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AlpTextyles

DEVELOPING HERITAGE-SENSITIVE & CIRCULAR CROSS-BORDER INDUSTRIAL TEXTILE PRODUCTS: CHALLENGES & SOLUTIONS

DELIVERABLE D2.1.2

SUPPORTED BY THE EUROPEAN UNION THROUGH THE INTERREG ALPINE SPACE PROGRAMME

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Alpine Wool Library: Woven, knit, and felted samples made with wool from 6 Alpine sheep breeds

Executive Summary

This deliverable reports on the development of a pilot action aimed at exploring the feasibility of heritage-sensitive and circular cross-border industrial textile products based on Alpine wool. Developed within the framework of the Interreg Alpine Space AlpTextyles project, the pilot responds to a long-standing paradox: despite its ecological, cultural, and material richness, Alpine wool remains largely marginalized within contemporary textile value chains and is often treated as a low-value by-product or even as waste.

Building on previous AlpTextyles research, the deliverable adopts an upstream perspective, focusing on the conditions under which Alpine wool can become legible, usable, and credible for industrial actors. Rather than attempting to compete with global commodity wools on volume or uniformity, the pilot explores how Alpine wool can be requalified as a differentiated ingredient resource, whose value lies in its specific material properties, territorial embeddedness, and circular potential.

The core result of the pilot is the **Wools of the Alps / Alpine Wool Library**, a material and knowledge infrastructure designed to document, compare, and showcase the diversity of wools from six autochthonous Alpine sheep breeds across six countries. Through a combination of fiber testing, spinning, weaving, knitting, felting, and padding experimentation, the pilot demonstrates how different Alpine wools lend themselves to distinct applications, ranging from knitwear and woven textiles to insulation and nonwoven uses.

Executive Summary

The Alpine Wool Library was conceived not only as an awareness-raising tool, but as a practical interface between breeders, designers, brands, and manufacturers. Its first major showcase at the leading international professional textile fair **Milano Unica** confirmed strong professional interest and validated the relevance of tactile, application-oriented material mediation for industrial audiences.

Drawing on the pilot experience and two in-depth brand cases, La Routo and Salewa, the deliverable synthesizes key lessons regarding circularity, ingredient branding, cross-border value-chain organization, and the role of intermediaries and artisans. It concludes that Alpine wool can be successfully reintegrated into contemporary industrial textile systems, provided that material heterogeneity is treated as a resource rather than a constraint, and that heritage sensitivity is combined with pragmatic, application-driven innovation.

1. Introduction

1.1 Context and objectives

This deliverable is produced within the framework of the **AlpTextyles** project, co-funded by the Interreg Alpine Space Programme, which aims to support the revitalization of Alpine textile heritage through sustainable, circular, and heritage-sensitive value chains. Within this broader objective, Work Package 2 focused on **pilot actions** testing concrete pathways for the development of new textile and craft products based on Alpine fibers, skills, knowledge, and aesthetics.

Deliverable D.2.1.2 specifically addresses the development of **heritage-sensitive and circular cross-border industrial textile products**, with a focus on wool from autochthonous Alpine sheep breeds. Beyond reporting activities, the deliverable synthesizes **key challenges encountered and solutions identified** when attempting to valorize Alpine wool within contemporary industrial textile value chains.

In developing this pilot action, we adopted an **upstream perspective**, examining how Alpine wool can be made available, legible, and usable for industrial actors at early stages of the value chain. This orientation reflects the AlpTextyles project's ambition to address structural bottlenecks that have historically limited the economic valorization of Alpine wool.

1.2 Rationale and scope

Numerous studies and regional initiatives have documented the marginalization of Alpine wool over recent decades, highlighting recurring issues such as limited volumes, regulatory constraints, fiber heterogeneity, declining processing infrastructures, strong competition from standardized imported wool, and limited consumer awareness. These analyses have been essential in explaining why Alpine wool is often treated as a low-value by-product, or even as a waste, despite its ecological and cultural significance.

Building on this body of knowledge, the pilot action documented in this deliverable was conceived precisely to test whether, and under which conditions, Alpine wool can be valorized in an industrially relevant manner. The point of departure on the pilot is that Alpine wool does not need to compete with global commodity wools on volume or uniformity. Instead, it can be positioned as a **differentiated material resource**, provided that its properties, limitations, and sourcing conditions are made transparent and accessible to industrial users and, ultimately, to consumers.

The scope of the pilot is deliberately demonstrative. It does not seek to solve all structural constraints of Alpine wool value chains, but to identify workable configurations that can inform future initiatives at larger scale.

1.3 Methodological approach

The work reported in this deliverable was developed combining multiple complementary methods. These include:

- analysis of existing studies and mappings, notably previous AlpTextyles deliverables on Alpine wool value chains and consumer perceptions;
- interviews, site visits, and informal exchanges with key informants, including breeders, wool processors, textile experts, designers, intermediaries, and business support organizations;
- collaboration with **Fibershed DACH**, commissioned to develop and technically coordinate the pilot action;
- iterative material testing and through prototyping and fiber characterization;
- presentation of pilot outcomes in professional contexts, most notably at **Milano Unica**, a major international textile fair, used as a space for validation and dialogue with industrial stakeholders.

This combination of analytical, collaborative, and demonstrative methods reflects the exploratory nature of the pilot, which was designed to test feasibility, surface constraints, and identify transferable pathways.

1.4 Development of the pilot action

The pilot action focused on wool sourced from **six autochthonous sheep breeds**, selected across different Alpine regions with the intention of ensuring a broad geographical representation of the Alpine macro-region. The selection followed a pragmatic '**one breed per Alpine country**' logic, allowing the exploration of variability in fiber characteristics, processing requirements, and potential applications.

The Biella district in Italy, one of Europe's most important historical wool-processing hubs, was initially identified as a potential production center. Preliminary contacts were established with key actors in the district (*Agenzia Lane d'Italia*, the *Biella The Wool Company* consortium, and *Pettinatura di Verrone*), to assess the feasibility of washing, carding, and processing wools from the six selected breeds locally.

These exchanges clarified that the minimum economically viable volume required for industrial handling, minimum **100 kilograms per sheep variety**, was incompatible with the objectives and scale of the pilot action. Reaching such volumes for each selected breed would have required disproportionate efforts, shifting the focus away from upstream coordination and learning.

At this stage, the pilot team formalized a collaboration with **Fibershed DACH**, which had already initiated a **Swiss Wool Library**, conceived as an upstream infrastructure to document and qualify local wools. Building on this existing methodological vision allowed the pilot to move toward a more operationally realistic configuration while preserving its cross-border ambition.

Through successive rounds of discussion and iteration, the pilot progressively moved toward a more operationally realistic configuration, working with smaller but representative quantities that would still allow meaningful technical characterization and application testing. Building on Fibershed DACH's pre-existing work and methodological vision, **the collaboration within AlpTextyles allowed the idea of a Swiss Wool Library to be extended beyond a national focus and repositioned at a cross-border Alpine scale**. This led to the identification of an alternative production hub centred on **Laines d'Ici**, located in the Canton of Vaud in Switzerland. This hub offered greater flexibility in handling limited volumes, while maintaining a high level of technical expertise and the capacity to work across different wool types.

1.5 Structure of the deliverable

Following this introduction, the deliverable is structured as follows.

- Chapter 2 situates Alpine wool within its historical and structural context, reconstructing its long-term role in Alpine pastoral systems and analyzing the drivers of its marginalization. It also presents updated mappings of contemporary Alpine wool value chains and integrates consumer research insights.
- Chapter 3 outlines the conceptual foundations of the pilot action, discussing points of departure, relevant benchmarks, and guiding principles informing the design of the Alpine Wool Library.
- Chapter 4 constitutes the core of the deliverable and presents the pilot action in detail, including breed selection, processing and prototyping phases, fiber testing, material profiles, and public showcasing.
- Chapter 5 introduces two industrial reference cases, La Routo and Salewa, illustrating distinct pathways for the integration of Alpine wools into contemporary textile and outdoor markets.
- Finally, Chapter 6 synthesizes the main lessons learned, discussing implications for circularity, origin-based branding, value-chain organization, and consumer perception.
- Chapter 6 synthesizes the main lessons learned from the pilot action. It discusses implications for circularity, heritage-sensitive innovation, value-chain governance, and consumer perception, and outlines perspectives for transferability and future developments beyond the duration of the AlpTextyles project.

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We gratefully acknowledge **Fibershed DACH** for acting as the main coordinator of the Alpine Wool Library pilot, for structuring the methodological approach, and for ensuring continuity between the AlpTextyles pilot action and the ongoing development of the Swiss Wool Library.

A special acknowledgement goes to **Laines d'Ici**, which acted as the main production hub for the pilot action. As both an association and an operating spinning mill, Laines d'Ici provided essential expertise in scouring, carding, spinning, and handling small and heterogeneous wool batches, making it possible to transform highly diverse Alpine wools into yarns and semi-finished materials suitable for experimentation and comparison.

We also acknowledge the contribution of organizations and experts who supported wool sourcing, technical assessment, and strategic reflection throughout the pilot, including **Agenzia Lane d'Italia**, **Biella The Wool Company consortium**, **Pettinatura di Verrone**, **MDG Naturfasern GmbH**, **Maison de la Transhumance**, **ZRC SAZU**, **Associazione Code di Lana** and **Ms Elena Turetti**, **Stand Montafon**, and **Filature Terrade**.

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We warmly thank the **artisans and technical partners** whose knowledge and skills were instrumental in translating fiber properties into tangible material samples:

- **Cecile Aschwanden** for wool testing;
- **Coraline Sandoz**, master artisan weaver, for the development of woven samples and for providing expert insight into the structural and aesthetic behavior of the different yarns;
- **Urs Landis (Urs Landis Knitwear)**, for industrial knitting tests and prototypes, bridging artisanal sensitivity and industrial knitting technologies;
- **Magalie Nussbaumer**, for wet felting experimentation and systematic testing of shrinkage, texture, and material behavior;
- **Pro Verzasca**, for their needle-felting machine, enabling semi-industrial exploration of nonwoven applications.

We further thank the brands **La Routo** and **Salewa** for sharing their experiences, products, and strategic insights into the industrial use of Alpine and European wools, which provided valuable reference cases for this deliverable and for the Milano Unica showcase.

Finally, we acknowledge all breeders, associations, institutions, and AlpTextyles project partners who contributed wool samples, contextual knowledge, and long-term engagement in the valorization of Alpine textile heritage. Their collective efforts made it possible to demonstrate that Alpine wool can be approached not as a residual by-product, but as a meaningful resource for contemporary, circular, and heritage-sensitive textile innovation.

2. Alpine wool as a heritage resource: historical and structural context

2.1 Wool in Alpine history

In Alpine regions, wool production has historically been inseparable from **seasonal pastoral mobility**. Sheep breeding was embedded in systems of vertical transhumance, whereby flocks were moved cyclically between lowland areas and high-altitude summer pastures. This seasonal droving constituted a **structuring principle of Alpine subsistence economies**, shaping landscapes, settlement patterns, and social organization.

Within these systems, humans and sheep **co-evolved over long periods of time**, adapting jointly to the ecological constraints of mountainous environments. Sheep were selected not only for meat or milk, but for their capacity to thrive on alpine pastures and produce wool suited to local climatic conditions and material needs. Wool, in turn, represented a critical resource for subsistence societies, used for insulation, clothing, blankets, and household textiles essential for survival in harsh environments.

This long-term co-evolution gave rise to a **rich material culture and distinctive aesthetics** grounded in wool as a locally available and multifunctional resource (AlpTextyles 2024a). Historical sources reviewed within the AlpTextyles project (2024b) highlight how wool underpinned a wide range of know-how, including shearing practices, fiber sorting, spinning, weaving, felting, knitting, and repair and reuse techniques. These practices responded to climatic conditions, seasonal rhythms, and material scarcity. Over time, they generated distinctive textile forms, patterns, and tactile qualities that today constitute an important component of the Alpine textile heritage.

At the same time, Alpine wool systems were never homogeneous. Historical evidence points to the existence of a **dual and interconnected system**, combining areas oriented toward subsistence and local transformation with others that were already integrated into **proto-industrial textile circuits**.

On the one hand, many high-altitude valleys and remote mountain areas were characterized by small-scale pastoralism and household-based textile production, where wool circulated primarily within local or regional economies. In these contexts, wool retained a strong use value, and knowledge transmission occurred within families and communities.

On the other hand, certain Alpine foothills and accessible valleys developed early forms of textile specialization and proto-industrial organization. Historical hubs such as **Biella** in Piedmont, **Vorarlberg** and **Tyrol** in the Eastern Alps, **parts of Lombardy**, **the Swiss Plateau and pre-Alpine regions**, and **areas of southern Germany and eastern France**, progressively integrated Alpine wool into wider commercial networks. These regions combined access to waterpower, transport routes, and skilled labor, enabling wool from surrounding mountain areas to be washed, carded, spun, and woven at larger scale.

These two systems were interdependent. Wool produced through seasonal pastoralism in high-altitude areas fed into proto-industrial centers, while these centers provided outlets, tools, and organizational forms that shaped upstream practices. Historically, the Alpine textile economy thus historically functioned as a **multi-scalar system**, linking subsistence-oriented mountain regions with emerging industrial hubs long before the advent of modern nation-states and contemporary value-chain configurations.

Recognizing this historical duality is essential for understanding both the depth of Alpine wool heritage and the nature of its later marginalization. Alpine wool has long circulated across spatial, economic, and social scales, and contemporary efforts to reconnect wool to industrial textile value chains can be understood as attempts to rearticulate these relationships under new technological, economic, and environmental conditions.

2.2 From valuable resource to devalorized by-product: historical drivers of wool marginalization

The marginalization of Alpine wool over the twentieth and early twenty-first centuries cannot be attributed to a single cause. Rather, it results from the **cumulative effect** of several long-term structural transformations affecting agriculture, textile manufacturing, global trade, consumer culture, and regulation. Taken together, these transformations progressively dismantled the historical articulation between Alpine pastoral systems and textile value chains outlined in Section 2.1.

A first major factor concerns **competition within the wool sector** itself. From the late nineteenth century onward, and especially after the Second World War, global wool markets became increasingly dominated by large-scale producers, most notably in Australia and New Zealand. These regions specialized in fine Merino wool, produced under highly standardized conditions and in volumes compatible with industrial processing. **Imported Merino progressively became the reference standard for quality**, not only in technical terms (fineness and homogeneity), but also in symbolic and commercial ones.

By contrast, Alpine wools, characterized by greater variability and often coarser fibers linked to environmental adaptation were increasingly framed as inferior or outdated, despite being well suited to many applications. European textile industries adapted their infrastructures, machinery, and sourcing strategies to these global standards, marginalizing heterogeneous regional wools that did not fit these specifications.

This competitive pressure intensified with the rapid diffusion of **synthetic fibers** from the mid-twentieth century onward. Nylon, acrylic, polyester, and later blends offered industrial manufacturers advantages in terms of price stability, uniformity, ease of processing, and marketing versatility. In mass markets, synthetics displaced wool altogether; in higher-end segments, fine imported wool consolidated its dominance. Alpine wool was thus squeezed from both ends: too heterogeneous for standardized industrial chains and too costly and difficult to source, relative to perceived quality, for price-driven markets.

A second, closely related factor concerns the **erosion of regional processing infrastructures**. As textile industries restructured, many local washing, carding, and spinning facilities across the Alpine arc closed, consolidated, or reoriented toward serving large industrial clients with standardized inputs. Historical industrial hubs progressively lost the capacity to process small or heterogeneous batches of wool. Once these intermediary infrastructures disappeared, breeders and local actors were left without realistic textile outlets, reinforcing the perception of wool as a residual by-product.

This process is still unfolding. Recent regional attempts to revitalize wool collection and valorization have often been severely constrained by the lack of supporting infrastructures. For example, in Val Camonica (Brescia province, Italy), one of the AlpTextyles research and pilot sites, the local organization **Code di Lana** faced the closure in 2018 of the historic washing and processing facility of Manifattura Ariete in Gandino (Bergamo province). Since then, collected raw wool has had to be shipped to Austria for processing. Across Europe, the disappearance of washing facilities has created a critical bottleneck for initiatives aimed at valorizing local wools.

This infrastructural erosion must be understood within a broader process of **delocalization and offshoring of textile manufacturing**. From the second half of the twentieth century onward, and especially from the 1970s and 1980s, textile and apparel production increasingly deterritorialized. Trade liberalization under the GATT framework and successive tariff reductions facilitated the relocation of labor-intensive stages of production to lower-cost regions, particularly in Asia. While **creative direction and branding remained concentrated in centres such as Paris and Milan**, manufacturing became geographically dispersed across global value chains. In this configuration, sourcing decisions privileged scale, predictability, and price over territorial embeddedness, further marginalizing Alpine wool.

These industrial and geopolitical transformations also reshaped **consumer perceptions**. Imported Merino wool progressively came to be perceived as the benchmark of wool quality due to its softness and fineness. By contrast, the more rustic characteristics of European wools were increasingly interpreted as indicators of lower quality. At the same time, wool itself gradually disappeared from the dominant imagery of the Alps. While Alpine regions continued to be associated with nature, purity, and authenticity, textiles and fibers largely vanished from this symbolic repertoire, severing the cultural link between landscape, pastoralism, and material production (AlpTextyles 2024c,d; see also Made in the Alps, 2023).

Regulatory frameworks have further contributed to this marginalization. On the one hand, wool can be recognized as a heritage product and be eligible for protection through **geographical indications** or quality schemes. On the other hand, raw wool is classified under both **waste and animal by-product regulations**, particularly when it is not immediately valorized, imposing administrative burdens and restricting transport and storage.

In particular, under **Regulation (EC) No 1069/2009** and its implementing regulation **(EU) No 142/2011**, raw wool is classified as a Category 3 animal by-product. While this category represents the lowest sanitary risk, it nonetheless imposes specific requirements regarding handling, storage, transport, and traceability. In practice, when wool lacks an immediate and clearly identified outlet, it is often treated de facto as waste, triggering additional administrative obligations.

This regulatory ambiguity complicates logistical flows, increases transaction costs, and discourages aggregation across farms and regions. It also creates uncertainty for intermediary actors, who must navigate overlapping sanitary, environmental, and waste-management regimes. As a result, wool is frequently framed less as a resource to be organized and valorized, and more as a **problem to be disposed of**, reinforcing patterns of devalorization despite its material, ecological, and heritage potential.

The outcome of these combined dynamics is a striking paradox: **Alpine wool continues to be produced** as a by-product of meat and milk production, **but is largely perceived as lacking intrinsic value**. Significant quantities of wool are shorn every year, yet much of it is sold for a few cents per kilogram, exported outside Europe as an undifferentiated commodity, incinerated, or otherwise discarded. Once aggregated and traded in bulk, wool loses any reference to breed, geographic provenance, or pastoral practice, becoming effectively **origin-less**.

The marginalization of Alpine wool is therefore not a question of resource scarcity, but of **disconnection from value-creating structures**. It is a problem of organization, perception, and governance. These historical drivers of wool marginalization are confirmed by the analysis of contemporary wool value chains, to which we now turn.

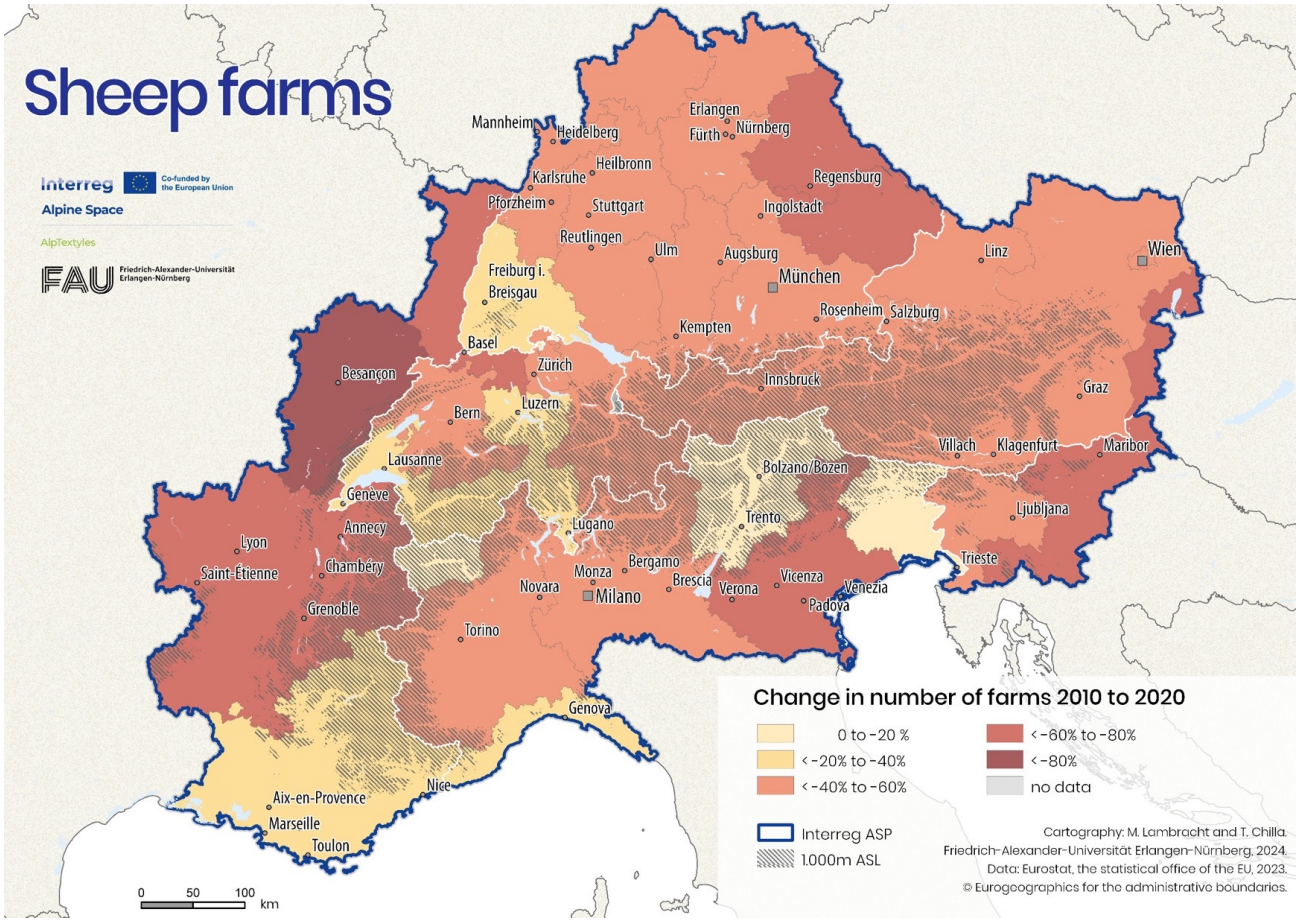
2.3 Contemporary Alpine wool value chains: production decline, concentration, and structural splits

The AlpTextyles mapping of Alpine wool value chains (2024e) provides a detailed empirical picture of how the processes of marginalization outlined in section 2.2 the translate into **current spatial configurations**.

A first key insight emerges from the **map of sheep farms** across the Alpine macro-region (**Fig. 2.1**), which documents changes over the past decade across 42 Alpine regions. While a general decline is visible across the entire Alpine arc, its intensity varies considerably. Inner-Alpine regions such as South Tyrol, the Aosta Valley, and Friuli have experienced relatively limited decreases, whereas regions in western France, eastern Slovenia, and eastern Germany have seen dramatic reductions, in some cases approaching 80 percent.

This decline cannot be attributed solely to demographic or environmental factors: low wool prices, limited subsidies, and uncertainty about future prospects have undermined the economic viability of sheep farming in many regions. In addition, the **specific qualities of Alpine wool** play a role: while shorter and coarser fibers can find outlets in geotextiles or insulation, longer and finer fibers required for apparel are largely sourced from overseas breeds, further weakening incentives for Alpine wool production oriented toward textiles.

Figure 2.1
Change in number of sheep farms in the Alpine region from 2010 to 2020



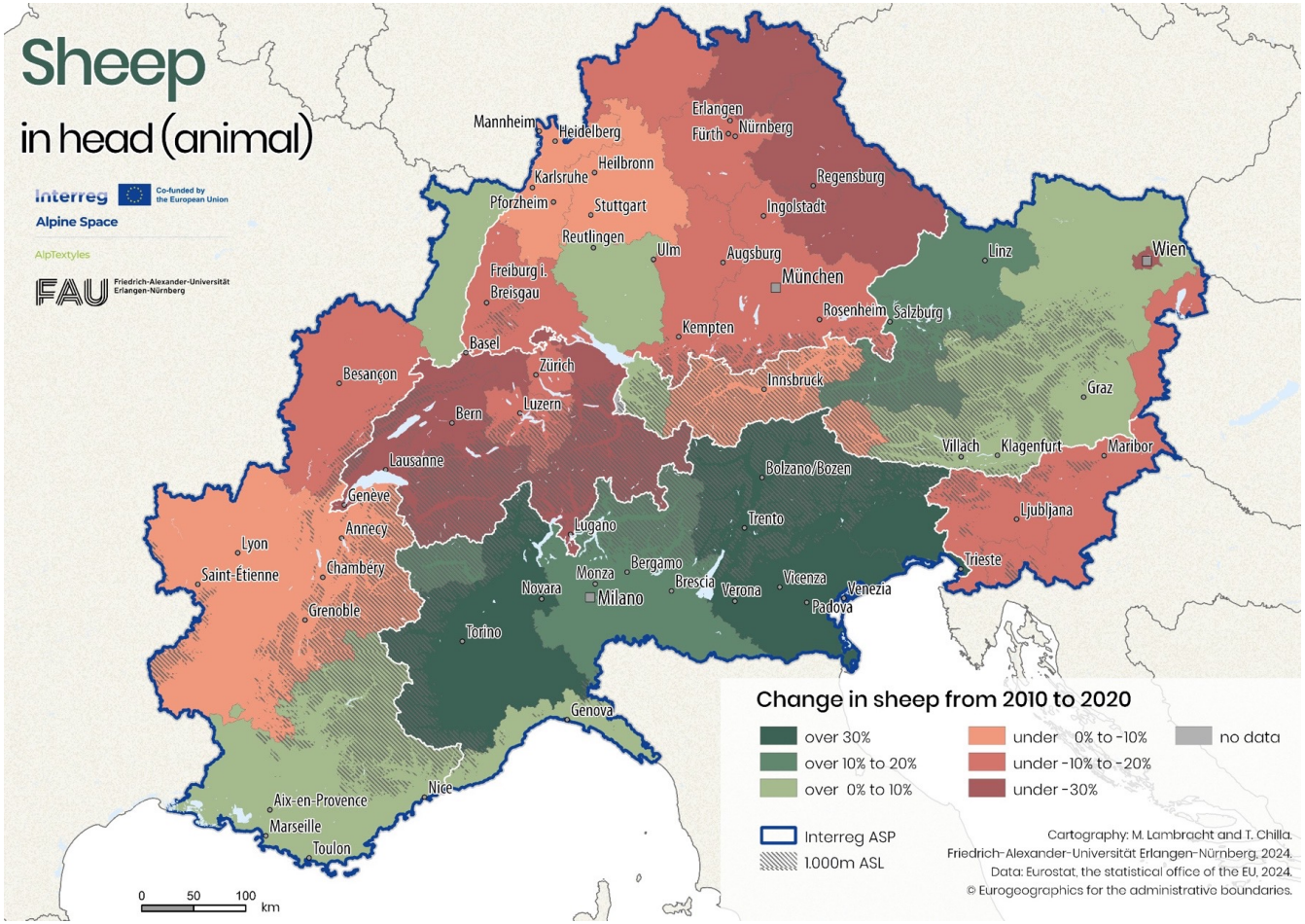
Source: AlpTextyles (2024e).

A second, complementary insight emerges when considering the **map of sheep populations (Fig. 2.2)**, which reveals a more differentiated picture. In several regions, including northern Italy, parts of France, and eastern Austria, sheep populations have remained stable or even increased, while declines are visible in areas such as Bavaria, Switzerland, and Slovenia. When read together with the previous map, this suggests processes of **concentration and centralization** rather than a uniform collapse of sheep farming. Fewer farms may be managing larger herds, reflecting broader trends in agricultural restructuring.

Taken together, these first two maps point to a crucial conclusion: **Alpine wool continues to be produced**, but under increasingly uneven and polarized conditions. The issue is therefore not the disappearance of the resource, but the transformation of the contexts in which it is produced and managed.

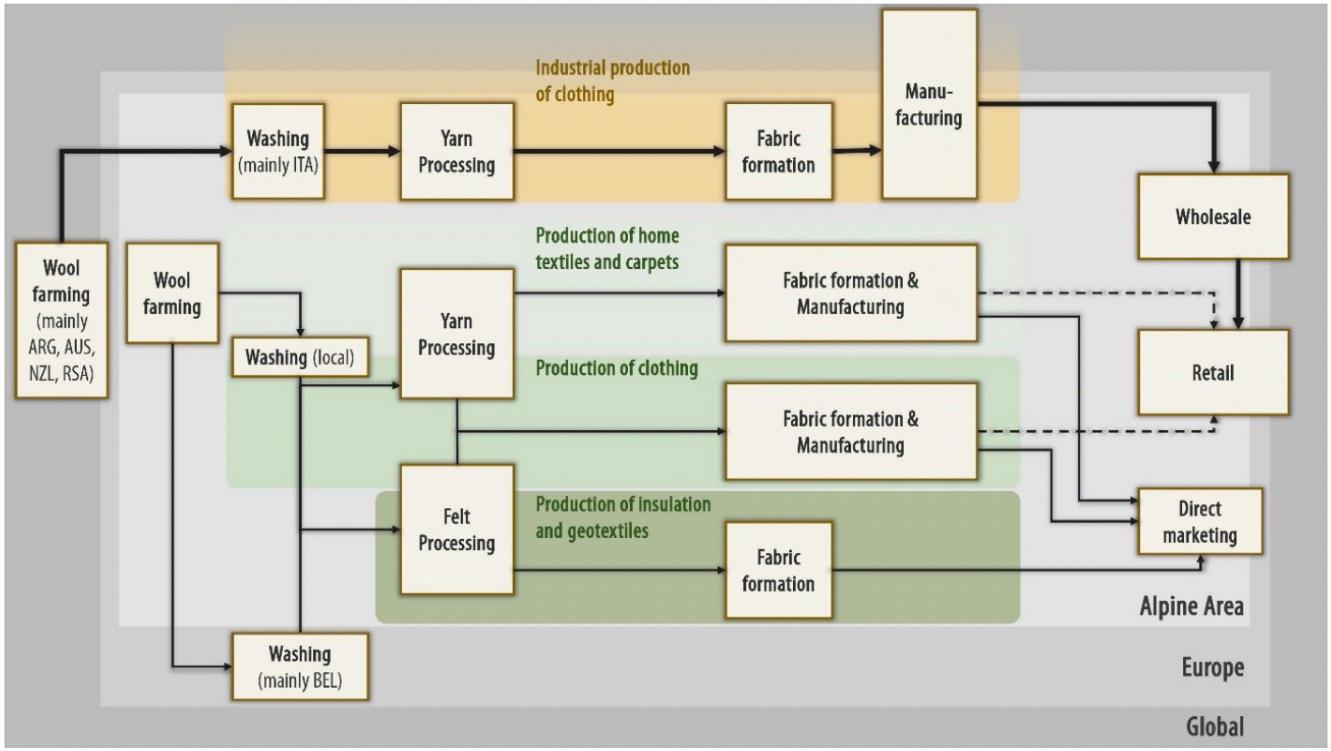
This becomes even clearer when examining the **mapping of the production network (Fig. 2.3)**, which synthesizes the structure of contemporary wool value chains, highlighting the existence of **two partially disconnected value chains**, characterized by both a scale split and a product split. On the one hand, a global wool value chain centred on the apparel sector dominates in terms of volume and economic power. This chain is strongly connected to sheep farms in Australia and New Zealand, which supply large quantities of fine wool, and to manufacturing hubs in low-wage regions of Asia. Within this configuration, Europe and the Alpine region retain primarily headquarters, design, and branding functions, while raw material sourcing and manufacturing are externalized.

Figure 2.2
Change in number of sheep in the Alpine region from 2010 to 2020



Source: AlpTextyles (2024e).

Figure 2.3
Production networks and splits in the European Alps



Alpine Wool | Production network and splits in the European Alps

Actors:
- Stage within the production network

Splits:
- Global **apparel** segement
- Regional **textile** segment

Flows:
- Flow between different stages
- Partial flow between different stages
- Flow with higher value creation

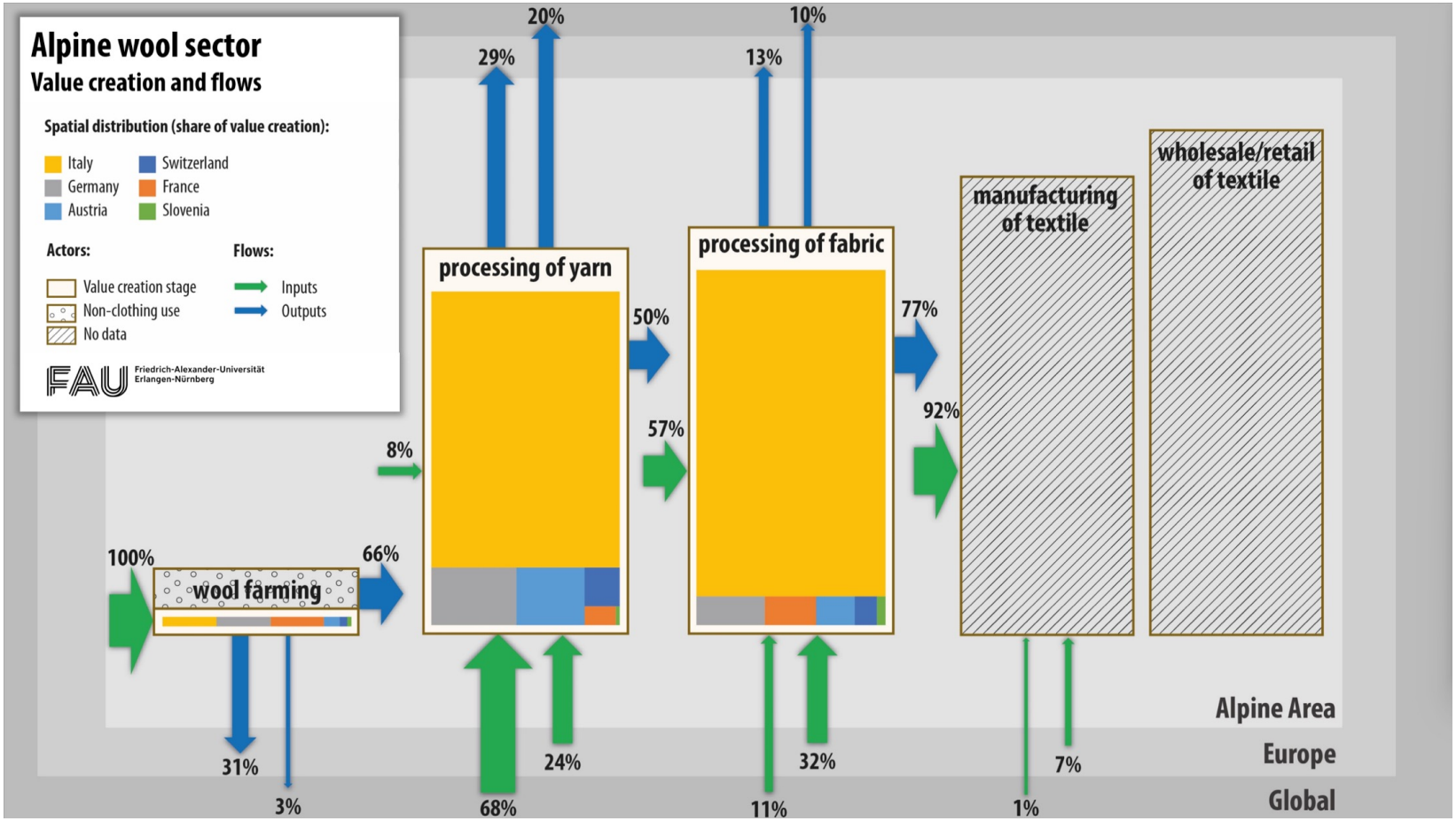
Source: AlpTextyles (2024e).

On the other hand, **regional value chains persist**, focused on home textiles, carpets, outerwear, insulation, and geo-textiles. These chains relies primarily on locally sourced Alpine wool and remain more deeply embedded in regional contexts. Where necessary, they also rely on imported wools to achieve functional blends or meet specific technical requirements. These regional chains are smaller in scale, and more tightly linked to local production systems and territorial specificities.

A further mapping focused explicitly on **value creation and commodity flows (Fig. 2.4)** adds an economic and spatial dimension to this structural picture. Economic output is visualized through the relative height of boxes along the value chain, while green arrows represent inputs and outputs. A first insight is that value creation increases markedly downstream. **While wool farming generates relatively modest and evenly distributed economic output, value creation grows substantially at the processing stages**, particularly yarn and fabric production.

The mapping also shows a **strong spatial concentration of value creation in Italy**, especially in yarn and fabric processing, sustained by significant imports of wool from global markets. This reflects a structural necessity: the Italian textile industry depends on wool qualities not available in sufficient quantity or consistency within the Alpine region.

Figure 2.4 *Global sourcing patterns of wool used by Alpine textile industries, highlighting the dominance of imported Merino and the marginal role of locally sourced Alpine wool.*



Source: AlpTextyles (2024e).

Overall, the mapping highlights several structural lock-ins:

- **Scale mismatches**, whereby industrial actors require minimum volumes incompatible with Alpine production realities;
- **Governance gaps**, with few intermediary organizations capable of coordinating collection, sorting, and technical qualification;
- **Spatial disjunctions**, where wool is produced in peripheral mountain areas while processing infrastructures are located far away;
- **Value asymmetries**, where most economic value is captured downstream, leaving breeders exposed to costs and risks.

When Alpine wool is valorized, this tends to occur either at craft scale, absorbing limited volumes at high symbolic value, or through non-textile outlets that absorb volume but bypass textile value creation. Both pathways leave unresolved the question of how Alpine wool might re-enter industrial textile systems. A possible answer lies in the analysis of Alpine imagery and consumer perceptions.

2.4 Consumer Insight: The Alps as an image resource weakly linked to textile production

Across contemporary markets, the Alps constitute a **powerful image resource**. AlpTextyles analyses (2024c,d) show that Alpine references evoke positive associations linked to nature, purity, authenticity, environmental quality, and outdoor lifestyles. These associations are widely shared, making the Alps a highly effective symbolic shorthand in branding and marketing.

However, this strong image is **only weakly and indirectly connected to textiles or wool**. While Alpine origin is positively evaluated in general, it is rarely associated spontaneously with fiber production, textile know-how, or contemporary manufacturing. Wool, when mentioned at all, is most often linked to abstract notions of naturalness rather than to specific Alpine breeds, regions, or value chains.

Analyses of branding and communication practices conducted within AlpTextyles further show that the Alps are widely mobilized in fashion and sport brand narratives, but predominantly as a **place of consumption rather than production**. This pattern is visible across a wide range of fashion and luxury brands, including major houses such as Chanel or Armani. In these cases, references to mountains, nature, or Alpine aesthetics function as symbolic devices within broader lifestyle narratives, contributing to emotional appeal or suggest occasions of use (e.g., winter sports or mountain holidays), without implying any material or productive link with Alpine territories.

A similar logic applies to brands that historically originated in or near Alpine regions. Many have evolved toward a **“brand origin” model**, in which geographical origin is retained as a symbolic anchor while production and sourcing are fully integrated into globalized value chains. An example is **Moncler**, which draws extensively on Alpine and mountain imagery to express technical performance, heritage, and its historical origin in Grenoble (France), while operating through highly internationalized supply chains. In such cases, origin functions as a narrative resource rather than an indicator of material provenance.

Consumer research conducted within AlpTextyles (2024c) provides more granular insights into how wool-based products are evaluated. A first recurring pattern concerns the **systematic preference for handmade over machine-made products**, with artisanal production more strongly associated with care, authenticity, and moral value. This represents a challenge for industrial valorization efforts, as industrial processing may be less positively evaluated regardless of material quality or environmental performance.

A second key insight relates to the **positive valuation of recovered wool**. Products incorporating recovered fibers are consistently evaluated more favourably, as they are associated with environmental responsibility and waste reduction. Importantly, this effect does not depend on artisanal production. Recovered wool thus provides a cognitive framework through which industrial processing can be perceived positively, as an act of valorization rather than resource extraction.

A third result concerns a **limited consumer awareness of sheep breeds**. Beyond Merino, awareness of specific breeds is extremely limited. However, lack of prior knowledge does not lead to negative evaluations. When breed information is introduced and linked to concrete product attributes or uses, it tends to be received with curiosity and interest.

Taken together, these findings suggest that consumer perceptions do not prevent the industrial valorization of Alpine wool. The challenge lies instead in reconnecting material properties, value-chain organization, and symbolic meanings. The following chapter examines previous initiatives that have sought to make wool diversity visible and usable, providing a foundation for the AlpTextyles pilot actions presented in this deliverable.

3. Developing the pilot: points of departure and inspirations

3.1 Points of departure

A leitmotiv in the previous chapters of this deliverable is that Alpine wool suffers not only from structural and organizational constraints, but also from **cognitive and cultural marginalization**. Among consumers and professionals alike, awareness of local wool remains limited. Wool quality is overwhelmingly evaluated through a single dominant lens, namely the softness and fineness associated with imported Merino. As a result, wools produced in Alpine regions and, more broadly, in Europe are frequently perceived as **"bad", "coarse", or "low quality"**, regardless of their actual material properties or potential applications.

This perception gap has concrete consequences. It discourages interest from downstream actors (including textile manufacturers and product designers), limits experimentation, and reinforces the treatment of Alpine wool as a low-value by-product rather than as a differentiated, culturally significant material resource. Importantly, this marginalization does not reflect limited quality per se, but rather a **mismatch between dominant expectations and the functional characteristics of Alpine wools**. Many of these wools are indeed coarser than fine Merino, yet they also display properties such as resilience, bulk, thermal insulation, breathability, and moisture regulation that make them highly suitable for a wide range of applications beyond next-to-skin apparel.

A key challenge, therefore, is to **raise awareness of its diversity and to reconnect specific wools with appropriate uses**. This requires shifting attention from a narrow definition of quality based on softness alone toward a more plural understanding of performance, functionality, and material fit. Doing so demands concrete tools that allow designers, brands, and other actors to *see*, *touch*, and *compare* different wools, and to understand what they can realistically be used for.

The pilot action responds directly to this challenge. It was designed as a **demonstrative showcase that makes Alpine wool diversity legible and actionable**. By qualifying and presenting different wools as potential ingredients for industrial and semi-industrial applications, the pilot seeks to counter entrenched perceptions and to enable more informed material choices. This approach aligns with the objectives of the Interreg Alpine Space programme by prioritizing feasibility, transferability, and the creation of a shared resource that can be taken up and further developed beyond the end of the project.

3.2 Benchmarks and inspirations

Several initiatives already exist that address, each in their own way, the challenge of making wool diversity visible, intelligible, and usable. These initiatives have responded to the fragmentation of European wool value chains and to the limited awareness of breed-specific characteristics by offering tools for documentation, inspiration, or professional networking. While they differ in scope, scale, and target audiences, they provided important reference points for the design of the AlpTextyles pilot action, helping to clarify what already exists and what remains to be developed.

3.2.1 Lanathèque

Lanathèque is a national platform dedicated to the French wool value chain. It is operated by **Lainamac**, a sectoral association created in 2009 to support the valorization of French wool. Lanathèque serves multiple functions: it references processors, manufacturers, and service providers active in the French wool value chain, and it presents a curated selection of traced wool materials. Its objective is to guide brands, designers, architects, and other professionals in making informed choices in favor of local or proximity-based transformation, while increasing the visibility of French know-how across both artisanal and industrial contexts. In doing so, Lanathèque also facilitates the constitution of short supply chains and professional networks centered on wool.

Source: Lanathèque.

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#RÉF : PR🔲3705

Préalpes du Sud

Race ovine
Préalpes du Sud
Type de race
race rustique
Origine géographique
France

Aire de répartition principale
Provence-Alpes-Côte d'Azur.
Département(s) :
Alpes-de-Haute-Provence, Drôme, Var, Vaucluse

Longueur de mèches moyenne
4 cm
Finesse de mèches moyenne
26 µm
Présence de jarre
oui
Couleur de la toison

Poids moyen de la toison
0.8 kg
Taux de rendement au lavage moyen
44 %

Écru

Organisme de sélection référent
OS des races Préalpes du Sud, Mérinos d'Arles et Mourérous
Adresse
OS ROSE 04100 Manosque
E-mail
m.daux@mre-paca.fr

This structured approach is particularly valuable in that it **renders wool heterogeneity explicit and comparable**. By foregrounding characteristics such as yield, fiber length, and the presence of guard hair, Lanathèque implicitly points toward differentiated potential uses rather than a single dominant application.

3.2.2 Atelier Laines d'Europe's *Wool of Europe* exhibition and *valise pédagogique*

Wools of Europe is an initiative developed by **ATELIER-Laines d'Europe**, a non-profit association based in France and dedicated to the development, promotion, and valorization of European natural fibers, and **Biella the Wool Company**, a consortium created in 2008 by a group of textile experts to promote native European wools in collaboration with companies based in the Biella textile district.

Its core realization is the **"Wools of Europe" exhibition**, conceived as a large-scale, immersive format showcasing the diversity of European sheep breeds and their wools. The exhibition, and its associated catalog, present around **one hundred ovine breeds from 27 European countries**. For each breed, the display combines: a large photographic portrait of the animals; raw fleece; a presentation of the breed and breeder; a finished object made from that wool; and a description of the artisan, artist, or company that produced the object.

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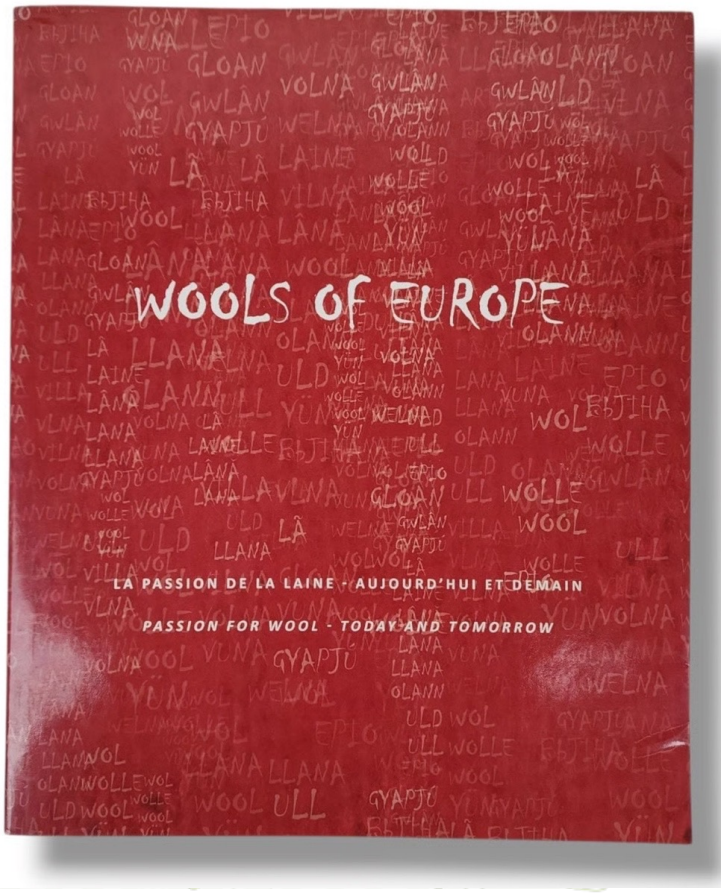
Showing sheep, their wools, and resulting products is a powerful device for raising awareness of European wool diversity and possible uses. The exhibition has been shown in a wide range of cultural and institutional venues since 2010, including museums, heritage sites, trade fairs, and former industrial spaces, and is now permanently exhibited at the former Lanificio Botto site near Biella, managed by Biella The Wool Company. The exhibition can also be rented for temporary installations. Due to its scale, it requires a minimum of 200 sq.m and is typically installed for several months.

The exhibition is accompanied by a **comprehensive catalog**, published as a bilingual (FR/EN) book, which reproduces the exhibition content in text and image. The catalog positions itself explicitly as a **tool for identifying actors within the European wool value chain**, combining breed descriptions, maps of ovine diversity by country, basic information on wool properties, and a directory of producers and experts.



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Wools of Europe: Photographs from the Exhibition..

Atelier-Laines d'Europe: Pedagogical suitcase.

In addition to the exhibition and catalog, ATELIER-Laines d'Europe has developed **pedagogical tools**, notably a "*valise pédagogique*" designed for breeders, schools, museums, artisans, and educators. This toolkit responds to a recurrent difficulty in outreach contexts: explaining not only how wool is transformed, but also where fibers come from and why breed diversity matters. This educational dimension reinforces the initiative's emphasis on awareness-raising, cultural transmission, and public understanding.

3.2.3 The Woolist

The Woolist originated as a **practice-based research project** aimed at reconnecting designers with local raw materials, producers, and makers in the textile and fashion industries. The initiative was developed through a four-year PhD project at Manchester School of Art by textile designer and researcher **Zoe Fletcher**, and is grounded in extensive empirical work across the United Kingdom.

A core contribution of The Woolist lies in its **systematic documentation of breed-specific wool properties** and their translation into **design-relevant knowledge**. Fletcher worked with **all British pure sheep breeds**, travelling across the UK to collect fleeces, yarns, and contextual information through direct engagement with farmers, mills, designers, knitters, and craftspeople. Each breed was documented across multiple stages of transformation, from raw fleece to yarn and knitted fabric, with attention to how material characteristics affect design outcomes.

The Woolist emphasizes **fit-for-purpose materiality**. Breed differences are articulated in terms of staple length, fineness, elasticity, resilience, felting behavior, handle, and response to woollen or worsted spinning systems. Importantly, these properties are presented through **practical experimentation**, notably hand and machine knitting. This approach allows designers to understand how different wools behave in use, and why coarser or more variable fibers may be highly suitable for certain applications while being inappropriate for others.

The Woolist rejects hierarchical wool quality judgments based solely on softness. As Fletcher explicitly notes, no wool is “better” in absolute terms: suitability depends on intended use. This perspective directly challenges the cognitive dominance of fine Merino as the default benchmark and reframes wool diversity as a resource rather than a constraint.

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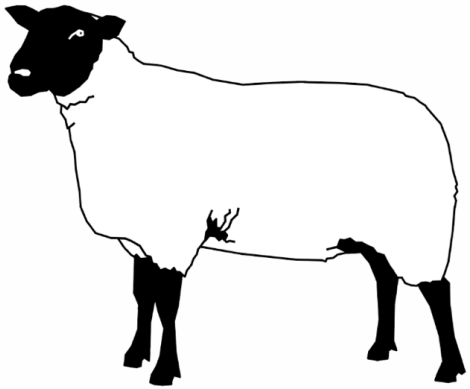
BREED CATEGORY

BLEU DU MAINE

LOCATION	THROUGHOUT UK
FLEECE COLOUR	WHITE/CREAM
MICRON COUNT	32-34.5
FLEECE WEIGHT	2.5-4 KG
BREED	MEDIUM
HANDLE	MEDIUM / SOFT
STAPLE LENGTH	7-13CM



The Woolist: Sheep breed entry. https://thewoolist.co.uk/sheep/bleu-du-maine

The outcomes of the research were consolidated into what is now referred to as the **Designer's Toolkit**: a combination of physical samples, explanatory materials, and digital content designed to support designers, makers, and educators in selecting and working with local wools. Since the completion of the PhD, The Woolist has continued to evolve through workshops, exhibitions, and public engagement, reinforcing its role as a bridge between research, practice, and material experimentation.

3.2.4 Fibershed DACH's Swiss Wool Library

Fibershed is an international network and movement originally founded in the United States, centered on the idea of **territorialized textile systems**. Its core objective is to reconnect agriculture, fiber production, processing, design, and consumption within defined geographic regions, in order to reduce environmental impacts, strengthen local economies, and restore transparency across textile value chains. Fibershed initiatives typically emphasize natural fibers, regenerative practices, and open-access knowledge as foundations for more resilient textile systems.

Operating within this broader movement, **Fibershed DACH** is a non-profit association active across **Germany, Austria, and Switzerland**. It adapts the Fibershed principles to local contexts through research, education, exhibitions, and pilot projects, and is explicitly oriented toward **bridging agriculture, textile craftsmanship, design, and industrial application**.

The **Swiss Wool Library** builds on earlier material research into the valorisation of local sheep wools, in particular the Herding Wool project by Alix Arto, Emma Casella, and Yihan Zhang, as well as the Skudde material research by Nina Conrad and Kathrin Toepffer (Fibershed DACH).

Within the Herding Wool project, felt samples from more than twenty (primarily Swiss) sheep breeds were collected and analyzed, combining raw and processed material samples with contextual information on breed origin, farming practices, and qualitative observations on fibre behaviour.

The Swiss Wool Library, currently a developing concept rather than an established collection, aims to expand this approach into a comprehensive and comparative sample archive that foregrounds both material knowledge and fibre processing insights, making the diversity and functional qualities of local wools visible.

Source:
Alix Arto, Emma Casella and Yihan Zhang from Herding wool
Picture: Courtesy of FIBERSHED DACH

By assembling this information into a coherent and comparative format, the Swiss Wool Library makes visible both the **heterogeneity of local wools** and their often-overlooked functional qualities. The emphasis on felt as an initial transformation technique reflected a pragmatic choice: felt allows rapid material exploration, accommodates a wide range of fiber qualities, and makes differences between breeds immediately perceptible.

3.3 Conclusions of benchmark analysis

The benchmark analysis confirmed that for Alpine wool to be considered seriously within industrial contexts, a first condition is to raise awareness of wool as a resource with differentiated material and symbolic properties. However, awareness-raising is necessary but not sufficient. Textile manufacturers and product developers require detailed **technical information** about wool properties, including fiber characteristics, behavior in processing, and suitability for different applications. In parallel, the benchmark analysis highlights the importance of **aesthetic and sensory information** capable of inspiring designers and supporting product developers, including visual, tactile, and comparative elements.

Taken together, these lessons led to a set of guiding principles for the pilot action:

- focus explicitly on **Alpine wools** and their diversity;
- bridge awareness-raising with **industrial and semi-industrial product development needs**;
- treat wool heterogeneity as a resource to be qualified rather than as a commondity to be standardized;
- combine technical data with **material and aesthetic mediation** to support creative and productive uses.

These principles provide the foundation for the pilot action presented in the following section, which builds on a demonstrative, transferable, and Alpine-focused approach.

4. The «Alpine Wool Library» pilot: objectives and implementation

4.1 Objectives and scope of the pilot action

The **Wools of the Alps / Alpine Wool Library** pilot action was designed as a **demonstrative action** aimed at testing whether Alpine wool, often perceived as marginal or unsuitable for contemporary textile markets, can be **requalified as a relevant material for industrial use** when its functional properties are systematically documented, translated into professional languages, and materially showcased.

The pilot pursued three main objectives:

- **To qualify Alpine wools as differentiated material resources**, moving beyond generalized or deficit-based representations and reframing fiber diversity as a source of functional and aesthetic specificity, explicitly linking fiber characteristics to potential applications.
- **To support new product development**, by providing designers, brands, and manufacturers with both technical information and aesthetic inspiration, thereby enabling informed sourcing, prototyping, and design decisions.
- **To test a transferable methodological framework**, capable of being maintained and expanded beyond the project duration, and replicable across regions and institutional settings, in line with Interreg Alpine Space objectives.

The action deliberately operated at a **demonstrative scale**, prioritizing learning, comparability, and feasibility across borders.

4.2 Selection of breeds

Six autochthonous sheep breeds were selected in collaboration with AlpTextyles project partners, with the explicit intention of ensuring **broad geographical coverage of the Alpine macro-region**, while keeping the pilot manageable. The selection followed a pragmatic "one breed per Alpine country" logic, reflecting the diversity of Alpine pastoral systems and wool characteristics:

- Engadin Sheep (Switzerland)
- Merino d'Arles (France)
- South German Merino (Germany)
- Montafon Stone Sheep (Austria)
- Bergamasca Sheep (Italy)
- Jezersko–Solčava Sheep (Slovenia)

This selection allowed the pilot to explore **significant variability in fiber fineness, length, resilience, yield, and handle**, without aiming for exhaustiveness. The breeds were not chosen as "best-in-class" examples, but precisely because they represent typical, often under-valorized Alpine wools. Given the limited volumes available and the demonstrative nature of the pilot, several samples were processed through artisanal or semi-industrial methods, which are more compatible with small batches and exploratory material learning. Moreover, working with artisans experienced in responding to the intrinsic qualities of under-utilized fibers made it possible to develop inspiring material prototypes that function as **proof-of-concept artefacts**, capable of informing and de-risking later industrial upscaling and product development.

Alpine Wool Library

Altextyles x Alix Arto, Emma Casella, Nina Conrad from Fibershed DACH

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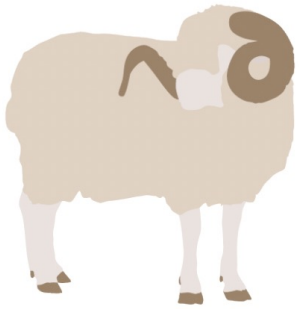
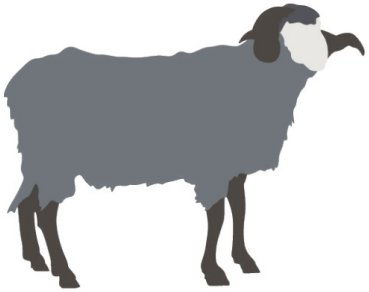
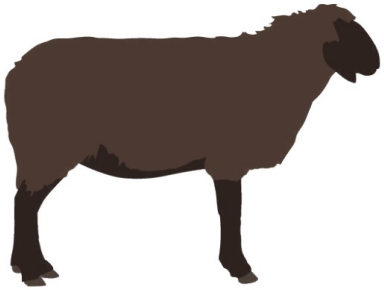
Pecora Bergamasca, Italy



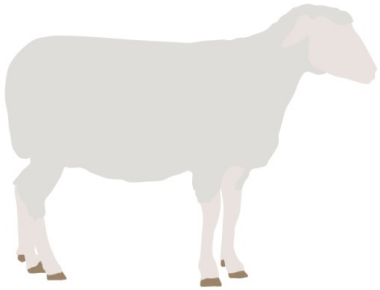
Merino d'Arles, France



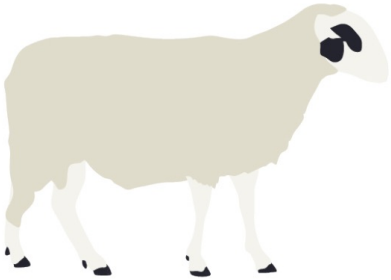
Montafoner Steinschaf, Austria



Engadinerschaf, Switzerland



Merinolandschaf , Germany



Jezersko–Solčava , Slovenia

4.3 Developing the Wool of the Alps / Alpine Wool Library pilot

The pilot adopted a **“from fiber to application” methodology**, combining scientific analysis with hands-on technical and aesthetic experimentation. Each wool was processed and documented through a shared protocol, enabling systematic comparison across breeds while remaining attentive to their specific material properties and transformation constraints.

The methodological steps included:

- **Raw fiber assessment**, including sorting and visual inspection;
- **Laboratory analysis** by Cecile Aschwanden, drawing on technical wool reports to document fiber diameter, distribution, and other key parameters relevant to processing;
- **Scouring, carding, and spinning**, carried out with partners capable of handling small and heterogeneous batches;
- **Material experimentation**, including knitting, weaving, wet felting, needle felting, and padding applications.

Each transformation stage was documented to capture how fiber properties translate into **material behavior**, highlighting both opportunities and constraints from a design and manufacturing perspective.

The pilot action was implemented through a cross-border network of specialized partners, coordinated by **emlyon business school**. Alix Arto, Emma Casella and Nina Conrad from **Fibershed DACH** played a central role in the **conceptual design, coordination, and documentation** of the pilot, ensuring coherence between scientific analysis, material experimentation, and design-oriented outputs.

Operationally, **Laines d'Ici** acted as the **central production hub**. Laines d'Ici is a Swiss non-profit association dedicated to the valorization of local wool and operates a **spinning mill** in Cernier (Canton of Neuchâtel). Laines d'Ici carried out wool scouring, carding, and spinning, and provided critical expertise in working with under-utilized and non-standardized wools with the flexibility required to process **small and heterogeneous batches**. Different spinning methods were explored in order to evaluate fiber behaviour and processing potential. For each breed, a range of sample yarns was produced and analysed. Based on their technical characteristics, **two to three yarns per breed** were selected for further development.

A key element of the decision-making process concerned the **suitability of yarns for different applications**, in particular weaving. This involved assessing whether a yarn could be used as warp, weft, or both. In general, **finer yarns were considered more appropriate for knitting**, especially for garments requiring flexibility and comfort, while **coarser yarns were oriented toward heavier applications**, such as structured fabrics, rugs, or carpets.

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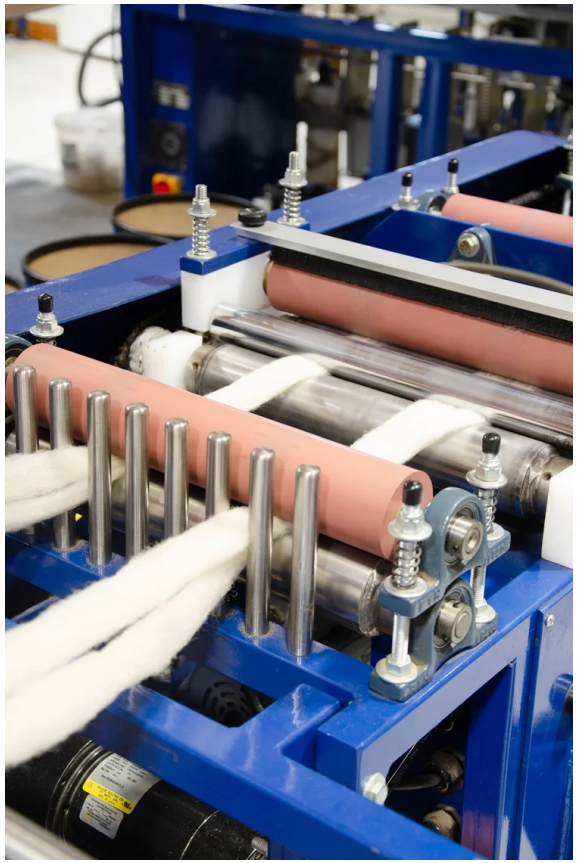
Wool sorting (left picture) and scouring (middle) at Laines d'Ici. Wool after washing (right). Pictures taken at Laines d'Ici.



Creation of the wool roving (left) and spinning (middle) at Laines d'Ici. Carded Engadin sheep wool sample (right). Pictures taken at Laines d'Ici.

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Raw wool from the selected breeds was sourced from partner organizations and breeder groups across the Alpine Space (Slovenia, Italy, Austria, Germany, France, and Switzerland). Following primary transformation at Laines d'Ici, materials were distributed to a network of specialized partners for further prototyping, including **weaving, knitting, wet felting, and needle felting**.

The involvement of different actors, each with overlapping technical and aesthetic knowledge bases at different stages of the wool value chains, enabled the collective production of situated knowledge on the most appropriate and promising uses of the different wools retained for the pilot action.

Weaving was carried out by master artisan Coraline Sandoz, whose artisanal practice made it possible to explore the structural and aesthetic behavior of the yarns at small scale, providing both material insight into their performance and visually expressive fabric swatches, while avoiding the time and cost constraints that would have made industrial weaving impractical within the demonstrative scope of the pilot.

Knitting was carried out in collaboration with Urs Landis Knitwear, a knitting mill specializing in prototyping and small-series flat knitwear, whose use of modern Stoll machines enabled the rapid production of representative knitted samples, allowing the pilot to test yarn behavior under industrial conditions and to compare outcomes across breeds using consistent machine settings.

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Hand weaving (left), Ms Coraline Sandoz working on the loom (center), and samples off the loom (right).

Photographs taken at Ms Coraline Sandoz's workshop (CH).

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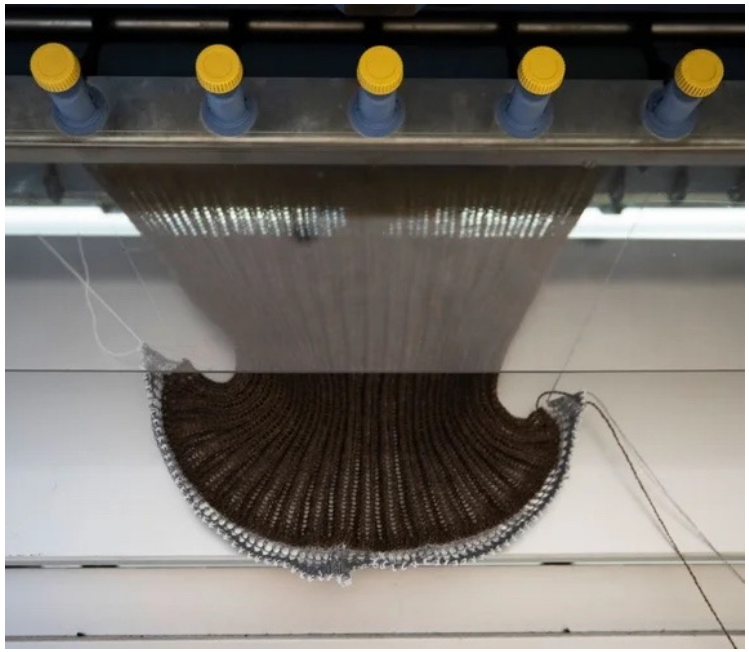
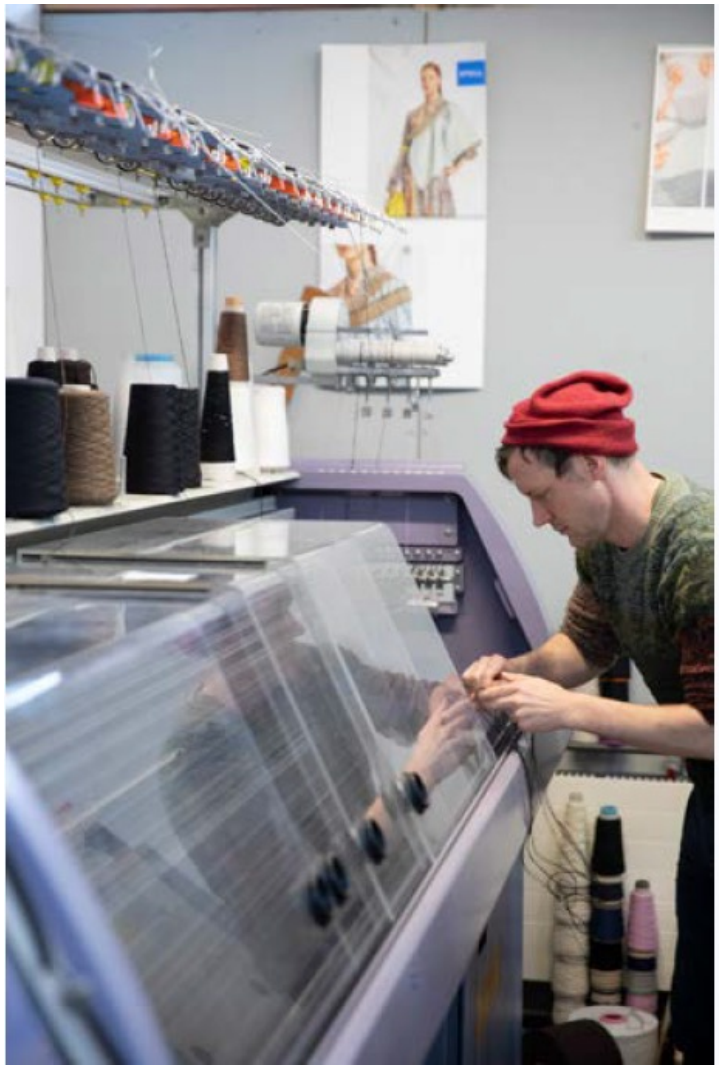
Alpine Wool Library, woven samples realized by Ms Coraline Sandoz, under the coordination of Fibershed. DACH.





Industrial knitting machine (left), Mr Urs Landis installing the machine (center), and knitted samples (right).

Photographs taken at Urs Landis Strickwaren(CH).

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Alpine Wool Library, knitted samples realized by Urs Landis Strickwaren, under the coordination of Fibershed DACH.

To explore the felting potential of the selected wools, the pilot combined **wet felting** and **needle felting**, two complementary techniques that differ in processing logic, costs, and resulting aesthetics. Considering both a traditional, water-based method and a more mechanical, semi-industrial process made it possible to better understand fiber behavior and to explore felt as an alternative to weaving, suitable for different applications and scales of production.

Wet felting was carried out by artisan Magalie Nussbaumer using a standardized protocol. For each sample, **22.5 g of carded wool** were layered into a **30 × 30 cm square** and wet-felted through controlled rolling for **12 minutes**. This approach made it possible to observe shrinkage, cohesion, softness, and surface characteristics, highlighting how different fibers react to moisture and mechanical agitation and how readily they entangle.

Needle felting was conducted at **Pro Verzasca**, a Swiss organization specialized in wool valorization, using a **compact needle-felting machine developed specifically for the Verzasca project**. This dry, mechanically driven process allowed the transformation of carded wool batts into dense felt samples, providing insight into fiber entanglement, compactness, and structural stability under conditions closer to semi-industrial nonwoven production.

Together, these two approaches helped identify differentiated felting pathways for Alpine wools, revealing material qualities, production constraints, and aesthetic outcomes relevant for both artisanal and industry-oriented applications.

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Carded wool ready to be wet felted (left).
Samples after wet felting (right).

Photographs taken at Magalie Nussbaumer's workshop, CH

Pecora Bergamasca, Italy

Merino d'Arles, France

Engadinerschaf, Switzerland

Merinolandschaf , Germany

Montafoner Steinschaf, Austria

Jezersko–Solčava , Slovenia

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Alpine Wool Library, wet felt samples realized by Pro Verzasca, under the coordination of Fibershed DACH.

Carded wool batts entering the machine to be needle felted (left). Felt sample coming out of the machine(center). Finished sample (right). Photographs taken at Pro Verzasca(CH).

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Pecora Bergamasca, Italy

Merino d'Arles, France

Engadinerschaf, Switzerland

Merinolandschaf , Germany

Montafoner Steinschaf, Austria

Jezersko–Solčava , Slovenia

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Alpine Wool Library, wet felt samples realized by Magalie Nussbaumer, under the coordination of Fibershed DACH.

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In addition to spinning, weaving, and felting tests, **Bergamasca wool was also explored as a padding material**, placed between fabric layers. Owing to its particularly coarse fibers, bulk, and resilience, the wool demonstrated good performance in terms of **loft, thermal insulation, and shape retention**. This use highlights an alternative valorization pathway that does not require fine yarns or surface aesthetics. Padding and filling are widely used by **sportswear and mountainwear brands**, which increasingly integrate local wool as an insulating layer rather than as a visible textile. For coarse Alpine wools such as Bergamasca, this application represents a **technically feasible and industrially relevant outlet**, expanding the range of possible uses beyond knitting, weaving, or felting and aligning with contemporary demand for bio-based insulation materials in outdoor and performance contexts.

Alpine Wool Library, wool as filling material, realized by Fibershed DACH. © Alix Arto, Emma Casella & Nina Conrad
Cotton fabric sourced from Lilablum GmbH

4.5 Testing wools

Samples of the selected wools were technically tested in collaboration with Cecile Aschwanden from Spycher-Handwerk AG, focusing on indicators highlighting different fiber aspects relevant for comfort, processing, and potential uses. The fiber tests were carried out using OFDA (Optical fiber Diameter Analyser), a standardized optical method that measures fiber characteristics on large samples and is commonly used in international wool research and industry.

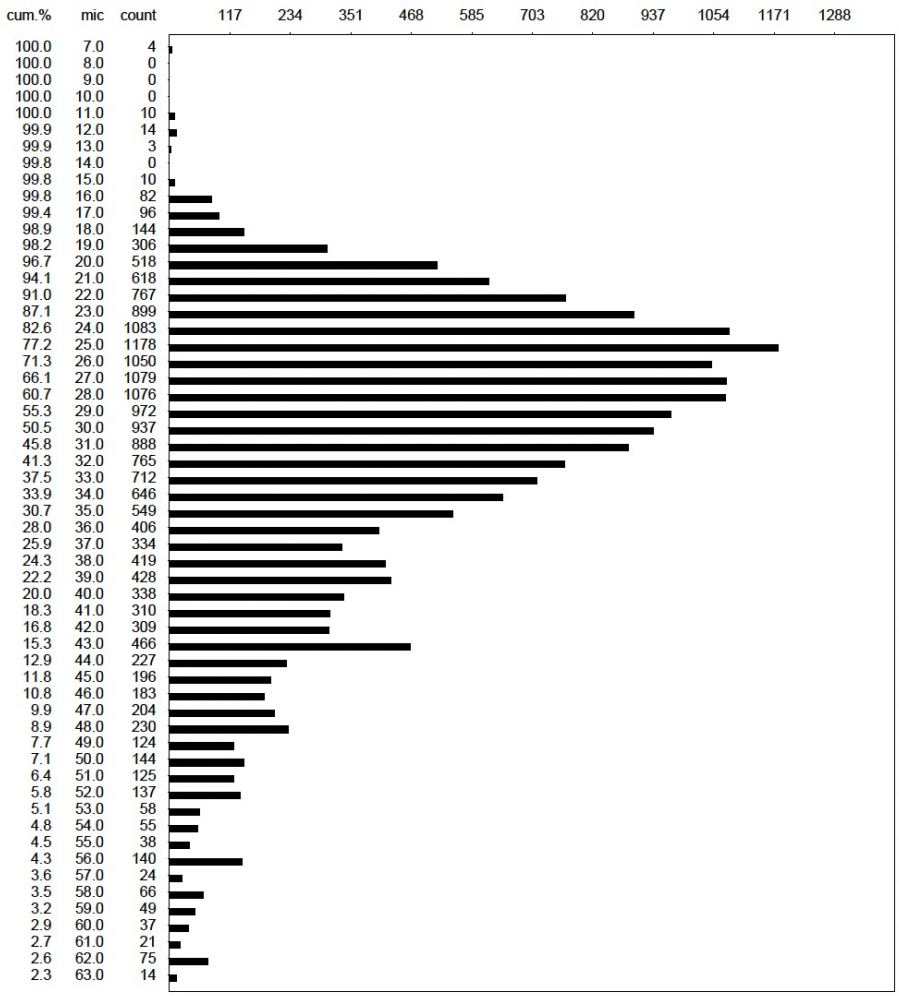
OFDA indicators are as follows:

- **Average fiber diameter (Diam):** This value indicates how thick the wool fibers are, expressed in microns (μm). Lower numbers generally correspond to finer fibers that feel softer against the skin, while higher numbers indicate coarser fibers that are better suited for structure, insulation, or durability. The value in brackets shows how much variation exists around the average.
- **Variation (CV – Coefficient of Variation):** This percentage shows how uniform the fibers are. A lower CV means the fibers are more consistent in thickness, which helps with smooth spinning and even fabrics. A higher CV indicates more variability, which can be challenging for fine garments but advantageous for bulkier or textured applications.
- **Comfort factor (CF):** This indicator estimates the proportion of fibers fine enough not to cause skin irritation. A high comfort factor means the wool is suitable for garments worn close to the skin. A lower value suggests it is better used for outer layers, padding, or felted materials.

- **Comfort edge (CEM):** This value helps identify the presence of coarser fibers that might cause prickling. Lower values indicate fewer problematic fibers, while higher values signal that the wool may feel rough if used directly against the skin.
- **Spinning fineness:** This is a synthetic indicator combining fineness and variability. It gives spinners and manufacturers a practical estimate of how the wool will behave during yarn production. Lower values generally indicate easier spinning into finer yarns.
- **Fiber curvature (Curve):** Curvature describes how much the fibers bend along their length. Higher curvature generally improves elasticity, cohesion, and loft, making the wool suitable for knitting, insulation, and felt. Lower curvature fibers tend to produce flatter, less elastic materials.
- **Sample size:** This indicates how many fibers were measured. Large sample sizes mean the results are statistically robust and representative of the batch tested.

Reading these indicators together provides a first insight into application-relevant trade-offs between softness, uniformity, processability, and structural performance. They were supplemented by insights from Fibershed DACH, which combined technical and aesthetic elements obtained from Laines d'Ici and the other mobilized partners into an integrated interpretation aimed at professional end-users.

Example of OFDA fiber test (Bergamasca sheep wool)



cum.%	mic	count
100.0	7.0	4
100.0	8.0	0
100.0	9.0	0
100.0	10.0	0
100.0	11.0	10
99.9	12.0	14
99.9	13.0	3
99.8	14.0	0
99.8	15.0	10
99.8	16.0	82
99.4	17.0	96
98.9	18.0	144
98.2	19.0	306
96.7	20.0	518
94.1	21.0	618
91.0	22.0	767
87.1	23.0	899
82.6	24.0	1083
77.2	25.0	1178
71.3	26.0	1050
66.1	27.0	1079
60.7	28.0	1076
55.3	29.0	972
50.5	30.0	937
45.8	31.0	888
41.3	32.0	765
37.5	33.0	712
33.9	34.0	646
30.7	35.0	549
28.0	36.0	406
25.9	37.0	334
24.3	38.0	419
22.2	39.0	428
20.0	40.0	338
18.3	41.0	310
16.8	42.0	309
15.3	43.0	466
12.9	44.0	227
11.8	45.0	196
10.8	46.0	183
9.9	47.0	204
8.9	48.0	230
7.7	49.0	124
7.1	50.0	144
6.4	51.0	125
5.8	52.0	137
5.1	53.0	58
4.8	54.0	55
4.5	55.0	38
4.3	56.0	140
3.6	57.0	24
3.5	58.0	66
3.2	59.0	49
2.9	60.0	37
2.7	61.0	21
2.6	62.0	75
2.3	63.0	14

Date	: 09Apr25
Sample ID	: Italian wool unwashed(Av3)
Description	: white
Lot/Client	: 336
Operator	: ca

OFDA2302:5.410 Cal: D = 4.7954*WH -2.37
Filename: Fibershed Wool Analysis April 2025.mes

Diam	= 32.32[10.94] um
CV	= 33.85 %
CEM	= 20.94 um
CF	= 54.23 %
Spin fineness	= 35.46
Sample size	= 20001
Curve	= 44.21[41.95] deg/mm

Source: Spycher Handwerk

4.6 A profile of the selected breeds and their wools

4.6.1 The Engadin Sheep (Switzerland)

The **Engadin Sheep** is an indigenous Alpine breed originating from the Upper Engadin valley in eastern Switzerland. It developed as a cross between Eastern Alpine mountain sheep (*Alpines Steinschaf*) and Bergamasca sheep, adapting to high-altitude environments characterized by steep terrain, cold winters, and long transhumance routes. The breed is recognizable by its reddish-brown fleece, pronounced nose, and pendulous ears, and is valued for its hardiness, fertility, and ability to thrive in marginal mountain conditions.

By the late twentieth century, the Engadin Sheep had become endangered, largely displaced by more standardized white Alpine breeds considered easier to fatten. Its recovery has been supported by conservation programs led by ProSpecieRara, the Swiss foundation dedicated to the preservation of endangered traditional animal breeds and plant varieties. Today it is raised by several breeding groups across German-speaking Switzerland, primarily in extensive pastoral systems. Wool production remains a secondary output relative to meat, but the fleece retains strong links to local agro-pastoral practices and landscape.

Engadine sheep in two colors, brown and black, Switzerland

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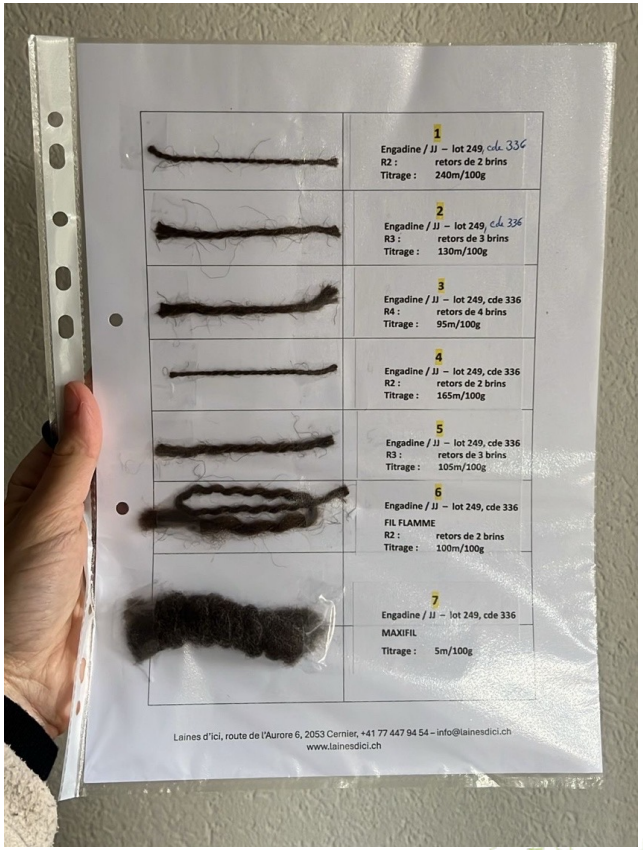
OFDA analysis of the Engadin Sheep wool sample indicates a **coarse and heterogeneous fiber profile**. The **mean fiber diameter is 34.82 *µ*m**, with a **standard deviation of 10.66 *µ*m**, reflecting substantial variability within the fleece. This level of fineness places the wool well outside the range of fibers typically used for fine apparel or next-to-skin garments.

The pronounced variability suggests a mixture of fiber types within the fleece, a characteristic commonly associated with mountain breeds adapted to harsh environmental conditions.

At this diameter range, comfort-related indicators are not central, and the data instead point to fibers with **high robustness and mechanical resistance**, rather than softness or uniformity. Overall, the OFDA results position Engadin Sheep wool as a **coarse Alpine wool**, technically more relevant for applications where fiber thickness and strength are relevant functional attributes and where tactile "rusticity" is acceptable or desirable.

Hands-on material exploration conducted by Fibershed DACH highlights a **slightly dry, grippy texture**, making this wool particularly suitable for felting processes.



Source: Fibershed DACH

While not appropriate for garments worn directly against the skin, spun yarns show good structural stability, and the fiber performs well in **outerwear, rustic knitwear, and weaving**, where cohesion and shape retention are required. Felting trials confirm that Engadin Sheep wool interlocks efficiently, producing dense and stable felt with limited processing intervention.

4.6.2 The Merino d'Arles sheep (France)

Merino d'Arles is a historic fine-wool sheep breed from southern France, developed in the early nineteenth century through the introduction of Merino genetics and their adaptation to Provençal pastoral systems. Over time, the breed became closely associated with seasonal transhumance between lowland winter pastures and Alpine summer grazing, shaping both its physical characteristics and its cultural significance.
For much of the nineteenth and early twentieth centuries, Merino d'Arles wool played an important role in regional pastoral economies and was widely regarded as the finest wool produced in Europe. From the mid-twentieth century onward, however, competition from imported wools and synthetic fibers progressively reduced its economic importance. Breeding priorities shifted toward meat production, and wool became a secondary output.

Today, the breed remains concentrated in Provence-Alpes-Côte d'Azur and continues to be embedded in transhumant systems. While its wool is no longer central to farm income, Merino d'Arles retains a strong material and territorial identity, making it a relevant reference point for contemporary initiatives seeking to reconnect fine Alpine wools with textile value chains (see par. 5.1).

Head of a Merino d'Arles sheep

Source: eponimm, Creative Commons Attribution BY-3.0

OFDA analysis confirms a **fine-wool profile with good comfort properties**, characteristic of Merino-derived breeds. In the washed sample, the **mean fiber diameter is 20.16 *µ*m**, with a **standard deviation of 4.76 *µ*m** and a **coefficient of variation of 23.61%**, indicating a fine but moderately heterogeneous fleece. These values place Merino d'Arles among fine wools suitable for apparel applications.

The **comfort factor reaches 98.07%**, while the **comfort edge (CEM) is 8.38 *µ*m**, indicating a very low proportion of coarse fibers likely to cause prickle. The **spinning fineness (20.76 *µ*m)** closely aligns with the mean diameter, suggesting that the fiber is technically suitable for spinning into fine yarns. The **fiber curvature of 110.53 deg/mm** reflects a well-developed crimp, contributing to elasticity and thermal performance in knitted structures.

Measurements on unwashed and carded samples show limited variation in average diameter (ranging between 20.03 and 20.83 *µ*m) but some reduction in variability after carding, confirming that processing stages influence fiber distribution while preserving the overall fine-wool profile. Taken together, the OFDA results position Merino d'Arles as a **high-quality fine wool**, technically compatible with apparel and knitwear, provided appropriate processing conditions are met.

Material experimentation highlighted that Merino d'Arles wool proved **difficult to process at small scale**, primarily due to its **high grease content and fine fiber structure**. These characteristics complicated washing and spinning. The yarn used for further experimentation was therefore sourced from **Filature Terrade**.

In terms of handle, the wool was **exceptionally soft and fine**, confirming its suitability for garments worn directly against the skin. At the same time, felting tests showed that, as expected for fine Merino fibers, Merino d'Arles **does not felt easily**, limiting its relevance for felt-based applications compared to coarser Alpine wools and suggesting that its primary value lies in knitwear and apparel applications where softness is decisive.

4.6.3 The South German Merino (Germany)

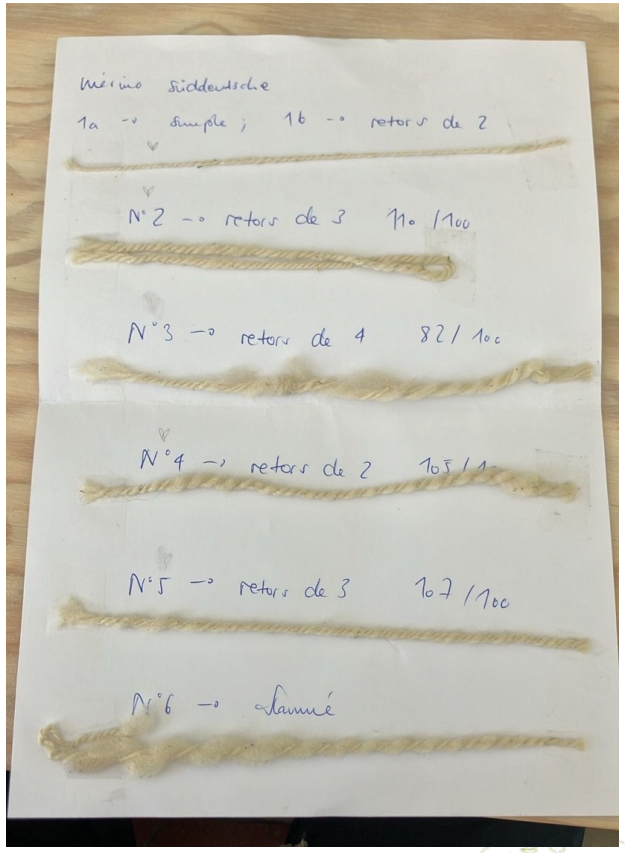
South German Merino (*Süddeutsches Merinoschaf*) is a long-established fine-wool breed developed in southern Germany through systematic crossing of local sheep with Spanish and later Saxon Merinos. The breed was historically selected to combine **fine fleece quality with adaptability to local climatic conditions**, and it remains one of the most widespread Merino-derived breeds in Germany today. Unlike more rustic Alpine breeds, South German Merino has been consistently oriented toward wool quality, with relatively uniform white fleeces and higher grease content.

OFDA analysis of the South German Merino wool sample indicates a **fine and comparatively uniform fiber profile**, consistent with its long-standing selection as a Merino-derived breed oriented toward wool quality. The **mean fiber diameter is 21.68 *µ*m**, with a **standard deviation of 5.01 *µ*m**, pointing to a relatively narrow distribution of fiber diameters within the fleece. This level of fineness places South German Merino well within the range of wools suitable for apparel applications, including garments worn directly against the skin.

The **comfort factor of 95.34%** confirms that the vast majority of fibers fall below irritation thresholds, supporting good next-to-skin comfort. The **spinning fineness value of 21.11 *µ*m** further indicates that the wool can be processed into fine yarns with predictable spinning behaviour. In addition, the **fiber curvature of 117.02 degrees per millimetre** reflects a well-developed crimp structure, contributing to elasticity, softness, and resilience in knitted textiles.

Comparative measurements on washed and carded samples show a modest increase in average fiber diameter and a slight reduction in comfort-related indicators, illustrating how processing stages affect fiber distribution and handle. Nonetheless, the overall OFDA profile remains characteristic of a **fine Merino wool**, whose properties prioritize softness, elasticity, and wearer comfort rather than structural rigidity.

Taken together, the OFDA results position South German Merino as a **high-quality fine wool**, technically well suited to fine knitwear and apparel applications, but also more dependent on appropriate processing infrastructure to fully preserve its intrinsic fiber qualities.



Source: Fibershed DACH

Material exploration conducted by Fibershed DACH highlighted the **unexpected softness** of South German Merino wool, particularly in knitted samples worn directly against the skin. Unlike more rustic Alpine wools, it behaves similarly to imported Merinos in terms of comfort and elasticity. At the same time, the fiber proved **demanding to process at small scale**. Its fineness and **high grease content** made washing, carding, and spinning difficult. Felting tests confirmed that, as expected for fine Merino fibers, the wool does **not felt easily**, limiting its suitability for felt-based applications and confirming its positioning as an apparel-oriented fiber in the context of the Alpine wool landscape.

4.6.4 The Montafon Stone Sheep (Austria)

The Montafon Stone Sheep (*Montafoner Steinschaf*) is an autochthonous Alpine breed originating from the Montafon valley in Vorarlberg, western Austria. Historically widespread in the region, it is a small, light, and highly rustic sheep, well adapted to steep terrain and high-altitude pastures. Its fleece shows significant natural variation in colour, ranging from white and grey to brown and black.

Following structural changes in Alpine agriculture after the Second World War, the breed declined sharply as farming shifted toward more productive meat breeds. By the early 2000s, Montafon Stone Sheep was considered endangered. Since then, coordinated conservation efforts involving breeders, cultural institutions including the Montafoner Museum, and regional authorities have supported its revival, framing the breed as both a genetic resource and a marker of Montafon's living pastoral heritage.

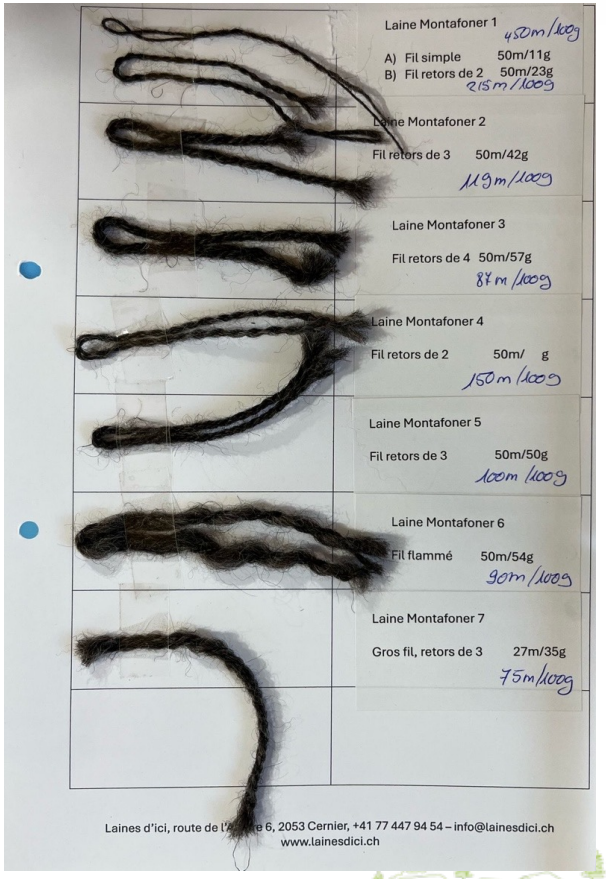
Montafon Stone Sheep

Source: Anton-Kurt, public domain.

OFDA analysis of Montafon Stone Sheep wool confirms a **coarse and highly heterogeneous fiber profile**, typical of robust Alpine breeds. In the unwashed state, the **mean fiber diameter is 33.73 *µ*m** with a **standard deviation of 9.54 *µ*m** and a **coefficient of variation of 28.28%**, indicating strong internal variability within the fleece. The **comfort factor (CF) is 40.19%**, well below thresholds associated with next-to-skin applications, while **spinning fineness reaches 34.39 *µ*m**.

After washing and carding, the **mean diameter decreases to 30.27 *µ*m** (SD 8.97 *µ*m), with a **comfort factor rising to 58.61%**, reflecting partial removal of coarse contaminants but continued fiber heterogeneity. Overall, these values position Montafon Stone Sheep wool firmly outside fine apparel categories, instead indicating fibers characterized by **mechanical resistance, structural integrity, and thermal robustness**, rather than softness or uniformity.

Hands-on experimentation highlights a **dry, firm, and resilient handle**, with good cohesion in carded webs and strong performance in weaving and felting. While clearly unsuitable for garments worn directly against the skin, the wool holds structure well in **outerwear fabrics, blankets, tweeds and loden, felted objects, and interior textiles**.



Source: Fibershed DACH

Its natural color variation is frequently perceived as an aesthetic asset rather than a limitation, especially in heritage-sensitive or rustic design contexts. Field observations in Montafon and collaborations with fashion schools have confirmed that these material properties align closely with local craft practices and design experimentations aimed at aesthetically valorizing the wool's properties.

Left: Tweed jacket made by Doris Bitschnau. Right: Dress created by Shuzo Matsuhashi in collaboration with the Montafon Museum. Source: Rinallo D. (2024), used with permission.

4.6.5 The Bergamasca sheep (Italy)

The Bergamasca Sheep is a historic Alpine breed originating in the Bergamo Alps and adjacent valleys of Lombardy. Traditionally managed through seasonal transhumance between lowland plains and Alpine pastures, it developed as a **large-framed, dual-purpose breed** valued primarily for meat and milk, with wool playing a limited but culturally significant role. Until the mid-twentieth century, Bergamasca wool supported a dense network of rural and proto-industrial activities in areas such as Val Gandino, where it fed local washing, carding, and weaving infrastructures and was used for robust, heavy textiles destined for workwear, blankets, and interior uses.

From the post-war period onward, the decline of local textile districts, competition from imported wools, and the rise of synthetic fibers led to a sharp devalorization of the fleece. More recently, renewed interest from breeders, local institutions and associations, and small entrepreneurial initiatives has sought to reconnect Bergamasca wool with place-based production and contemporary applications, often emphasizing durability, circularity, and territorial identity.

OFDA analysis of the Bergamasca Sheep wool sample indicates a **coarse and highly variable fiber profile**, typical of robust Alpine breeds. In the unwashed state, the **mean fiber diameter is 32.32 *µ*m**, with a **standard deviation of 10.94 *µ*m** and a **coefficient of variation of 33.85%**, reflecting substantial heterogeneity within the fleece. The **comfort factor is 54.23%**, while **spinning fineness reaches 35.46 *µ*m**, values that clearly place this wool outside the range suitable for next-to-skin garments.

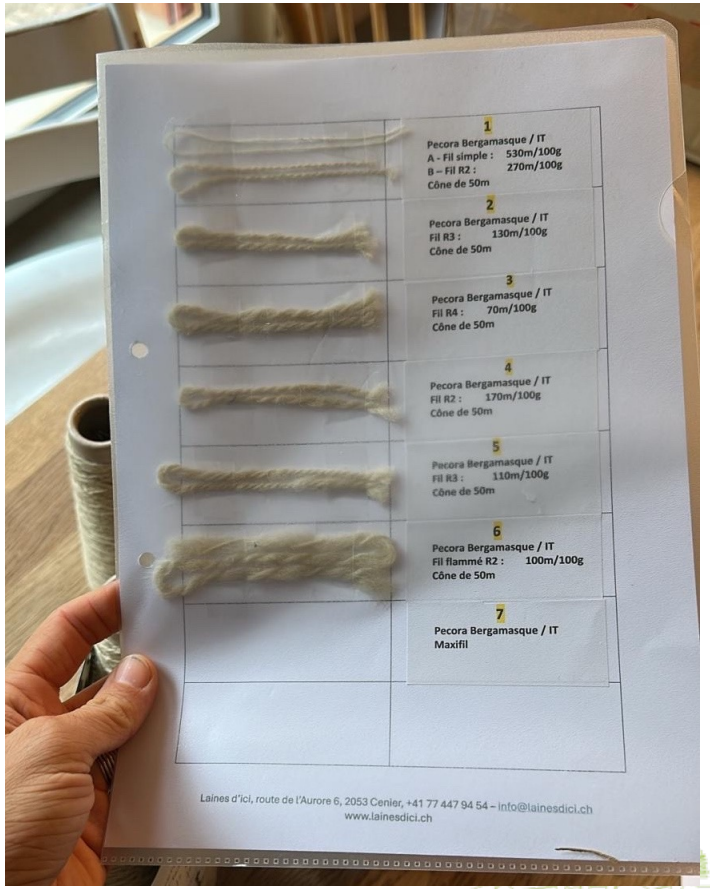
Bergamasca Sheep

Source: Patafisik, Creative Commons Attribution BY-SA 4.0.

After washing, the **mean diameter remains stable at 32.29 *µ*m**, with variability remaining high (CV 34.50%) and the **comfort factor decreasing slightly to 51.08%**, confirming that fiber coarseness is an intrinsic characteristic rather than an effect of contamination. The **fiber curvature (around 44–46 deg/mm)** is comparatively low, indicating limited crimp and elasticity when compared to fine Merino wools.

Overall, the OFDA results position Bergamasca wool as a **coarse, structurally oriented fiber**, characterized by thickness, resistance, and heterogeneity rather than softness or uniformity, and therefore technically aligned with applications where mechanical performance and bulk are functional attributes rather than constraints, including nonwoven and insulating uses.

Historical references to Bergamasca wool textiles emphasize its use in **thick, long-lasting fabrics** designed for rural labor and domestic interiors, a logic that resonates with contemporary interests in durability, repairability, and circular material flows.



Source: Fibershed DACH

4.6.6 The Jezersko–Solčava Sheep (Slovenia)

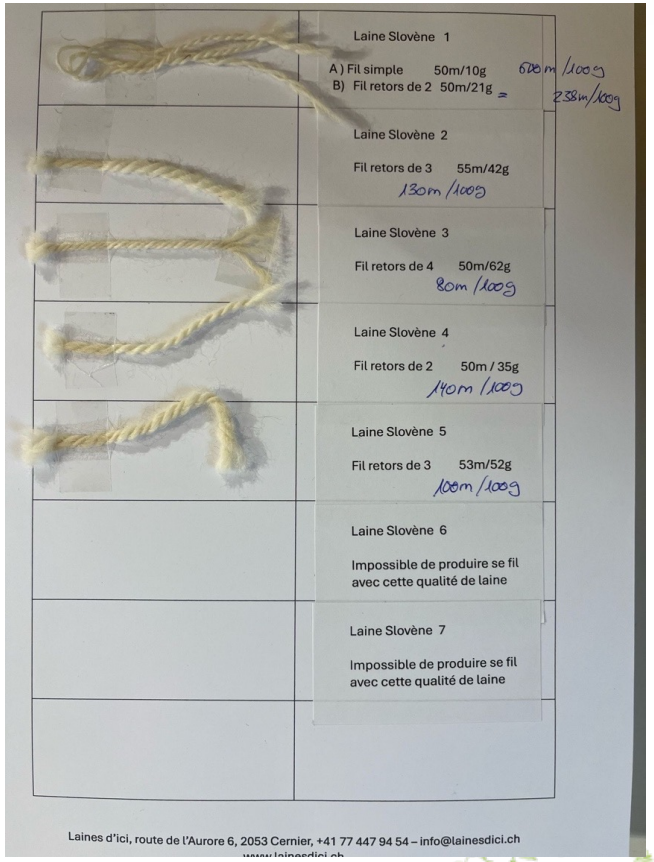
The Jezersko–Solčava Sheep is an indigenous Alpine breed originating in the northern Slovenian Alps, particularly the Jezersko and Solčava regions. It developed within transhumant pastoral systems adapted to steep terrain, long winters, and limited forage, resulting in a **robust, medium-sized, multipurpose sheep** primarily valued for meat and resilience.

From the late nineteenth century onward, local sheep populations were selectively crossed with **Bergamasca sheep**, introduced from northern Italy, and later with **Padovana sheep**, in an effort to improve body size and productivity. These crossings contributed to the breed's characteristic morphology and to a fleece that combines medium-to-coarse fibers with significant internal variability. Subsequent twentieth-century attempts to further "merinize" the breed by introducing fine-wool Merino genetics proved largely unsuccessful. While they marginally increased fineness, they also undermined hardiness and suitability for Alpine conditions, without producing a fiber competitive with imported fine wools.

As a result, breeding strategies eventually shifted away from wool "improvement" toward **genetic conservation and functional adaptation**. Today, the breed is protected as a genetic resource in Slovenia and is emblematic of Alpine pastoral heritage, with renewed interest in valorizing its wool based on its intrinsic material properties.

OFDA analysis of the Jezersko–Solčava wool sample indicates a **medium-to-coarse fiber profile with substantial internal variability**, positioning it between fine Merino types and very coarse Alpine wools. In the carded sample, the **mean fiber diameter is 27.54 *µ*m**, with a **standard deviation of 7.42 *µ*m** and a **coefficient of variation of 26.94%**. The **comfort factor reaches 71.86%**, and **spinning fineness is 28.79 *µ*m**, suggesting a fiber that is technically more versatile than many mountain breeds, though still outside fine apparel benchmarks.

After washing, the **mean diameter increases to 30.56 *µ*m** (SD 6.19 *µ*m), while variability decreases (CV 20.26%) and the **comfort factor drops to 53.73%**. fiber curvature decreases from **51.82 deg/mm to 39.87 deg/mm**, indicating limited crimp and elasticity. Overall, the OFDA results characterize Jezersko–Solčava wool as **structurally robust, moderately coarse, and heterogeneous**, with technical properties more aligned with durability and bulk than with softness or uniformity.



Source: Fibershed DACH

Jezersko–Solčava Sheep

Experimentation conducted within the pilot confirms that Jezersko–Solčava wool has a **slightly dry, grippy handle**, making it particularly well suited for **felting**. While not appropriate for garments worn directly against the skin, the wool performs reliably in **outerwear, rustic knitwear, woven fabrics, and felted products**, where structure and resistance are valued. Yarn produced from this fiber holds shape well and translates effectively into compact textile surfaces.

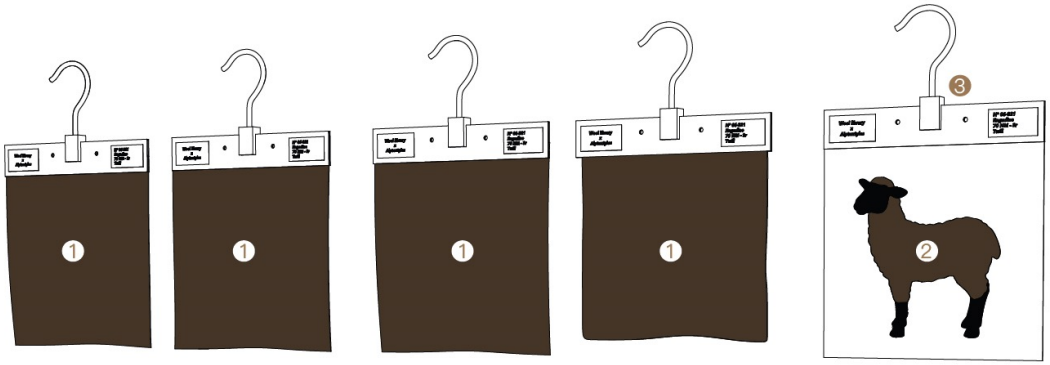
Taken together, both historical experience and contemporary testing suggest that Jezersko–Solčava wool is best approached as a **distinct Alpine fiber** whose value lies in applications that leverage strength, texture, and material presence.

4.7 Showcasing the Alpine Wool Library

The Alpine Wool Library was conceived as a **material-oriented showcase** designed to speak directly to potential users of wool in design, fashion, and textile development. For each of the six breeds included in the pilot, the Library presents a coherent set of elements combining **technical information and aesthetic exploration**. This includes multiple **30 × 30 cm textile samples** produced using different techniques and structures (knitted, woven, felted, as explained before), each accompanied by basic information on the front and complementary technical details on the back. These samples are complemented by a **breed card** presenting the origin of the sheep and key scientific data on fiber characteristics, as well as by materials illustrating earlier stages of transformation, including **raw wool and yarn**, displayed in various formats. A modular hanging system allows samples to be removed, handled, and recombined, making the Library adaptable to different exhibition contexts.

CONTENT

For each of the six breeds (Engadine, Pecora Bergamasca, Merino d'Arles, Montafoner, Süddeutsche & Sloveninan wool) we will have:

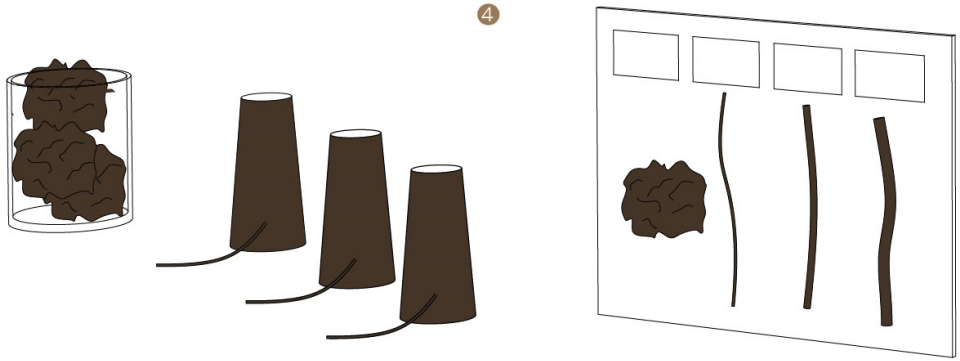


1.
• Different samples (30 x 30 cm) with different techni–ques and structures (knitted, woven, felted).
• Each samples has basic info written at the front.
• Complementary informations are written at the back and a QR code bring you to more information and ap–plications proposals.

2.
A card with a presentation of the breed and scientific datas about the fiber.

3.
Hanging system with:
• Holes for putting the samples in a box
• Hanger that can be removed and twisted

4.
Samples of initial stages:
• Raw wool
• Yarn
It can be shown as cone, in a box, on a board...



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A modular hanging system allows samples to be removed, handled, and recombined, making the Library adaptable to different exhibition contexts. This design choice reflects a core assumption of the project: **textile knowledge is inherently sensorial**. While visual information can inspire and orient designers, many critical qualities of wool such as handle, warmth, elasticity, density, and resilience can only be assessed through **direct physical contact**. The possibility to touch and manipulate the samples was therefore central to the Library's conception.

For trained professionals in fashion and textiles, tactile engagement enables immediate recognition of material potential and constraints, supporting more informed decisions than screen-based representations alone. In this sense, the Alpine Wool Library functions not only as an information device, but also as a **tool for embodied learning and material comparison**, aligned with professional practices in textile development.

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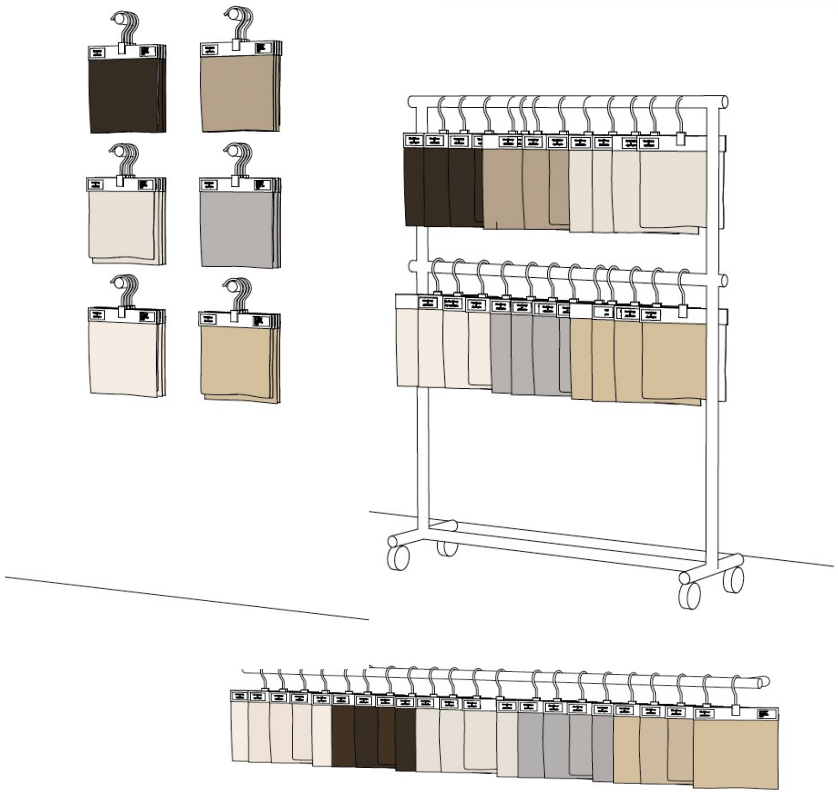

Alpine Wool Library: Exhibition possibilities.

The Alpine Wool Library was first showcased at **Milano Unica** (8–10 July 2025), one of the leading international trade fairs for high-end fabrics and accessories. The showcase was located within the AlpTextyles stand in the **Innovation and Trend Area**, a highly central space visited by a large majority of the fair's international audience of textile manufacturers, brands, designers, and buyers. Milano Unica represents a key reference point for the global textile industry, making it a particularly relevant setting to present Alpine wool to professional users. To further highlight the fact that it is indeed possible to use regional wools from Alpine sheep breeds in new collection development, the Milano Unica AlpTextyles stand also featured products from two brands indentified during previous project activities: La Routo and Salewa (see chapter 5).

The Library was subsequently presented at AlpTextyles dissemination events in **Škofja Loka, Slovenia (28 August 2025)**, at the **Hôtel de Région Auvergne-Rhône-Alpes in Lyon (21 October 2025)**, and at a private event organized soon thereafter in Lyon by **Le Textile Lab** for partners of the Interreg Alpine Space **Woolshed** project.

The Alpine Wool Library was produced in **three identical copies** and is available for future showcases upon request, enabling continued dissemination beyond the project's duration. Building on this experience, **Fibershed DACH** is actively working to extend the Library by integrating additional breeds and expanding its scope, with the objective of establishing a long-term, open resource supporting the valorization of regional wool in design, education, and industry.

The Alpine Wool Library showcase at Milano Unica.

Source: [AlpTextyles Milano Unica 2025 Scrapbook]

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5. Brands that use Alpine wools

During its showcase at the Milano Unica AlpTextyles stand, the Alpine Wool Library was enriched with products from two brands, **La Routo** and **Salewa**, selected to illustrate how Alpine wools can be effectively integrated into contemporary products. In this chapter, we provide some background on these two brands and the concrete strategies through which regional wools can be made usable, credible, and competitive in industrial and design-oriented contexts.

The two cases were sampled for three main reasons. First, both brands move beyond a purely symbolic or narrative use of Alpine imagery and instead **engage explicitly with wool as a material resource**. Importantly, not all initiatives valorizing local wools are grounded in long-term strategies. Some products using regional fibers are developed primarily for promotional purposes, relying on storytelling to signal territorial attachment rather than forming a stable component of a brand's collections. For this reason, limited editions and capsule collections without continuity in product development were deliberately excluded from our sampling.

La Routo exhibit at the AlpTextyles stand in Milano Unica. © Diego Rinallo 2025

Second, these brands represent **two distinct but realistic pathways for industrial valorization**. La Routo focuses on apparel and knitwear, operating close to the limits of what Alpine fine wools can technically deliver, and therefore illustrates strategies of blending and value chain transparency. Salewa, by contrast, mobilizes Alpine wool as an ingredient material for insulation and padding, where robustness, thermoregulation, and moisture management matter more than fineness or softness.

Third, both cases highlight the **structural necessity of cross-border value chains**. Neither relies on a single national production system. Instead, they assemble geographically distributed but functionally coherent European networks, reflecting constraints already identified in previous chapters, notably the disappearance of local washing and spinning capacities and the scale mismatch between Alpine wool production and industrial requirements.

5.1 La Routo: positioning merino d'Arles within technical outdoor apparel

The La Routo case illustrates how the industrial valorization of a local sheep breed can be addressed through **targeted product development and value-chain reconfiguration**. The brand was conceived in response to a long-standing challenge faced by Merino d'Arles breeders: despite the recognized technical quality of their wool, it was marketed at prices that failed to cover shearing costs, providing little incentive for quality-oriented wool production.

Historically, **Merino d'Arles** wool played a central economic role in Provence. Developed from the early nineteenth century following the establishment of the Bergerie Impériale d'Arles, the breed contributed significantly to regional prosperity until the mid-twentieth century, when competition from Southern Hemisphere wool producers and synthetic fibers led to a sharp decline in wool prices. Sheep farming progressively shifted toward lamb meat production, notably under the "*Agneau de Sisteron*" Protected Geographical Indication, and wool became a secondary by-product, with shearing carried out primarily for animal welfare.

Source: *Maison de la Transhumance*

Against this backdrop, the **Maison de la Transhumance**, a French territorial organization dedicated to safeguarding, promoting, and supporting transhumant pastoralism, explored new pathways to revalorize Merino d'Arles wool. A decisive opportunity emerged in the early 2010s with the development of the **GR69 La Routo long-distance hiking trail**, which follows historic transhumance routes from Arles to Piedmont. The trail provided a coherent framework to link pastoral practices, contemporary outdoor uses, and product innovation, enabling the launch of a EU-supported technical clothing project.

From the outset, La Routo adopted a **cross-border and hybrid value-chain model**, acknowledging the lack of suitable industrial processing capacity in France. The project brought together three main actors: Merino d'Arles breeders, organized from 2018 onward within the **Collectif pour la Promotion du Mérinos d'Arles (CPMA)**; the **Maison de la Transhumance** as coordinating and anchoring organization; and **MDG Naturfasern GmbH**, a German company specialized in high-quality animal fibers, led by natural fiber expert Michael Dal Grande. By 2020, the CPMA counted 25 breeders and supplied around 100 tons of wool to the project.

Product development proceeded through iterative experimentation. Initial prototypes (socks, jackets, sweaters) were developed using 100% Merino d'Arles wool. However, first-layer garments worn directly against the skin proved problematic, as the wool was not soft enough for this application. La Routo thus adopted a **material-led blending strategy**, combining Merino d'Arles wool with Falkland Merino wool (around 18 microns, long and silky fibers) sourced from a small group of breeders. This hybrid composition enabled the completion of the product range, particularly for base layers.

The value chain was organized around **territorial specialization within Europe**. Wool is sorted in Valensole (Alpes-de-Haute-Provence). After shearing, greasy wool is transported to Biella (Italy), where washing, combing, carding, and spinning take place. Sweaters and jackets are then manufactured in Biella, socks in Troyes (France), and T-shirts in Baden-Württemberg (southern Germany). Except for first-layer products requiring blended wool, production was designed to operate largely within a **400 km radius**, reducing transport-related emissions. La Routo products were launched in 2022 and are distributed online and through selected French retailers.

While the brand has faced some criticism for not being “100% French”. this critique overlooks the structural constraints of the French wool industry. In contrast to global competitors, La Routo relies on a predominantly **Alpine value chain**, using cross-border collaboration as a means to combine territorial anchoring with industrial feasibility. In doing so, the case demonstrates how local wool can be reinserted into contemporary textile markets through **pragmatic product development choices**, hybrid sourcing, and transparent value-chain organization rather than through symbolic territorial claims alone.

Promotional material explaining the sourcing strategy of La Routo products
Source: *Maison de la Transhumance*

5.2 Salewa

Salewa illustrates a different pathway for the industrial valorization of Alpine wool. Rather than using it in garments worn next to the skin, Salewa has primarily integrated it as a **functional insulation and padding material**, where its specific properties can be fully exploited and coarser fibers are not penalized.

As a leading outdoor brand with global reach, Salewa operates within highly internationalized value chains and places strong emphasis on technical performance, durability, and environmental impact. Within this framework, the company has engaged in several initiatives aimed at supporting the use of **alternative wools** to the globally dominant Southern Hemisphere Merino. This strategy reflects material performance considerations, brand positioning, and sustainability objectives.

A central example is the use of **TirolWool**, an Alpine wool sourced from mountain sheep raised in South Tyrol and the Austrian Tyrol, notably *Tiroler Bergschafe* and *Brillenschafe*. This wool is integrated primarily into **padded jackets and insulation layers**, including the Puez, Fanes, and Ortles jacket lines, as well as garments developed for Tyrolean Mountain Rescue teams.

Product incorporating Tirolwool.
Source: *Salewa.*

The initial collaboration with mountain rescue organizations was motivated by a desire to equip professionals operating in extreme environments with a **natural, locally sourced fiber**, while simultaneously supporting Alpine sheep farmers. From a material perspective, TirolWool is characterized by a **medium-fine white fleece**, long and slightly wavy fibers, and a combination of robustness and softness. While these properties make the wool particularly well suited for **thermal insulation, breathability, and thermoregulation**, they also explain why it is **not suitable for garments worn in direct contact with the skin**. TirolWool is thus predominantly used as **padding**, where its natural insulation performance, moisture regulation, and ability to retain warmth even when wet provide a clear functional advantage.

At the level of the value chain, Salewa relies on a **specialized and industrialized processing system** designed to ensure consistent quality while reducing environmental impact. Wool washing, formerly carried out in Belgium, has been relocated to **Bergamo (Italy)** to reduce transport distances. Carding, combing, and further treatment are carried out by **Imbotex**, a processing company based in Cittadella (Italy), which transforms raw Alpine wool into insulation-grade material. A key technological step is an Imbotex-patented oxygen-based treatment, used instead of chlorine to modify wool scales while preserving fiber structure, improving softness, breathability, and odor management. Following this treatment, TirolWool fibers are combined with recycled polyester fibers containing heat-reactive minerals, contributing to thermal regulation properties.

Despite their different market positionings and product strategies, both La Routo and Salewa mobilize cross-border value chains anchored in historically connected Alpine regions, using wool in ways that are consistent with its material properties and technical affordances, and openly adopt pragmatic solutions such as blending to ensure product performance and market success. Taken together, these choices illustrate an approach to valorization that integrates heritage sensitivity with material realism, industrial constraints, and comparatively shorter supply chains, thereby also limiting transport-related environmental impacts when compared to long-distance wool sourcing.

This approach contrasts with the “brand origin” logic previously discussed (see par. 2.4), which often relies on symbolic and narrative associations to Alpine identity without a corresponding anchoring in fiber origin, processing locations, or territorialized value chains. Rather than using Alpine references primarily as markers of authenticity or place-based storytelling, La Routo and Salewa demonstrate how regional wool can be credibly reinserted into contemporary markets through strategies grounded in material properties, historically structured territories, and functionally coherent production networks.

6. Lessons learned

First, the pilot confirms that the marginalization of Alpine wool is not due to a lack of resource availability, but to a disconnect between material reality and market perceptions. Mapping work carried out within AlpTextyles shows that significant quantities of wool are still produced across the Alpine region. However, much of this wool remains underutilized, exported at very low prices, or treated as waste. From a market perspective, this situation reflects not a scarcity of supply, but a failure to translate existing resources into legible and valued market propositions. Addressing this gap requires acting simultaneously on **material knowledge, product applications, and consumer awareness**.

Second, valorizing Alpine wool is closely linked to circularity objectives, as wool represents a bio-based resource that is currently mostly wasted despite its functional potential. The pilot demonstrates that many Alpine wools can be reinserted into textile value chains when they are assessed in relation to appropriate applications. Product innovation strategies such as **blending, padding, and felting** allow coarse or heterogeneous wools to find credible outlets, especially in outdoor, sport, and interior textile markets. These uses do not compete directly with fine imported merinos, but instead respond to functional requirements such as thermoregulation, resilience, and moisture management. From a circularity perspective, these strategies transform wool from a disposal problem into a productive input, contributing to waste reduction and resource efficiency.

Third, origin-based branding strategies, when combined with clear information on fiber properties and uses, offer a powerful lever for value creation. Building on the *fiber origin* approach developed in earlier AlpTextyles work (…), the pilot shows that wool origin can function as an ingredient attribute. Breeds such as those included in the Alpine Wool Library illustrate how origin, material performance, and application domain can be articulated together. For wool growers and supporting associations, this opens multiple strategic options, ranging from breed-specific initiatives to regional or Alpine-wide positioning. For companies, ingredient branding makes it possible to integrate local wool into collections even when manufacturing cannot be entirely regional, as long as origin is transparently acknowledged and meaningfully linked to product performance and heritage narratives.

Fourth, reassembling Alpine wool value chains requires collaborative and often cross-border solutions, rather than strictly local or national ones. The pilot confirms that no single territory currently concentrates all the necessary infrastructures for washing, carding, spinning, prototyping, and manufacturing. Cross-border value chains, built on **territorial specialization**, often offer more realistic and sustainable configurations than either globalized supply chains or long-distance national ones. In this context, heritage plays an important role as a **connecting thread across borders**, linking pastoral practices, historical routes, and shared Alpine identities. Heritage sensitivity does not imply a return to the past, but provides a common framework through which actors from different regions can collaborate and legitimize joint value creation.

Fifth, collaborations with artisans and specialized small-scale producers emerge as strategic knowledge nodes within the value chain. Their role extends well beyond service provision. These actors possess, or can rapidly develop, **situated knowledge** about how specific wools respond to different transformation processes and how their aesthetic and tactile qualities can be mobilized. In the pilot, artisanal and semi-industrial partners acted as interfaces between scientific testing and industrial logic, translating fiber data into tangible samples that speak to designers' aesthetic sensitivities. Such collaborations accelerate learning, reduce uncertainty, and can inform later industrial scaling, making them a critical component of innovation processes involving non-standardized materials.

Finally, consumer perceptions must be actively addressed if Alpine wool is to be revalorized at scale. Consumer research within AlpTextyles shows that while the Alps enjoy a strong positive image, wool and textile production are largely absent from this imaginary. Moreover, consumers tend to associate quality wool almost exclusively with softness and imported merinos, and show a very limited awareness of the hundreds of Alpine and European breeds. The Alpine Wool Library demonstrates that tactile engagement, clear application framing, and transparent origin narratives are effective tools to reshape these perceptions. Valorization strategies must therefore operate not only upstream in the value chain, but also downstream, by educating consumers and professional users about why different wools exist and how their diversity constitutes an asset rather than a limitation.

Taken together, these lessons show that Alpine wool can be successfully reintegrated into contemporary textile markets when resource availability, circularity, origin-based branding, collaborative value-chain organization, and consumer perception are addressed in an integrated manner, as exemplified by the Alpine Wool Library.

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