement, difficulties for newcomers to entering the business, and a heavy burden of bureaucracy and regulations. Moreover, family businesses often have limited resources or skills to implement innovative management and processing approaches.

3. Policy experiences

Overall, PDO regulations protect the product and support premium prices. However, powerful external industrial interests push to make these regulations laxer and permit different products, not following all the traditional rules of Iberico ham production, to be marketed as such.

European policies, such as the CAP, do not recognise Dehesa's uniqueness. Agriculture

policies subsidise pastures, and environmental policies protect trees. Hence, the Dehesa ecosystem is fragmented by public policies, and farmers receive lower subsidies. Generational replacement incentives are not attractive enough for young people. Territorial service provision policies for rural areas are based on the number of inhabitants, leaving unpopulated areas poorly serviced. Limited access to connectivity and digitalisation worsens the situation.

4. Recommendation for future policies

Flexible policies.
Policies such as the CAP, forestry policies and Iberico ham regulations should be adaptable to the unique characteristics of the Dehesa landscape, recognising it as a distinct hybrid ecosystem with both productive and anthropized forest qualities.

Remuneration for ecosystem services.
Ecosystem services provided by the dehesa, such as carbon sequestration and biodiversity preservation, should be recognised and remunerated.

CAP eco-schemes.
The eco-schemes should offer payments for the maintenance of these areas and encourage sustainable practices.

Clear control and labelling standards.
The quality standard for Iberico ham should closely align with traditional production practices. Clear product categories must be defined to provide consumers with transparency and combat fraud in product marketing.

Adequate management of genetic resources.
The genetic book of the Iberico pig breed requires adequate management and control to protect the rights of small producers and facilitate the protection and genetic improvement of pure breeding.

Support for local products and services.
Public institutions should actively support and promote the consumption of local products, strengthening territorial identification and added value.

Access to basic services.
Access to healthcare, communication, education, and culture is vital for rural settlement and generational renewal.

Digitalisation.
Rural areas require improved digital infrastructures and support for the ageing population to access and use digital technologies. Digitalisation can enhance traceability and quality assurance in Iberian ham production by using remote sensors for animal monitoring and infrared systems for product origin verification. It supports dehesa sustainability through early pest and disease detection and acorn harvest forecasting. Interconnectivity of digital systems to manage livestock is also necessary.

Research and knowledge transfer.
Increased research and knowledge sharing on the management of dehesa is crucial. Sharing local and academic knowledge is necessary for advancing towards a more sustainable, resilient, and valued Sierra Morena territory.

Inclusive and long-term policies.

Policies that impact mountain areas should be long-term policies that involve various territorial actors and promote practices to enhance sustainability and resilience in the Sierra Morena landscape.

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Vignerons de Huesca in Spanish Pyrenees

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Summary

The region of Hoya de Huesca is a transition zone between the pre-Pyrenean mountains and the Ebro valley. A newly reborn mountain wine value chain is now in its first development stages. Progressive depopulation and labor shortage have pushed farmers towards a dominant grain monoculture system, though not competitive at national and global scale. Vineyards were abandoned to make room for less demanding crops. Recently, some farmers decided to replant vineyards in the area, taking advantage of climate change. Viticulture and wine production remains marginal for Huesca, but it is the only farming activity that grants sufficient income to farmers and may help the social revival of villages. The peculiarity of this reborn wine region is the absence of external investors, while the initiative relays on few entrepreneurial local or neo-rural producers, gathering actors along the entire value chain, setting synergies with tourism and creating quality brands for the development of the whole territory. The community interaction is one of main feature of the value chain.

1. *Mountain wine production by Vignerons de Huesca: young but promising Value Chain*

The region of Hoya de Huesca is a transition zone between the pre-Pyrenean mountains and the Ebro valley. The Huesca region is in the so-called “depopulated Spain” (España vaciada). About half of the province’s surface is flat arable land occupied by intensive culture of cereals and animal breeding.

Figure 19: Winter landscape with Bodega Edra vineyards

Key Policy Messages

- ☞ Attract younger generations of professionals to live and work in mountains.
- ☞ Develop infrastructures.
- ☞ Easing the administrative burden on farmers.
- ☞ Uptake of economic diversification opportunities.

Mountain wine production in the Huesca province is a relatively young value chain but based on a strong historical background. Progressive depopulation and the shortage of labour have pushed farms toward a dominant grain monoculture system, which is not competitive on the national and global markets. Vineyard production has been reduced to make room for less demanding crops. Recently, some farmers have decided to replant vineyards in these mountainous regions, trying to take advantage of the benefits offered by climate change.

The community synergy and interaction are among the main features of the value chain.

The area has a high level of vulnerability caused by abandonment, emigration and climate change.

2. Value chain contribution to resilience and sustainability

The Wine production in pre-mountain areas is a traditional activity developed along centuries. It established a sustainable relationship between natural resources exploitation and the human communities needs and their culture. Hoya de Huesca, the door from Pyrenees, since Roman's time, have therefore contributed to the management of forests and water basins essential for downstream activities and ecosystem services. Vineyards are a clear example where traditional productions innovated for facing contemporary market, so allowing local population to stay in places where it is possible to develop a virtuous relationship between nature and human activities with both local and systemic economic and environmental advantages. It allowed the development of resilience initiatives, fit to face contemporary challenges (environmental, economic, etc.).

Local wines and foods with a traditional character or image are often perceived by consumers as of higher quality. This region has maintained ancient genotypes and traditional recipes of typical food specialities.

Nowadays, the combination of geographical origin and typical food is a useful tool to increase the touristic appeal of the area, if supported by acknowledged high quality standards. Information on the origin, intrinsic properties (e.g., nutritional value) and sensory traits can be conveniently explored as tools to be combined for communicating typical food quality.

The value chain is a virtuous example of the combination of traditional and innovative productions for the contemporary market, allowing the population to integrate agricultural incomes with other economics activities. Up to 50% of activities of the value chains take place in the area and up to 70% of value generated by wine production stays in the territory and the local community.

3. Policy experiences

The use of National and European funds offers an opportunity to develop and support such initiatives and to replicate best practices. At the same time, the complex procedures for accessing European funding and the need to identify elements of innovation in response to contemporary challenges are limiting factors, requiring skills that are often not present among the actors in the area. This often leads to the fact that only large industries and big private companies can become direct beneficiaries of different policy initiatives.

4. Recommendation for future policies

Economic actions:

- Subsidies for interesting projects that bring the added value for the territory.
- Review of environmental standards and easing the administrative burden on rights and permits, easing environmental regulations for business and pioneer settlements for the first years after establishment.

- Tax incentives for entrepreneurs and deductions in social security contributions.
- Investment in infrastructure such as roads, ruts, electricity and quality water network, sewerage, internet, broadband, digital fibre, social networks, leisure and cultural centres, playgrounds, spaces for families, restaurants, pharmacies, grocery stores.
- Investment in the communication and dissemination of private projects to be undertaken through common enterprise brand efforts.
- Creation of interpretation centres of agriculture in general and especially of mountain viticulture subject in rural areas.
- Legal definition of a new category of mountain and/or landscape wines and provide free planting rights for young farmers willing to join at the rural territory.
- Facilitate the substitution of less profitable crops with vineyards, which can also facilitate the control of forest fires.
- Creation of CAP's measures that affect producer farmers instead of landowners.

Social actions:

- Organization of courses related to mountain wine projects and investment in solvent rural training centres.
- Facilitate the arrival of foreigners to rural territories.
- Training in Research, Development and Innovation for the business network, especially young entrepreneurs.
- Construction of public housing at affordable prices and creation of autonomous and pleasant residential areas. Aid for social rents and the formation of social cooperatives.

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Mountain grain in the Grisons Alps

Carmen Forrer and Isabel Jaisli

Summary

The mountain grain value chain represents a traditional highland farming practice enhanced by innovative approaches to new production methods and marketing schemes. Mountain grain cultivation diversifies the region's traditional animal agriculture with sustainable plant products. However, the value chain faces challenges such as difficult growing conditions, and the lack of specific infrastructure (e.g. mills, silos), skilled labor, or adapted seeds. Policies to address these challenges encompass innovation, financial support and investment, education, and connectivity.

This policy brief aims to describe a summary of the results collected in the region during the MOVING project and make policy recommendations for the future to increase resilience and sustainability.

1. Scaling heights: Mountain grain cultivation in the Swiss Alps

The Grisons Alps – ranging from around 200 to over 4'000 m.a.s.l. – form the entire south-eastern part of the Swiss Alps. Grisons is both the biggest canton of Switzerland and the one with the lowest population density with around 28 people per km^2. The most important economic sectors are energy production (mainly hydro power), tourism, secondary industry, and agriculture.

Figure 10: Malting barley and wheat harvest in Tartar (around 990masl), source: still from Cuci-Hof, 2020.

Key Policy Messages

- ☞ Education, training, and advisory service.
- ☞ Infrastructure improvement.
- ☞ Financial support and investments.

Agriculture in the Grisons Alps is demanding. In higher regions, growing seasons are up to two months shorter than in the valleys and yields are comparatively lower. The poor accessibility and steep slopes are challenging and require special equipment and infrastructure as well as a lot of manual labour. Nevertheless, agriculture has a long tradition in the Grisons Alps and plays a major role in forming the cultural heritage and landscape.

The agricultural production in the area is highly dominated by livestock production, making use of the abundant grassland resources. However, one-sided business models (like a focus on livestock) have shown to be less resilient under changing environmental, political, societal and economic conditions. In contrast, diversification enhances the ecological, socio-cultural, and economic value of the

region in a way that is enriching for farmers and many actors.

Plant production, such as grain, can be an attractive diversification for farmers in the Grisons Alps. The Gran Alpin cooperative provides a prime example of the diversification of traditional farming practices at high altitudes. The cooperative plays an important role by managing the mountain grain production in the Grisons Alps. It was formed in the 1980s and over 100 farmers count as member today. The value chain focuses on the production and distribution of premium organic cereal products such as pasta or beer, which are popular with both private customers and retailers.

Our research has shown that infrastructure in the farming (small machinery) and processing stages, availability of site-appropriate seeds, and the current support for livestock production in the region are the main factors holding back grain production on farms. The main problems of the processing facilities are the small volume, high variety of grains, and the insufficient local infrastructure. In addition, difficult logistics and long transport distances due to the remote location of the farms, as well as a lack of qualified staff in the processing stages, affect the productivity of the value chain.

Success factors have been the cooperative's drive, partnerships with local processors and retailers, as well as premium pricing through organic and regional branding. The challenges of marketing are taken on by the cooperative on behalf of the farmers, which reduces the effort needed to increase grain production or even start it in the first place. The value chain has high demand and the potential to contribute significantly to local sustainability and economic, socio-cultural and environmental value creation, but requires investment and further support strategies to maintain its position.

Overall, this value chain shows that plant-based value chains combined with livestock farming are visionary in mountain areas and that innovative cooperative projects can accelerate development by combining traditional approaches reinvented for current trends, so called retro-innovations.

2. Value chain contribution to resilience and sustainability

As described in the first section, the challenges facing the MRR are related to both socio-economic factors and the natural environment. The mountain grain value chain is one way for the MRR to produce alternative agricultural products that do not rely on livestock farming. The production of niche products or products where the market is not yet saturated can generate significant additional value for the MRR. This can be achieved, for example, by promoting innovative products. The mountain grain value chain has great potential to increase value creation in the Grisons Alps, create jobs, and thus reduce the emigration of young people. Gran Alpin products are in great demand, as the trend in Switzerland is increasing towards local, artisanal, and organic products.

Furthermore, it is well known that livestock farming is a major contributor to climate change. While alpine grassland-based extensive livestock production is comparatively "sustainable", alternative plant

production is additionally favourable. Also, the mountain grain value chain offers the chance to positively meet the threat of climate change by choosing the right grain varieties and profiting from warmer temperatures.

However, there are several obstacles that we have been able to identify so far to achieving sustainable development of the MRR. The most important obstacles are socio-economic. There is a lack of infrastructure along the growing value chain and investments are not possible either for financial reasons or, more often, because there is a lack of labour power, time, and knowledge.

One of the most pressing infrastructural challenges is at the processing stage, particularly due to the limited number of mills and storage silos in the region. The area has three small traditional mills, but all are operating at their capacity. Larger, more commercial mills often lack the specialized equipment required for processing some of the rarer grains, such as traditional rolled barley. Storage also presents a significant issue. Mountain grain farmers produce relatively small quantities of each variety, necessitating separate storage for each type. This quickly exhausts the available silo capacity. Additionally, the grain collection points are typically owned by large companies that show little interest in storing such small quantities, further complicating the storage situation for these farmers.

While the Gran Alpin cooperative coordinates and does administrative work, there is still little exchange of knowledge within the network of the mountain grains value chain and especially not with external partners.

Finally, there are also natural obstacles. As already mentioned, the persistent dry periods are a problem. But almost more important are the constraints imposed by the nature of the landscape. Currently, the market demand for Gran Alpin grain is greater than what can be produced. With a strong orientation towards livestock production, only few farmers are currently interested to diversify their production through arable farming.

We hope that with our value chain analysis we can show the importance and potential of this value chain for the region to put it on the political agenda and convince bigger players to support these mountain entrepreneurs. This value chain shows how innovative projects can accelerate development and are often mixed with originally traditional approaches that are reinvented for current demands.

3. Policy experiences

The challenges faced by agricultural producers in mountain areas have led to special support to agriculture in mountain areas by the federal government. This includes higher contributions for the construction of agricultural infrastructure, higher direct payments for keeping livestock in difficult terrain, and slope contributions. Farmers of the cooperative Gran Alpin also received additional financial support from the cantonal government for growing mountain cereal, in addition to the State direct payments.

However, agricultural policy was identified as one of the key constraints to transformation. Current support is heavily biased towards livestock production. The same orientation is reflected in agricultural education. Few incentives and trainings are currently provided for mountain grain production. In general, transitions at farm level face several constraints, as they require know-how, financial investments, and additional work. There is often a lack of framework conditions to support farmers to innovate.

4. *Recommendation for future policies*

During the MOVING project, observations were shared that provide opportunities for transformation, including success stories of pioneers, changes in the support system, collaborations and research that foster innovation, but also the opportunity to build on local traditions.

These are the pressing recommendations for the future:

- **Education, training, and advisory service.**

Changes in agricultural education as well as in the processing stages are needed to provide farmers and other skilled labour with innovation skills and the know-how needed for diversification and the establishment of new production systems. Increasing collaboration with other value chains and actors in the region to leverage knowledge and resources can further promote the value chain.

- **Infrastructure improvement.**

We recommend the adaptation of infrastructure, especially in the processing and storage stages of the value chain. Well-functioning processing facilities and storage silos for small quantities are crucial for the value chain. At the farm level, adequate machinery for mountain grain production and well-established transport logistics are needed. Innovation in these areas reduce costs, increase efficiency, and eventually improve product quality.

- **Financial support and investment.**

This recommendation addresses financial support to both individual actors and collaborative groups, to encourage and explore innovative, mountain-specific practices. In addition, direct financial support for the introduction of machinery and technologies adapted to the value chain, aims to increase attractiveness and resilience. Ensuring access to funding mechanisms and credit facilities for farmers and other stakeholders will enable essential investment in infrastructure development.

Eventually, agricultural policies need to be reoriented to allow for greater flexibility, ownership, innovation and openness to mountain crop production. Innovation centres, pioneers and research will also play an important role in this process. In addition to the supply side, adaptations on the demand side are also needed, e.g. incentives for local products through increased availability, marketing or pricing strategies. Specifically building on local traditions and identities will be an important strategy to guide future demand.

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Tête de Moine cheese PDO

Dominique Barjolle and Isabella Maglietti-Smith

Summary

The Swiss Jura region is characterized by mountainous terrain and the tradition of high-quality artisanal production of Tête de Moine PDO cheese. With its unique limestone composition and mosaic landscape of forests, pastures, and arable land, the Jura region faces challenges like fluctuating rainfall and summer droughts impacting fodder and forest health. It contributes to the region's economic resilience and sustainability. Despite historical challenges like milk price declines and high production costs, the Tête de Moine PDO cheese supports the local economy by stabilizing milk prices and generating substantial employment and revenue. Future policies should aim to simplify and integrate agricultural regulations to enhance regional resilience. This includes establishing a unified policy framework to address climate change impacts, supporting innovative and sustainable projects, and promoting consumer awareness and sustainable practices. Food policies combining agriculture with food-related issues, with adaptive forest, spatial planning, environmental, and energy policies, are essential. Cantonal policies should prioritize climate resilience, support training and innovation, and streamline administrative procedures to bolster the Tête de Moine PDO value chain against current and future threats.

Figure 23: Tête de Moine PDO cheese cows in the Jura mountainous region.

Key Policy Messages

- ☞ Integrate and Simplify Policies: reduce interventions and enhance coordination and resilience against climate change.
- ☞ Support Sustainable Innovation: Encourage projects related to climate impact, energy use, biodiversity and resilient infrastructure in the Tête de Moine value chain.
- ☞ Promote Training and Awareness for resilient agricultural practices, and boost consumer awareness and support for sustainability efforts.

1. Tete de Moine PDO cheese and the mountain that gives it its name

The Swiss Jura is a medium-altitude mountainous region, culminating at 1.720 m above sea level. It consists of five cantons - Vaud, Neuchâtel, Jura, Bern and Solothurn - and it shares a large border with France, where the Jura massif continues. The Jura massif has a long tradition of artisanal and industrial production. Indeed, the region has been industrialised since the 18th century, specialising in the luxury watch industry, particularly in La Chaux-de-Fonds and the Vallée de Joux, and in the machine industry in the Bern and Jura canton. The Swiss Jura has experienced strong de-industrialisation but has managed to rebound and maintain its high-quality watch production, based on its human and organisational resources.

The Jura is mainly composed of limestone, which has difficulty retaining water and can

experience droughts when rainfall drops. To compensate for this, rain falls abundantly (1.000 to 2.000 mm/year) and this is distributed more or less evenly throughout the year. The region is mainly covered by forest, pasture, wooded pasture and arable land, creating a landscape mosaic specific to the Jura as well as a heterogeneity that is beneficial for biodiversity. This MRR is therefore particularly vulnerable to fluctuations in rainfall or high temperatures and has already experienced severe summer droughts affecting pastures and forests, with a high loss of fodder production and the death of many trees. Several regional nature parks are present in the MRR with the aim of preserving the ecological, cultural, historical and economic wealth of the region.

2. Value chain contribution to resilience and sustainability

The MMR's primary agricultural output is cattle milk production, reflecting Swiss mountain agriculture trends. With 70% of Switzerland covered by mountains, and 70% of its agricultural land being pastureland (Confédération Suisse, 2017), livestock, meat and dairy products are crucial. Historically, milk overproduction led to a milk quota in 1977, abolished in 2007. Since the 1990s, milk prices have fallen below production costs, forcing many farmers out of business. To compensate, Swiss farmers receive direct payments, covering about half of their income, to support landscape, environmental, and biodiversity protection, thus decoupling production from income.

Challenges such as climate change, market liberalization, economic growth, and fossil fuel scarcity increase production costs. Switzerland's geomorphology and high living costs hinder its competitiveness in the European market, exacerbated by a duopoly of major retailers (Migros and Coop).

PDO cheeses like the Tête de Moine help stabilize milk prices for farmers. This premium cheese, consumed with a girolle, has become a luxury product, significantly boosting sales. The Tête de Moine value chain supports the local economy, generating 370 jobs and an annual turnover of about 70 million Swiss Francs.

3. Policy experiences

The Tête de Moine value chain has made it possible to cope with the milk crisis in the Swiss Jura, by better remunerating dairy farmers and ensuring that their production is sold. In the face of the current climate crisis and the intensification of pastures, efforts to preserve this land use must be made. We suggest including a better consideration of the environment directly at the inter-professional level. In its Vision 2035 for mountain regions, the Swiss Association for Mountain Regions (SAB) invites regional actors to strengthen collaboration, to identify and exploit development and innovation potentials and to proactively shape the processes of change. A response from regional stakeholders such as the interprofessional body could be a first step towards adaptation to present and future threats.

4. Recommendation for future policies

Based on a participatory foresight exercise conducted by MOVING Swiss research team in collaboration with a Tête de Moine stakeholder group, the need for future policies have been identified as follows: fostering resilience and sustainability into agricultural policy; simplifying the application of policies; removing "silo thinking" and establishing a unified law addressing climate, food and agriculture challenges. This approach would help address both short-term shocks and long-term climate change impacts through cross-cutting solutions.

A new comprehensive agriculture, food and climate policy is essential, combining agriculture with food-related issues, including the food consumption environment at the food sale places. Policy should simplify criteria for direct payments and strengthen support for biodiversity, climate-resilient infrastructures (like water reservoir), and integrative regional development projects.

Strategic options that reduce climate impact and energy consumption should be encouraged. The management of PDOs should align with sustainability objectives, ensuring compliance despite challenges like fodder shortages. Training, research, and innovation policies must support resilient and sustainable agricultural practices, develop resistant species, and prevent diseases.

Regional policies should encourage economic diversification, therefore both agricultural and non-agricultural economic activities, fostering sustainability and dialogue among stakeholders.

Forest policies need to adapt to climate change by supporting research on resistant species and sustainable management practices. Food policies must quickly adapt standards to address climate impacts on product quality and promote awareness among all players in the food consumption environment. Consumer and health policies should promote sustainable consumer patterns through effective communication.

Spatial planning policies should focus on preserving green areas and establishing resilient agricultural infrastructures. Environmental policies should coordinate with other sectors to enhance resilience against climate change and protect natural resources. Energy policies must support renewable energy production and reduce greenhouse gas emissions and energy consumption.

At the cantonal level, climate plans should set clear objectives and prioritize measures for agriculture and consumption. Cantonal support for training, especially for young farmers, and innovative projects is crucial. Simplifying administrative procedures will further aid in achieving these goals.

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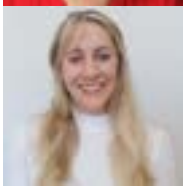

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Greenhouse Tomato Beydaglari

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Summary

Greenhouse cultivation has started in the region in the last 20-25 years and the region has become an important production center in terms of greenhouse cultivation. The number of greenhouses in the region is increasing constantly. This increase poses a threat in terms of excessive use of natural resources, especially water resources.

There is not a specific policy to support agricultural production, especially in mountainous areas. However, there are several subsidies for crop and greenhouse production to increase farmers' income levels, productivity and production, and to strengthen infrastructure. The main problem in the region is the depletion of water resources due to drought. Measures related to irrigation water should be taken first to ensure the continuity of greenhouse production in the region.

1. *An alternative production for the Beydaglari: Highland greenhouse cultivation*

The Beydaglari is the western extension of the Taurus Mountains, stretching parallel to the bay in a north-south direction in the west of the Antalya Bay. Livestock husbandry, forestry, agriculture and tourism are the main activities in the region.

Figure 22: Greenhouse cultivation at Beydaglari

Key Policy Messages

- ☞ Protecting natural resources
- ☞ Harmonising greenhouse expansion with natural resources
- ☞ Awareness of climate change

Greenhouse cultivation is carried out on a total area of 764,206 decares in Turkey. Tomato is the most important vegetable cultivated in greenhouses and the Antalya province has the highest production (TURKSTAT, 2024). In Turkey, greenhouse production is generally carried out on the plain, but in recent years it has been extended to mountainous areas such as Beydaglari. Greenhouse cultivation in the highlands has been developing since the 2000s. It is a relatively new production activity compared to other agricultural activities. Favourable climatic conditions such as daylight intensity and temperature played an important role in the development of greenhouse cultivation.

Greenhouse production begins in the highlands when production ends in the plain.

The production of tomatoes in greenhouses in the coastal area stops during the summer due to extreme temperatures. In this way, demand can be met throughout the year with highland greenhouse cultivation

2. Value chain contribution to resilience and sustainability

The region has become an important production centre for greenhouse cultivation, as this is an income-generating activity. There has been an increase in employment and income levels with the expansion of greenhouse cultivation in the region. The region has started to receive reverse migration since greenhouse cultivation can be carried out especially in the summer period on the plateau and it is a more profitable production branch compared to other production activities.

The number of greenhouses in the region is constantly increasing. This increase poses a threat in terms of excessive use of natural resources, especially water resources. As a result of climate change, precipitation in the region is decreasing, leading to droughts. It is contradictory that greenhouse areas are increasing while drought is occurring. Greenhouse irrigation in the region is largely based on groundwater. The access of the farmers to the groundwater will become more difficult with the impact of the drought.

In greenhouse tomato production, the prevalence of pests and diseases is increasing due to climate change. This has a negative impact on both productivity and product quality and leads to an increase in production costs.

3. Policy experiences

There is no specific policy to support agricultural production, especially in mountainous areas. However, there are several subsidies for crop and greenhouse production to increase farmers' income levels, productivity and production, and to strengthen infrastructure. These subsidies include fuel, fertilizer, good agricultural practices, organic agriculture, greenhouse insurance, biological and biotechnical control, bumblebees, agricultural extension and consultancy and small family enterprise with less than 5 decares of land (Ministry of Agriculture and Forestry, 2024). Although there are several subsidies for agricultural production, the amounts are not sufficient. Most of the greenhouses in the region are small-scale family farms. It is therefore important that subsidies are designed to protect the smallholders.

In addition to these subsidies, rural development investment grants are available for the construction of new greenhouses and for the technological renovation and modernisation of existing greenhouses. In addition, low-interest investment and business credits are available to farmers who are found to be cultivating in a new modern greenhouse facility or under controlled greenhouse production conditions in accordance with the Regulation on Greenhouse Registration System (Ministry of Agriculture and Forestry, 2024). Credit support is important in greenhouse farming due to the high number of smallholders and insufficient capital accumulation. However, in the current situation, due to the high amount of investment, bureaucratic obstacles and lack of equity capital of family farms, the

take-up rate of this incentive remains very low.

4. Recommendation for future policies

The main problem in the region is the depletion of water resources due to drought. To protect and manage water resources, irrigation projects should be supported, dams and ponds should be built, illegal use of groundwater should be prevented, and, in this regard, dissuasive penalties should be introduced, quotas should be applied per enterprise to prevent unnecessary use of water. Water resources availability should be taken into consideration when installing new greenhouses and excessive increase in the number of greenhouses should be prevented.

The increasing use of pesticides to control pests and diseases poses a risk to human, animal and environmental health. In this context, research into biological and biotechnological control and support for farmers is particularly important. In addition, the widespread use of smart agriculture technologies in greenhouses is very important to minimise inputs such as irrigation water, fertilisers and pesticides.

In order to ensure the continuity of greenhouse tomato production in the region and to improve the quality, more support should be given to small family farms, production models such as good agricultural practices and organic agriculture should be disseminated, the product should be evaluated in different ways such as drying etc., the market structure should be improved, cooperatives and farmers' associations should be established in marketing and export markets should be increased.

Acknowledgements

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Speyside Scotch Malt Whisky

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Summary

Speyside Malt Whisky distils culture and heritage, from mountain landscapes, for the world. The value chain links whisky, tourism and land management and can create a more sustainable future for the region's communities and businesses. The case exemplifies Scotch Whisky Association 2023-25 Strategy and Scotland Food & Drink's objective of increasing production whilst addressing climate change and ecosystem restoration. Findings map onto the objectives of the Cairngorms National Park Partnership Plan. However, making and sustaining these linkages and ensuring that these developments respond to local priorities needs continual work and resources. This is more difficult outside the national park.

Figure 23: Dalwhinnie Distillery barrels. Photo Credit: Kirsty Blackstock.

Key Policy Messages

- ☞ Manufacturing food and drink can support local tourism in mountain areas.
- ☞ Climate adaptation and mitigation are central to our value chain.
- ☞ Place based and sector based collective action institutions, working together, are crucial.

1. *A Taste of Speyside*

To address the objectives of MOVING (how value chains can help make mountain areas resilient to climate and other changes), we focussed on the Scotch Malt Whisky value chain within the Upper Speyside Badenoch and Strathspey region.

The value chain approach considered how the natural, social, cultural and economic assets of the Badenoch and Strathspey region are used during the production, processing, distribution and consumption stages of Scotch whisky (Protected Geographical Indication- PGI) Creation.

There are 29 active distilleries in the study area, producing around 150 million Litres of Pure Alcohol (lpa) per annum. (2021) with more downstream (outside the mountain boundary), contributing to overall Scotch exports worth £5.9 bn in 2023. We also considered the links to wider food and drink tourism as there are 14 distillery visitor centres. Our case study nests within the wider Cairngorms National Park (CNP), a popular tourism with 1.92 million visitors p.a. as well as home to around 18,000 residents.

The CNP was designated due to the mix of nationally important natural and cultural heritage including an important alpine

montane system. The Cairngorms are the source of several major Scottish Rivers that are threatened by climate change through impacts on quality and quantity.

Whisky production relies on inputs from outside the mountain region (barley, energy, transport); and mountain assets (water for making and cooling the spirit; climate, skills, and distillery specific knowledge/ technologies. Most distilleries are named after specific locations and marketed as unique brands based on history and culture.

2. Resilience and sustainability

Our analysis found the malt whisky value chain utilised local assets at all four stages (production, processing, distribution and consumption) and sense of place was integral to marketing and consumption. The production phase draws on public goods such as plentiful clean water. Processing stage provides economic value to the region; but the distribution and retail stages are largely located outside the region. The link with food and drink tourism was seen to recapture some economic value for the region associated with consumption.

Relatively well paid and secure manufacturing jobs help sustain year-round populations and services in the more remote parts of the region. However, not all local residents were aware of these opportunities. Distilleries are increasing their use of renewable energy onsite, supporting a circular economy through reuse of by-products, and using water-saving technologies, as well as investing in peatland restoration.

However, the region lacks affordable housing for distillery and tourism workers. Traditional tourism, that can create problems of traffic congestion, pressures on services, litter and increase costs of rental accommodation. Climate change projections suggest that the area will face increased water scarcity and potential restrictions on abstraction leading to losses in production.

Distilleries need capital to setup and run, and many are owned by multi-national corporations, contrasting value chain decision making with local governance structures. This potential disconnect is reflected, for example, in the Cairngorms National Park Partnership Plan (2022-27) which does not mention the malt whisky sector despite many synergies between the Plan's objectives and value chain analysis. Engaging local people, particularly local land managers, in discussions about value chains, was challenging as few saw beneficial connections.

3. Policy experiences

The Speyside malt whisky value chain and associated tourism responds to a range of Scottish policies, which reflect international obligations e.g. the UN's Sustainable Development Goals. Our study exemplifies the Scotland Food & Drink partnership Strategy through an expanding distilling sector coupled with increasing tourism.

The whisky and tourism value chains both recognise the drive for 'net zero' in the Scottish Climate Change Plan, with the Scotch Whisky Association's ambition for the sector to reach net zero by 2045; and VisitScotland adopting a Destination Net Zero Climate Action Plan. Adaptation to

climate change, particularly the National water scarcity plan is reflected in the SWA Water Stewardship Initiative and sustainability goals in Scotland [Tourism] Outlook 2030.

Wider rural development challenges, such as affordable housing, sustainable transport, energy and digital infrastructure, skills and training provision and engaging young people are addressed by different national housing, transport, planning, skills and youth policies.

Land management for agricultural and ecosystem outcomes are influenced by the proposed changes to agricultural support programme plus the national Environment and Biodiversity Strategies.

Regional responses to both national policy and local priorities can be found in regional plans and strategies, such as the CNP Partnership Plan, the Spey Catchment Initiative and local tourism campaigns e.g. Visit Morayshire 'Taste of Speyside'.

Together, these policies are driving change, although it is easier for larger companies and estates to invest in technological and nature-based solutions than for the smaller land and tourism businesses. However, there are difficult trade-offs including the increasing production of whisky when access to water may be restricted due to climate change.

4. Recommendations for future policies

Research participants want whisky production and tourism development that are both environmentally sustainable and socially responsible, while still being globally connected. Investment in affordable housing, local facilities, and wages will encourage the local working population to grow.

To achieve this, existing policies need to be implemented using a place-based, decentralised approach that can be adaptively managed. Although a remote area facing natural constraints, the area has development pressure, requiring a different response to other Scottish mountain regions.

Whilst the benefits of working with private enterprise are recognised, there are still few mechanisms to encourage collective action between the land and water managers; distilleries and those involved in tourism. MOVING has created a forum for exchange and the Landscape Enterprise Network (LENS) approach is being explored to bring these sectors together through specific investment relationships.

Using the global reach of large whisky brands to promote local food and drink could be further developed, alongside embedding more research and development activities in the region, including local apprenticeships. Combining active travel e.g. Speyside Way with food and drink tourism can meet many policy objectives simultaneously.

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