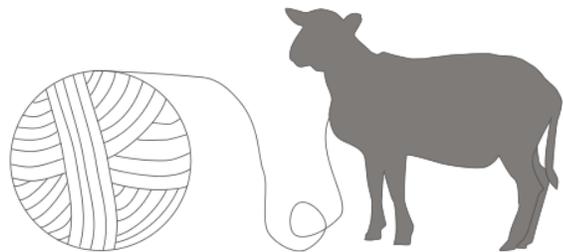


Norway: Wool from Norway's conservation sheep breeds – the complete wool value chain

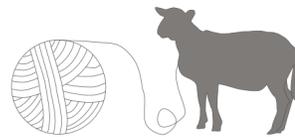
- Ingvild Espelien (Board leader and Project Leader, Selbu Spinneri)

 *Selbu
Spinneri* 



Ingvild

- Biologist by attitude and lifestyle
- Live on a farm (15 years with sheep, today we have goats) with our family (children, grandchildren) – self sufficiency farming
- Board leader and project leader, Selbu spinneri
- Oudor life – dressed in wool!





A story is based on
personal experience

The sheep made the cultural landscape at our farm

- The wool had no value, but it was wonderful to use in garments!
- We wanted to give value to the wool of the national sheep breeds – so we started Selbu spinneri

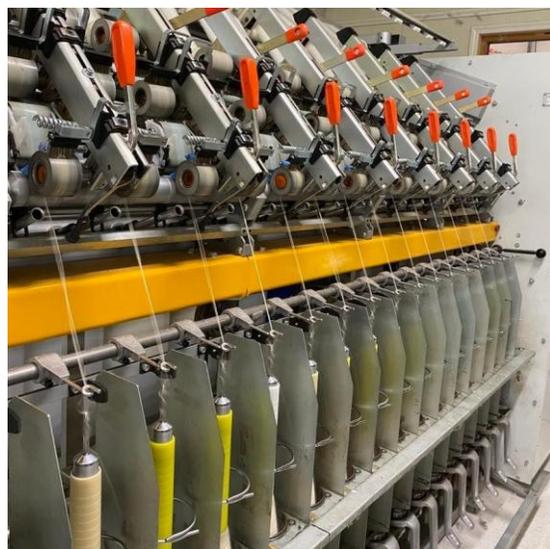
The national sheep breeds of Norway – our favourite wool!

- Most of the Norwegian sheep breeds have coarse and pigmented wool
- The farmers get less/nothing paid for their wool (in C2S), while the white wool of the high-quality classes (C1) is paid NOK 70,-/kg
- As national sheep breeds are also most often smaller, they produce less meat, so less money for the meet
- **The best way to conserve the sheep is to eat the meat, use the skin and make high quality textiles of the wool!**
- Selbu spinneri is a family business and we proudly say that we live as we work.....





- Established in 2010, Five employees in 2026
- Around 6000 kg of raw wool/year – we aim to grow to reach 10 000
- Turnover the last two years: 3,5 mill Norwegian kroner/year
- Our aim is to increase the value of pigmented wool from the national sheep breeds. We process wool into products for the farmers (commission spinning).
- We sell yarn and other products in our factory outlet and webshop.
- We develop and disseminate knowledge about the different properties of wool and traditional crafts through project work.



Our production: We do the whole process

- From unwashed wool to finished yarn, felt, rye yarn or carded wool, all in the spinning mill in Klæbu.
- The machines are adapted to production in small batches with wool, each process requires skilled, working hands.
- We use almost no chemicals and are constantly working to utilize all wool residues from production into different products.
- We work continuously to make our production less harmful to the planet, - the climate and the nature environment.

Salary for the work we do

- A sustainable business model
- To make each other good... the nature, the sheep, the farmer, those who work at the spinning mill and those who use the yarn should be able to make a living...
- The surplus from our business goes into new machines and increased capacity



Norwegian wool stations: How does the wool collecting/grading system work for the farmer with a national sheep breed?

- **All** sheep farmers can sell/give the wool to the wool stations
- The price of the wool varies from **no payment** for the coarse, felted and pigmented wool, to NOK 60 (6 EURO) for the “finer”, white wool (C1, 25-35 micron)
- The world market price for this wool is less than 1 EURO
- The Norwegian wool prices are subsidized by the Norwegian Government as sheep farming is considered a marginal agricultural production
- **Can farmers increase the value of the wool from their farm?**



Our wool “grading”

- We sort according to purpose
- The small microscope is used when we look for kemp/medulla in the wool fiber
- Kemp/medulla is visible also in brown or grey wool, but impossible to see in black hairs – we need to feel it by hand
- What is good quality? NO BAD WOOL – **just different uses** - all wool can be utilized
- **Use to conserve – by this sorting, we can make high quality products from the national sheep breeds with pigmented wool**



A challenge and a risk: competence and quality

Quality and competence through the value chain:

- ✓ For each step in the value chain, quality and competence is essential. At the farm, the sheep's living conditions, the feeding and care, the shearing, the sorting of the wool fleeces -essential for the wool quality.
- ✓ The wool must be graded according to National grading systems *or for the planned use*.
- ✓ The wool must be washed/scoured correctly.
- ✓ In the spinning mill, it must be spun into the right kind of yarn for each use and each wool quality
- ✓ The wool might be more suitable for other products than spinning, depending on its properties
- ✓ **No wool is waste!**





Characterization of wool-1: - From the Norwegian national sheep breeds founded by the Norwegian genetic resource centre (published in 2017-18)

- Fiber length, quality and diameter
- Spun of a **standardized** yarn – tests of the yarn
- Textile washing tests
- SVEREA, Sweden did the tests

Light fastness test, knitted sample

Breed	Light fastness	TEXTILE/TEKO
Old Norse sheep grey	>6	Very Good
Pelssau grey	>6	Very Good
Old Norwegian spælsau grey	>6	Very Good
Grey Trøndersau lamb	"5-6"	Good
Grey Trøndersau Adult	"5-6"	Good
Dala dark grey	"5-6"	Good
Spælsau black	"5-6"	Good
Bleset sau lamb black	"4-5"	(?)
Old Norwegian Spælsau light brown	<4	?

Estonia – Norway University education project: Characterization of wool – 2:

- Wool sorting courses – traditional sheep breeds in both countries, exchange of experiences and competence
- Spun standardized yarn for textiles for fulling/waulking – cooperation with Estonian spinning mills during the production
- Feedback from the textile tests: We did make the high-quality product that we planned!
- Report published – and scientific publications: Ave MATSIN, Merje BEILMANN, Marte ESPELIEN BLOMLI, Astri KALJUS, Liina LEHIS, Ingvild SVORKMO ESPELIEN, Diana TUULIK & Eli WENDELBO – Estonian and Norwegian Sheep Wool as a Textile Material.
<https://doi.org/10.7577/formakademisk.5450>



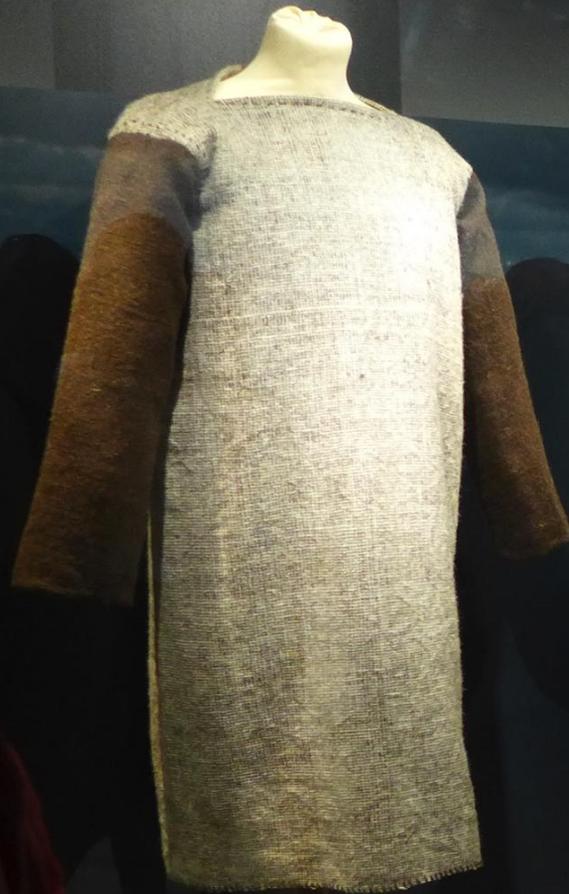


Questions to be studied and discussed further:

The wool quality of the different sheep colours

- The selection for wool quality and survival of the sheep
- What is **actually good wool quality?**
- **New and more detailed test of the wool from the Nordic sheep breeds!**

We have reconstructed the tunic from Lendbreen and have learned more about how it was made and what it must have looked like when it was new.



Veven
Stoffet i kjortelen er vevet på en oppdravvev. Den er enkel, og består hovedsakelig av en sammen med to bommer. Vevningsprosessen påføres på tynge i rektangel. Den moderne er konstruert for å vevet rektangulære på oppdravvev.

The loom
The cloth was woven on a simple warp-weighted loom – usually a frame with two beams. The threads of the warp are held taut by stones weighing along the bottom. As the threads are not held tight, when weaving the cloth on a vertical loom for the reconstruction.

Stoffet
Rekonstruert stoff er vevet i kjortelen i to deler, enten diamantmønster eller som diamantmønster som diamantvev. I hovedsak er det i tillegg vevet en mørk og en lys farge som sammen skaper et spekket mønster.

The cloth
The weaving technique used is called diamond hilt, from the diamond pattern seen in the weaves. In the main piece, dark and light wool have also been used to create a speckled pattern.

Sømmen
Kjortelen er håndsydd med grove sømmer i ulldåd, i rektangulære kanter og på halsen.

The stitching
The tunic was sewn using wooden thread. The stitching is quite coarse, as can be seen in the reconstruction seen by Helene.



Foto: U. T. Grønborg

Reconstruction of the Lendebre tunic

The Norwegian glaciers are retracting due to climate change

- Archaeologists found a tunic from 300 AC in the glacier named Lendebreen
- Reconstructed yarn
- Warp weighted loom
- Drop spindle test
- Archaeological museum, Oslo and in the Lom mountain museum
- This would not be possible without the old Norwegian sheep (villsau)

A complete value chain: Selbu husflidcentral – local knitting tradition

- The development of three yarn types for reconstruction of the Selbu mittens
- Anne Bårdsgård's books: Selbu mittens and Selbu patterns (English, German Japanese etc)
- Selbu husflidcentral – local value chains for the world's knitters and artisans

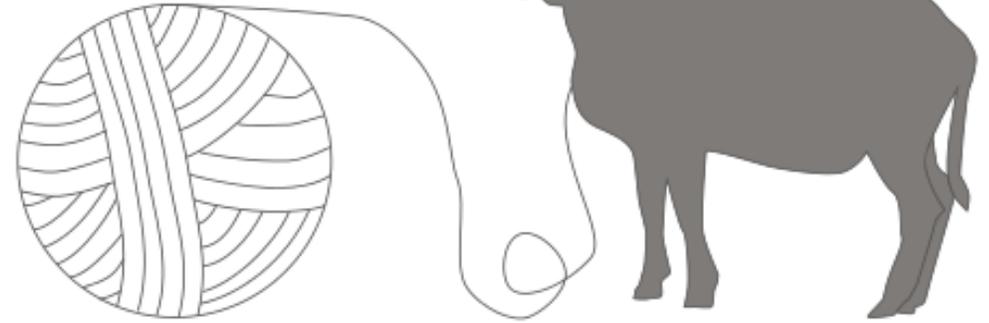


Completing the value chain: The finished garment

- **Tingvoll ull:** a small company – a big knitter
- 3D knitting machine
- Medium scale production for direct sale and wholesale
- All yarn delivered from Selbu spinneri
- Building experience and competence step by step
- Plans for “larger” volumes



Picture from Tingvoll ull



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