



hiWOOL - Network for heritage and innovation for the future of WOOL

1st Fieldwork Activities Report

October – November 2021

Index

Index	2
1. Introduction	3
2. Participants	3
3. Joint fieldwork activities	3
4. Wool knowledge exchange	7
The sheep breeds	7
The industry of wool	10
Citizen engagement to wool	12
5. Final considerations	14
Annex – Budget update	16

1. Introduction

The project hiWOOL is an initiative of “Salva a Lã Portuguesa”, an association that intends to celebrate natural Portuguese heritage by preserving national/local wool and producing yarn for knitting, crochet, and weaving differentiated by native breeds, using manual processes.

The project aims to promote the exchange experiences between Portugal and Norway concerning the implementation of small-scale wool industries and how to add value to the wool through high-end products.

During the project’s lifetime, two joint fieldworks in the frame of Fiber, Industry, and Heritage work package are planned and this report intends to describe the activities developed in Norway during October, 24th- October, 31st, corresponding to the first action.

The aim of the fieldwork was to observe, analyze and share knowledge about wool processing in all the stages (selecting, assessing, scouring, carding, spinning, plying, and finishing). The activities included visits to museums, wool stores, a designer studio, sheep farms, and a spinning mini-mill.

2. Participants

The participants in the joint fieldwork, from hiWOOL project, were:

- Ingun Klepp – SIFO, OsloMet (Consumption Research Norway SIFO, Oslo Metropolitan University);
- Ingvild Espelien – Selbu Spinneri AS;
- Marte Espelien – Selbu Spinneri AS;
- Tone Tobiasson – independent journalist for fashion, wool and sustainability subjects;
- Ana Paula Falcão – “Salva a lã Portuguesa” Association;
- Gianni Montagna – D_TEX Lab, FAUL (Laboratório de Desenvolvimento Têxtil, Faculdade de Arquitetura da Universidade de Lisboa);
- Guida Fonseca – “Salva a lã Portuguesa” Association;
- Mafalda Pacheco – “Salva a lã Portuguesa” Association.

3. Joint fieldwork activities

The activities in Norway took place in Oslo (October, 24th - 31st) and Klaebu (October, 27th - 30th) in good collaboration between the Portuguese and Norway teams. The traveling between Oslo and Selbu occurred during October 26th and 30th.

In Klaebu the Portuguese team benefited from the exchange of experiences with two research groups, from Estonia and Norway, with similar projects, namely:

- Estonian and Norwegian local sheep wool: research and study materials for textile students in higher education - University of Tartu;
- East - Norway University.

During the fieldwork, daily posts were done at the Instagram and Facebook accounts of the Salva a Lã Association, giving details of the workshop, visits and activities done during the mission (Figure 1).

Salva a Lã Portuguesa está em Bygdøy, Oslo, Norway. Publicado por Mafalda Batista Pacheco · 25 de outubro de 2021 ·

Happy to visit the Old Norwegian short-tailed sheep at the Bygdøy Royal Manor Farm in Oslo. A good start for the first day on fieldwork for the @hiwool project! It will be a promising week 🌱🌿🌲🌲🌲🌲

@eeagrantspt @eeanorwaygrants @selbuspinneri @chicoracao @dtex_textiledesignconference @tone.tobiasson

#bygd... Ver mais

Salva a Lã Portuguesa Enviar mensagem

980 Pessoas alcançadas 71 Interações Promover publicação

Salva a Lã Portuguesa está em Norsk Folkemuseum. Publicado por Mafalda Batista Pacheco · 26 de outubro de 2021 ·

Amazing archival documents and knitting exhibition at the Folk Museum, guided by the brilliant Kari-Anne Pederson, curator at the museum.

@eeagrantspt @eeanorwaygrants @selbuspinneri @chicoracao @dtex_textiledesignconference @tone.tobiasson @salvaalportuguesa

#norwegianwool #hiwool #salvaalportuguesa #folkmuseumoslo

Salva a Lã Portuguesa Enviar mensagem

302 Pessoas alcançadas 28 Interações Promover publicação

Salva a Lã Portuguesa está em Selbu Bygdemuseum. Publicado por Mafalda Batista Pacheco · 28 de outubro de 2021 ·

Busy morning at the Selbu museum with our colleagues from Estonian and southwest Norway and our #hiwool partners Selbu spinneri! What a lovely mittens!

@eeagrantspt @eeanorwaygrants @selbuspinneri @chicoracao @dtex_textiledesignconference @tone.tobiasson

#norwegianwool #portuguese wool #hiwool #salvaalportuguesa

Salva a Lã Portuguesa Enviar mensagem

979 Pessoas alcançadas 100 Interações Promover publicação

13 1 partilha

Salva a Lã Portuguesa está em Klæbu. Publicado por Mafalda Batista Pacheco · 29 de outubro de 2021 ·

What an amazing workshop dealing with Portuguese and Norwegian wools at our partners Selbu spinneri factory! The new yarn research just started! It seems that the next months will be challenging!

@eeagrantspt @eeanorwaygrants @selbuspinneri @chicoracao @dtex_textiledesignconference @tone.tobiasson

#norwegianwool #portuguese wool #hiwool #salvaalportuguesa

Salva a Lã Portuguesa Enviar mensagem

2255 Pessoas alcançadas 264 Interações Promover publicação

27 2 comentários 3 partilhas

Salva a Lã Portuguesa está em National Museum of Art, Architecture and Design. Publicado por Mafalda Batista Pacheco · 3 de novembro de 2021 ·

Wool use is present everywhere in Norway! And finding knitters in public places is very common! We've been absorbing all this tradition and we came back with lots of ideas in mind and knowledge to put in practice in the next month! 🙌

@eeagrantspt @eeanorwaygrants @selbuspinneri @chicoracao @dtex_textiledesignconference @tone.tobiasson @joamango @gijegumpi @nasjonalmuseet @samiskarktekturbibliotek

#... Ver mais

Salva a Lã Portuguesa Enviar mensagem

1998 Pessoas alcançadas 200 Interações Promover publicação

Figure 1 – Facebook posts done during the fieldwork in Norway.

The principal activities developed in Oslo were:

- **October 24th:** Visit to *Vulkan market* (space shared by artists and artisans with presentation and sale of products with benefits made from wool) (Figure 2). At the *National Library of Norway*, we had a short talk with a group of different generations of women knitters, some from Colombia, knitting in the public place (Figure 6). Social dinner with Norway team, Kari-Anne Pedersen (Head Curator for Costumes and Textiles in *Norsk Folke Museum*) and Lisbeth Løvbak Berg (Ph.D. student from *Oslo Metropolitan University*) to discuss the wool problem in Europe and in more detail in Norway and Portugal (Figure 3);
- **October 25th:** Guided visit to *Norsk Folke Museum* made by Kari-Anne Pedersen to the “Strikking. Knitting History” temporary exhibition and the “Folk Dress” permanent exhibition complemented by an in-situ explanation concerning the Norwegian costumes and traditions. Visit to museum archives to analyze and discuss the old patterns and its importance (Figure 4). Stopover at *Bigdoy Royal Manor farm* to learn about the characteristics of Old Norwegian Short Tail sheep breed (Spælsau) (Figure 5). Visit to the traditional houses complex with examples of the wool activities and instruments (spinning wheel, looms, etc.) in the main living room and correspondent traditional dresses.
- **October 26th:** Visit to the wool designer atelier run by Elisabeth Stray Pedersen (Figure 2). Oslo wrap up meeting with Tone Tobiasson and Ingun Klepp (Figure 3).

The principal activities developed in Klaebu were:

- **October 27th:** Introduction of the project by the partners (Figure 8), a tour in the Selbu Spinneri SA mill (Figures 9 and 10), and a short discussion of the role of Wool in Estonia, Portugal and Norway;
- **October 28th:** Visit to Craft Museum in Selbu (Figure 12), and to the Malvik Wool Station;
- **October 29th:** Visit to a farm in Leinstrandveien (Figure 12), a wool workshop at the Selbu Spinneri (Figure 11), and a final meeting to summarize the visit with all the participants.



Figure 2 – Visit to wool markets and fashion design studios, in Oslo.



Figure 3 – Oslo meetings between the project members.



Figure 4 – Wool textile samples analyzed during the meetings in Oslo.



Figure 5 – Visit to the Norsk Folke Museum and to the Bigdoy Royal Manor farm, in Oslo.



Figure 6 – Knitting in public places in Oslo.

4. Wool knowledge exchange

The sheep breeds

There are more than 10 local sheep breeds in Norway belonging to two groups:

- 5 Crossbred: Norsk kvit sau, Dalasau, Grå Trøndersau, Steigarsau and Blæset sau.
- 5 Spælsau: Spælsau (white and colored), Norsk Pelssau, Gammalnorsk sau, Gammalnorsk Spælsau

The Spælsau

At the Bigdoy Royal Manor farm, in Oslo, there is a flock of Old Norwegian Short Tail (Spælsau) (Figure 5). The Old Norwegian Short Tail Landrace and the Gammalnorsk spæl are considered to be the original breed of sheep in Norway, and it is one of the Northern European short-tailed sheep breeds. It is well adapted to the climate and was a domestic animal from the Iron Age. The Spælsau stock is about 22% of the sheep in Norway.

Although the Old Norwegian Short Tail breed almost went extinct at several points in the last century, conservation efforts have succeeded in growing the population to around 30,000 animals and the breed is no longer considered threatened.

The Spælsau gives rich milk, has a strong flock instinct, and manages well outdoors most of the year. Wool colors include black and white but common among older types (Gamalnorsk and Villsau) are many variations and shades of grey (known as “blue”) and brown (known as “red”).

The wool is characterized through having two layers: An outer longhaired glossy undulating layer of wool protecting the underlying layer against wind and rain, and an underlying layer which keeps the sheep warm. The long protective wool which is used for weaving is traditionally spun into two-strand tightly-spun yarn instead of the usual three-strand type, resulting in a beautiful lustre. This spælsau yarn was used in the Norwegian old tapestries and in clothing because it was light, stable and absorbed little moisture.

The Crossbred

Norsk kvit sau (Norwegian white sheep) is a sheep breed that has been crossed by crossbred breeds (including Dalasau, Rygjasau and Steigarsau) from the 1970s onwards. Of type, it belongs to the long-tailed sheep. The breed name was introduced in 2000/2001. The breed is therefore the most widespread in Norway.

Dalasau was considered the most widespread Norwegian crossbred sheep breed in Norway until the term Norwegian White Sheep was introduced. Dalasau is a large and coarsely built type of sheep that typically weighs 80-90 kilos (sows). The sheep is white with chalk-white cover hairs on the legs and head, but a black nose and hooves. It has large, slightly drooping ears. The sheep produce a lot of wool of medium quality and have good meat content. In 2006, 6% of the registered ewes in the Sheep Control were Dalasau. Before this, as many as 43% of the animals joined the Sheep Control were counted as Dalasau sheep.

Grå Trøndersau sheep breed that was counted as extinct until a herd of gray sheep was discovered on a farm in Telemark, in 1992. The breed is known for particularly fine, gray wool. Systematic sampling has shown that some of the animals have particularly fine-fiber wool, something that has also been emphasized in the breeding work. The origin of the sheep breed is unknown, but one theory is that the breed was created by crossing between Old Norwegian sheep and tauter sheep. After the gray Trøndersau sheep was rediscovered in 1992, a protection crew was the ship at Ole Hans Lien's in Telemark. Today, there are just under 400 winter foras in around 25 herds. Gray Trøndersau sheep has a black belly, legs and head, and a white drop-shaped spot under a quarter of an eye. Wool on the back and on the sides are steel gray. According to the breed standard, wool must have particularly fine fibers. The breed has a half-long tail.

Steigarsau is a northern Norwegian sheep breed, bred in the 1880s in Steigen in Nordland after crossing between imported sjeviotsau sheep of the sutherland type and local northern Norwegian spælsau. Steigarsau is a medium-sized sheep, raised on neat legs, with a live weight for ewes of around 70-80 kg. The breed is known for good wool quality. The back of the scallop sheep should be long and a good meat set. The head should be easy to feel on the shoulder in the back of the nose. The hair layer on the head can be somewhat yellowish, sometimes with dark spots, but the wool trap should not have black hair. Noses and claws should be black. The sheep is calm and productive with a well-developed maternal instinct. In 2010, the Norwegian Genetic Resource Center has an overview of about 650 winter-fed sheep distributed among about 14 herds.

Blæset sheep has been known in Rogaland since the 1920s. The breed belongs to the group of crossbred sheep. The origin is somewhat unclear. Either it is a cross between black Rygjasau and Spælsau in the 1920s, or the sheep originate from the Zwartblesau which originates from the Netherlands. There is little documentation of work and measures around the breed over the years, so it is difficult to find any greater certainty for the breed's origins.

In some places of Norway, the sheep can stay out the whole year, but at inland farms, the sheep is kept indoors during the winter months. Winter feeding costs are compensated for when the sheep had one or two lambs. The lambs born in spring.

The old Norwegian species of sheep shed naturally during summer, and the wool is plucked from the animals. This method provided particularly long wool fibers, and there was no waste. When shearing the animals with blade shears, even the short fibers unsuitable for spinning were cut off. This became common, however, when cross breeding of races began in the 19th century. In the areas where the sheep were kept indoors during winter, shearing was done in spring and fall, and occasionally at Christmas time. The sheep was tied to a pole and sheared while standing or it was placed on the back in the shearer's lap.

To get cleaner wool, the sheep is often washed prior to the shearing. This made the wool easier to handle, and was more delicate on the natural grease of the wool. Washing after shearing was done with hot water and urine as a detergent. The wool is corded into a rolag that is spun into yarn using a spindle or spinning wheel. Wool is not a large source of income, but it provides valuable extra earnings.

SAUERASER OG ULLTYPER

Norge har én million vinterföra sauer, som fører fram 1,5 lam hver i snitt. Totalt antall sau/lam om sommeren er 2,5 millioner dyr, som produserer 25 millioner kilo kjøtt og knapt 4 millioner kilo ull. De fleste rasene avles både for kjøtt og ull.

Sauerasene deles inn i to hovedgrupper; korthals [spæl] og langhala. Alle spælsaurasene stammer fra den nord-europeiske korthalsausen

som har vært i Norge så lenge det har vært sau her. De langhala rasene stammer fra importer av britiske saueraser fra 1700 tallet og fram til begynnelsen av 1900-tallet.

Per 2021 har vi seks saueraser som regnes som nasjonale og trua; blåset sau, dalasau, fuglestadbrogete sau, grå trøndersau, rygjasau og steigarsau. Nasjonale raser som regnes som sårbar eller ikke trua,

er gammalnorsk spælsau, gammalnorsk sau, norsk pèlssau, sjevot, moderne spælsau, og norsk kvit sau. De to sistnevnte rasene er desidert størst, regnet i antall dyr. (NIBIO/Norsk Genresercenter)

Plakaten tar for seg et utvalg av de mest vanlige rasene i Norge. Mer utfyllende informasjon og flere rasebeskrivelser finner du på animalia.no/ull

ULL AV CROSSBRETOTYPE



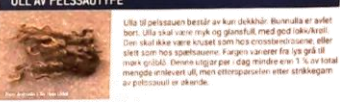
Langhala sauer belegges som crossbred sauer. Ull fra disse rasene utgjør omtrent 60 % av mengde av ullens ull. Hvis crossbred rasene er såkalt blanda avlet samt langhala, vil de i tillegg ha ull med kortere fiber. Ull fra crossbred sauer vil være myk, kruset og ha god spinnbarhet. Spinnbarheten er den enkelte crossbred sauer har fiberlengde på 25-40 my (centimeter millimeter). Denne ulltypen brukes mye til å lage ullprodukter som ulltepper, møbler og tekstil.

ULL AV SPÆLSAUTYPE



Korthals sauer belegges som spælsauer. Ull fra disse rasene utgjør omtrent 30 % av mengde av ullens ull. De har litt mer fiber enn de som er avlet med langhala og kortere fibre. Denne typen ull er myk og har god spinnbarhet og vil være myk, kruset og ha god spinnbarhet. Spinnbarheten er den enkelte spælsau har fiberlengde på 25-40 my (centimeter millimeter). Denne ulltypen brukes mye til å lage ullprodukter som ulltepper, møbler og tekstil.

ULL AV PÈLSSAUTYPE



Ull fra pèlssauten består av kort fiber. Ull fra denne typen sauer vil være myk og ha god spinnbarhet. Denne typen ull er myk og har god spinnbarhet og vil være myk, kruset og ha god spinnbarhet. Spinnbarheten er den enkelte pèlssau har fiberlengde på 25-40 my (centimeter millimeter). Denne ulltypen brukes mye til å lage ullprodukter som ulltepper, møbler og tekstil.

CROSSBREDRASER

NORSK KVIT SAU



Norsk kvit sau, NKS, er en spælsau som er avlet fram på 1970 tallet, en kryssing mellom grå trøndersau og norsk kvit sauer. Egnet rase fra 2005/2006. NKS er den vanligste rasen i Norge. Den er en crossbredtype normal med hvit ull, en god skinner, norsk sau og Gilt driver avlenshet på sauer. Den er en god brukssau og har god spinnbarhet og vil være myk, kruset og ha god spinnbarhet. Spinnbarheten er den enkelte norsk kvit sau har fiberlengde på 25-40 my (centimeter millimeter). Denne ulltypen brukes mye til å lage ullprodukter som ulltepper, møbler og tekstil.

SJEVIOT



Sjevot er en gammel korthals fra Østlandet i Skottland. De fleste dyrene som er i Norge er fra 1900-tallet. Da sauer kom til Norge ble den krysset med de fleste store rasene. Sjevot er en korthals med god skinner og vil være myk, kruset og ha god spinnbarhet. Spinnbarheten er den enkelte sjevot har fiberlengde på 25-40 my (centimeter millimeter). Denne ulltypen brukes mye til å lage ullprodukter som ulltepper, møbler og tekstil.

DALASAU



I 1923 ble navnet dalasau brukt for en ble den kalt vasssaue. Opprinnelig en kryssing mellom korthals sauer, sjevot og suthland. Dalasau er en korthals med god skinner og vil være myk, kruset og ha god spinnbarhet. Spinnbarheten er den enkelte dalasau har fiberlengde på 25-40 my (centimeter millimeter). Denne ulltypen brukes mye til å lage ullprodukter som ulltepper, møbler og tekstil.

GRÅ TRØNDERSAU



Grå trøndersau er en gammel spælsau som er avlet fram på 1970 tallet, en kryssing mellom norsk kvit sau og norsk kvit sauer. Egnet rase fra 2005/2006. Grå trøndersau er en korthals med god skinner og vil være myk, kruset og ha god spinnbarhet. Spinnbarheten er den enkelte grå trøndersau har fiberlengde på 25-40 my (centimeter millimeter). Denne ulltypen brukes mye til å lage ullprodukter som ulltepper, møbler og tekstil.

RYGJASAU



Rygjasau er en gammel spælsau som er avlet fram på 1970 tallet, en kryssing mellom norsk kvit sau og norsk kvit sauer. Egnet rase fra 2005/2006. Rygjasau er en korthals med god skinner og vil være myk, kruset og ha god spinnbarhet. Spinnbarheten er den enkelte rygjasau har fiberlengde på 25-40 my (centimeter millimeter). Denne ulltypen brukes mye til å lage ullprodukter som ulltepper, møbler og tekstil.

STEIGARSAU



Steigarsau er en gammel spælsau som er avlet fram på 1970 tallet, en kryssing mellom norsk kvit sau og norsk kvit sauer. Egnet rase fra 2005/2006. Steigarsau er en korthals med god skinner og vil være myk, kruset og ha god spinnbarhet. Spinnbarheten er den enkelte steigarsau har fiberlengde på 25-40 my (centimeter millimeter). Denne ulltypen brukes mye til å lage ullprodukter som ulltepper, møbler og tekstil.

BLÅSET SAU



Blåset sau er en gammel spælsau som er avlet fram på 1970 tallet, en kryssing mellom norsk kvit sau og norsk kvit sauer. Egnet rase fra 2005/2006. Blåset sau er en korthals med god skinner og vil være myk, kruset og ha god spinnbarhet. Spinnbarheten er den enkelte blåset sau har fiberlengde på 25-40 my (centimeter millimeter). Denne ulltypen brukes mye til å lage ullprodukter som ulltepper, møbler og tekstil.

FUGLESTADBROGETE SAU



Fuglestadbrogete sau er en gammel spælsau som er avlet fram på 1970 tallet, en kryssing mellom norsk kvit sau og norsk kvit sauer. Egnet rase fra 2005/2006. Fuglestadbrogete sau er en korthals med god skinner og vil være myk, kruset og ha god spinnbarhet. Spinnbarheten er den enkelte fuglestadbrogete sau har fiberlengde på 25-40 my (centimeter millimeter). Denne ulltypen brukes mye til å lage ullprodukter som ulltepper, møbler og tekstil.

SUFFOLK



Suffolk er en gammel spælsau som er avlet fram på 1970 tallet, en kryssing mellom norsk kvit sau og norsk kvit sauer. Egnet rase fra 2005/2006. Suffolk er en korthals med god skinner og vil være myk, kruset og ha god spinnbarhet. Spinnbarheten er den enkelte suffolk har fiberlengde på 25-40 my (centimeter millimeter). Denne ulltypen brukes mye til å lage ullprodukter som ulltepper, møbler og tekstil.

SPÆLSAURASER

SPÆLSAU, KVIT OG FARGET



Spælsau, kvit og farget er en gammel spælsau som er avlet fram på 1970 tallet, en kryssing mellom norsk kvit sau og norsk kvit sauer. Egnet rase fra 2005/2006. Spælsau, kvit og farget er en korthals med god skinner og vil være myk, kruset og ha god spinnbarhet. Spinnbarheten er den enkelte spælsau, kvit og farget har fiberlengde på 25-40 my (centimeter millimeter). Denne ulltypen brukes mye til å lage ullprodukter som ulltepper, møbler og tekstil.

NORSK PÈLSSAU



Norsk pèlssau er en gammel spælsau som er avlet fram på 1970 tallet, en kryssing mellom norsk kvit sau og norsk kvit sauer. Egnet rase fra 2005/2006. Norsk pèlssau er en korthals med god skinner og vil være myk, kruset og ha god spinnbarhet. Spinnbarheten er den enkelte norsk pèlssau har fiberlengde på 25-40 my (centimeter millimeter). Denne ulltypen brukes mye til å lage ullprodukter som ulltepper, møbler og tekstil.

SVARTFJES



Svartfjes er en gammel spælsau som er avlet fram på 1970 tallet, en kryssing mellom norsk kvit sau og norsk kvit sauer. Egnet rase fra 2005/2006. Svartfjes er en korthals med god skinner og vil være myk, kruset og ha god spinnbarhet. Spinnbarheten er den enkelte svartfjes har fiberlengde på 25-40 my (centimeter millimeter). Denne ulltypen brukes mye til å lage ullprodukter som ulltepper, møbler og tekstil.

GAMMALNORSK SAU



Gammalnorsk sau er en gammel spælsau som er avlet fram på 1970 tallet, en kryssing mellom norsk kvit sau og norsk kvit sauer. Egnet rase fra 2005/2006. Gammalnorsk sau er en korthals med god skinner og vil være myk, kruset og ha god spinnbarhet. Spinnbarheten er den enkelte gammalnorsk sau har fiberlengde på 25-40 my (centimeter millimeter). Denne ulltypen brukes mye til å lage ullprodukter som ulltepper, møbler og tekstil.

GAMMALNORSK SPÆLSAU



Gammalnorsk spælsau er en gammel spælsau som er avlet fram på 1970 tallet, en kryssing mellom norsk kvit sau og norsk kvit sauer. Egnet rase fra 2005/2006. Gammalnorsk spælsau er en korthals med god skinner og vil være myk, kruset og ha god spinnbarhet. Spinnbarheten er den enkelte gammalnorsk spælsau har fiberlengde på 25-40 my (centimeter millimeter). Denne ulltypen brukes mye til å lage ullprodukter som ulltepper, møbler og tekstil.

GAMMALNORSK SPÆLSAU



Gammalnorsk spælsau er en gammel spælsau som er avlet fram på 1970 tallet, en kryssing mellom norsk kvit sau og norsk kvit sauer. Egnet rase fra 2005/2006. Gammalnorsk spælsau er en korthals med god skinner og vil være myk, kruset og ha god spinnbarhet. Spinnbarheten er den enkelte gammalnorsk spælsau har fiberlengde på 25-40 my (centimeter millimeter). Denne ulltypen brukes mye til å lage ullprodukter som ulltepper, møbler og tekstil.

Figure 7 – Sheep breeds in Norway.

The industry of wool

The visit to the mill company Selbu Spinneri was of great importance since the project aimed to have contact with companies from different realities and small-medium productive scale, so that we could understand how to create parallels with the Portuguese productive reality.

Contacting this company was not an accident, as its managers are used to working with small productions, attach great importance to the exchange of knowledge and invest in the production of synergies with bilateral projects with different countries.

Selbu Spinneri is a company considered a Mini Mill where the equipment and work instruments are adapted to productions considered small or medium and where the quality of the material produced is extremely important.

The company is in constant development and the effort to improve products and processes is constantly being evaluated and improved. The company has the capacity to wash the wool it uses for its productions, having the possibility to guide the entire production process from the collection of the fiber to the spinning of yarn from a single cable to yarn twisted into several cables. Most of the yarns produced are for knitting and they also produce a small amount of yarn for weaving. The focus on sustainability is a constant process that is taken into account in all stages of production, which are similar to the stages developed by large-scale industries.

The company works fundamentally with the natural colors offered by the different breeds of sheep, being able to create threads from white to black passing through a series of shades of grey, creating different shades and gradations depending on the mixtures and the amounts of shades placed in the same batch. Some yarns are dyed with natural dyes despite representing a tiny amount of their production.

The company has a space with weaving looms and where they can test some yarns that can develop and teach the primordial traditional Norwegian weaving techniques.

The system of wool collection in the Norwegian national territory is done in a very organized and branched way, having the ability to collect practically all the wool produced in the national territory and channel it to what are called "Wool Stations". Wool Stations collect the wool from the shearing of the sheep, as well as the cut hair of animals that are slaughtered and introduced into the Norwegian food chain. The wool is collected in round heavy paper bags that are identified with the code of each wool producer belonging to that collection system. The bags are used several times and recycled until their end of life when they no longer meet the needs of producers and are replaced by new ones.

In the wool collection stations, the wools are separated and selected in different ways, by color, roughness, length, and diameter and by the more or less curly structure. The different qualities of wool are selected to be used for different purposes, from yarns for weaving fabrics for clothing, or for the production of felts or more rustic pieces, such as rugs or even fillers.

As the winters in Norway are long and cold, the worst quality wool is sometimes not even washed and is used in agriculture, mixed with the soil, in order to create a less inhospitable environment for the growth of some vegetables and tubercles.



Figure 8 – Presentations by the project members during the Klaebu meetings.



Figure 9 – Guided visit to the processing of the wool in the Selbu Spinneri mill.



Figure 10 – Sourcing the wool from Norway and Portugal during the workshop in Klaebu.



Figure 11 – Wool textile samples debated during the workshop in Klaebu.



Figure 12 – Visits to the Leinstrandveien farm and to the Selbu Museum.

Citizen engagement to wool

Norway citizens are engaged in the sheep-wool cycle. According to a survey conducted in 2018 by Vicionates and Alfnes, 40% of adults (nearly half of all women) had knitted something in the last 12 months. As the interest in handicrafts, such as knitting, has grown rapidly among young women in recent years, the sustainability of the different operations in the yarn value chain has become an increasingly important topic for producers and sellers.

The involvement and awareness of the community start in the early school years by promoting study visits to small wool industries and leisure time activities (Figure 13). As an example, Selbu Spinneri received in its facilities during the 2021 summer holidays a group of 20 children, ages ranging between 12 and 15 years old. Also during the year, some 10-15 children attend different arrangements in the spinning mill, such as plant dyeing, hand spinning, or wool sorting. These children are between the ages 5-17 years and they attend together with their parents.

Concerning the adult population, Selbu Spinneri provides courses, lessons/speeches, guided tours in the spinning mill, workshops, and seminars for adults, in a total of 20 courses, 15 speeches, 10 workshops, and 2 seminars, during last year. The age of the adults varies between 18 and 90 years.

Higher education students are also the object of attention of the Selbu Spinneri, by promoting guided tours and workshops for students. Last year has been visited by Norwegian University of Science and Technology, University of South-Eastern Norway and for upper secondary school. Around 20 students participate each year.

In addition, the promotion of knitting competitions by local enterprises starts to gain visibility. One of those local initiatives is the "Tingvoll" sweater, a communal endeavor based on a *dugnad* among local enthusiasts with a common wish to showcase locally anchored clothes and better use of wool from local Old Norse sheep. The very close cooperation between the farmers, mill, and knitters is the very basis for the local anchoring such an initiative can garner. The initiative developed by Arnar Lyche in 2019, employed in the region's farmers cooperative and a sheep farmer, and for three years in a row, Tingvoll Wool has invited local amateur knitters to make their version of first a Tingvoll-sweater (Figure 14). A catwalk-show, with young and old models is part of the program. In 2020 the Coastal Culture sweater was proposed, and in 2021 a sweater celebrating the farmer, all made from yarn spun at Selbu Spinning Mill with Lyche's flock's wool.

Finally, the importance of wool in the preservation of the Norwegian identity. In last years, the promotion of a national dress, steeped in century-old traditions and often tied to specific regions called *bunad*, has motivated the discussion around the national symbols and its certification (Figure 15). This type of dress, a heritage-inspired design with roots to Norwegian folk costumes, has gained in popularity and new 'fantasy creations' inspired by the folk costumes are in vogue. Nowadays about 75 % of Norwegian women own one.

Several designers started looking to this as an opportunity for their collections and the inclusion of national patterns or local materials is nowadays explored as a way to promote the cultural expression of Norwegian identity.



Figure 13 – Selbu Spinneri facilities.



Figure 14 – Tingvoll sweater competition. (<https://www.facebook.com/tingvollull>)

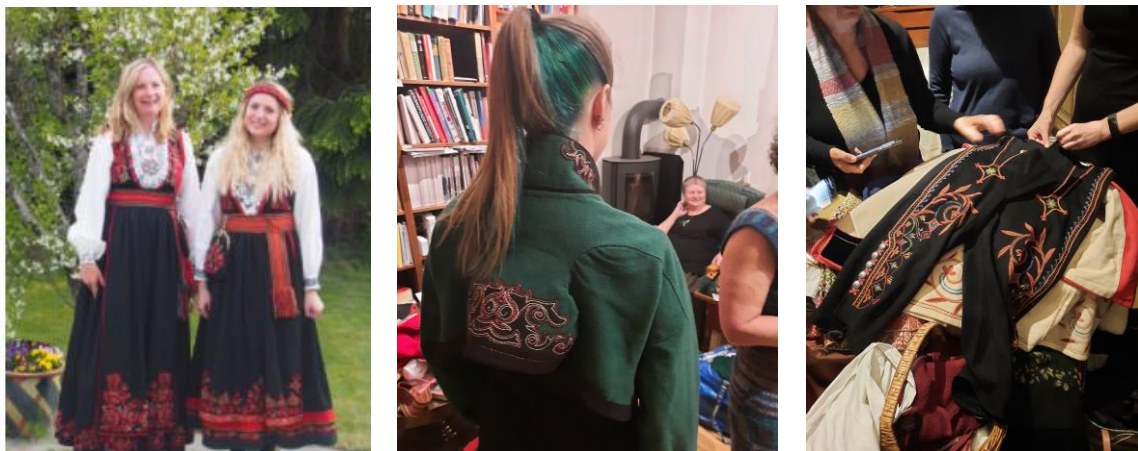


Figure 15 – Examples of traditional costumes.
 (<https://impakter.com/crusing-into-the-future-with-a-local-angle-for-fashion/>)

5. Final considerations

Norway has a long tradition for sheep husbandry and wool and currently, almost all wool is utilized. This is an important perspective and approach to be analyzed, once in Portugal, like the rest of Europe, most of the coarse or colored wool is considered waste.

The wool from more than 10 Norwegian sheep breeds is mainly a byproduct from milk or meat production. Wool from different sheep breeds vary in texture, color and softness. This beautiful diversity was observed during the fieldworks in Oslo, Klaebu and Selbu.

The local wool value chain is well developed in Norway. The fieldwork investigation allows seeing the work of a small-scale wool processing and the high demand for services and products of mini-mills. Also, to contact with initiatives to find ways to utilize more diverse fiber types have been established on a local scale in Norway.

The sustainability of the wool cycle is a hot topic on the government agenda, in research centers, and in farmers and wool producers. Ordinary citizens are also engaged in the wool cycle, revealing awareness and knowledge about all steps in the sheep-wool process above the European average. The engagement process has the strong support of the wool industry, with the promotion of visits to factories and wool activities and workshops to students, of the various school cycles, and by promoting knitting competitions to develop the wool-cycle industry and increase wool presence in Norwegian lives. The current discussion about the certification of materials and processes for making the *bunad* is a clear evidence of how important wool is in the search of national identity.

A study on knitting in Norway developed by OsloMet's CIFO¹ Research Center, states that in 2018 around 43% of women in Norway were knitting on a regular basis and also 4% of men were doing the same. This dimension does not provide any kind of comparison with Portugal, where hand knitting is seen, substantially as a hobby or distraction associated with traditional crafts in extinction, despite the current revival.

One of the most important factors of this project was the exchange of experiences and the different points of view that make it possible to add value to the wool product, which has countless possibilities of use, regardless of its quality and commercial value. The project allowed the exchange of information and some techniques that are traditional in Norwegian and Portuguese culture and identity, and probably the biggest manifestation of this visit to Norway was the study of traditional jerseys with typical Norwegian patterns, whether linear design or round fitting design.

Future developments of the project count with the fieldwork trip in Portugal, in May 2022, with the participation of the Norway team together with the Portuguese team. The fieldwork will be planned as a mirror of the Norway activities to allow future comparison, and will involve a workshop for the production of the yarn made with the junction of Norwegian and Portuguese wool. An international competition to knit a cup-sweater by applying this yarn is under development, and it is to be launch in the last trimester of the year, joining the final event of the project, the online forum.

¹ <https://www.tnp.no/norway/exclusive/knitting-man-norway-goes-viral>
<https://forskning.no/kronikk-naeringsliv-kultur/kronikk-43-prosent-av-alle-norske-kvinner-strikker/1166988>

The textile samples with the combination of yarns from Norway and Portugal in weaved and knitted processes are ongoing. The selected sheep breeds are 3 Norwegian breeds (Old Norwegian Short Tail/ Spælsau, Blæset and Bruner) and 3 Portuguese breeds (Campaniça, Saloia and Bordaleira).

It is clear that to deepen and defend the woolen heritage is a way to increase demand for wool from local sheep breeds, exchange knowledge and promote sustainable wool production. This fieldwork promoted this exchange and to establish the beginning of a network for future projects on responsible utilization of local fibres and to develop knowledge about small-scale value chains.

Annex – Budget update

The budget involved in the participation of the four Portuguese elements in the joint fieldwork is summarized in next table. The original documents are kept in the CIAUD – FAUL/UL archives and digitalized invoices are shared in the google drive folder.

Activity - Joint Fieldwork in Norway	Estimated	Effective	Description
Transfer	80,00 €	80,00€	2 return trip
Accommodation (120€)	2.880,00 €	2.481,00 €	6 nights
Per diem (62,55€)	1.751,40 €	1.751,40 €	7 days
Transport airplane	2.120,00 €	1.913,00 €	2 return trip Lisbon-Selbu 3039Km (530 € ref. Erasmus)
Material acquisition (wool)	197,50 €	464,00 €	
Total	7.028,90 €	6.689,40 €	