

SUSTAINABLE RAW MATERIAL: WOOL COMMITMENT

This wool commitment outlines the priority issues using wool fibers or similar animal fibers for high-quality garments as part of the HUGO BOSS sustainability strategy. The described topics are based on publicly available research work and illustrate the complexity by bringing together all relevant issues with the intention to create additional value for all stakeholders.

1 Why wool

Wool is a renewable resource composed of the natural protein keratin, which is similar to the protein substance of human hair. Wool will biodegrade when buried in soil, given the required levels of temperature, oxygen and moisture. Research indicates that wool fiber also biodegrades in both fresh and salt water¹.

Wool fiber has outstanding characteristics: It has a naturally water-repellent outer membrane, and a structure that allows the fiber to naturally absorb moisture, resist odor and react to changes in the body's temperature. Using high quality wool fibers like Merino, guarantees a long lasting fashion garment. Unlike synthetic fibers, wool garments during washing procedures do not release any critical non-biodegradable micro particles that would get into the natural water cycle and be taken up by marine organisms, finally entering the food chain².

The share of wool based garments within the HUGO BOSS product portfolio is 16% (second most important fiber) which is equal to 2.26 thousand tons in 2017³.

2 Sustainability issues of wool

Valuable knowledge concerning the issues of wool in terms of sustainability has benefitted from the research done for the World Apparel and Footwear Life Cycle Database (WALDB), the three white papers on the Natural Capital Valuation, and the close collaboration with experts in sheep farming and wool garment production.

Wool fiber production is an important economic driver for many farmers around the globe and remains an expensive investment. In September 2018 the average price for Merino ewe lambs and hoggets were at AU\$148 per animal⁴.

On the other hand, sheep farming requires natural resources and good animal welfare practices need to be in place.

Hereafter some facts to set the focus on the relevant sustainability issues.

2.1 Animal welfare

As for all raw materials, deriving from animals, the main attention is on their living conditions. The World Organization for Animal Health⁵, states that animal welfare standards should be based on sound scientific findings, and optimal animal health should always be the basis for animal welfare. The OIE is the global authority for standards on animal welfare, and their defined "Five Freedoms" for the care of animals are recognized internationally:

¹ Y. Sun et al., "Study on Biodegradability of Wool and PLA Fibers in Natural Soil and Aqueous Medium", *Advanced Materials Research*, Vols. 641-642, pp. 82-86, 2013)

² Napper I, Thompson R (2016), Release of synthetic microplastic plastic fibers from domestic washing machines: Effects of fabric type and washing conditions, *Marine Pollution Bulletin*, Vol. 112, Nov. 2016

³ HUGO BOSS sustainability report 2017

⁴ AuctionsPlus: Weekly Livestock Market Comments

⁵ OIE <http://www.oie.int/en/animal-welfare/animal-welfare-at-a-glance/>

- Freedom from hunger, malnutrition and thirst
- Freedom from fear and distress
- Freedom from physical and thermal discomfort
- Freedom from pain, injury and disease
- Freedom to express normal patterns of behaviour

In 1998 the European Commission⁶ has established the Council Directive 98/58/EC on the protection of animals kept for farming purposes and defined similar 'five freedoms' as the ones mentioned above by the OIE.

Furthermore, animal welfare requires disease prevention and appropriate veterinary care, shelter, management and nutrition, a stimulating and safe environment, humane handling and humane slaughter or killing.

A major issue in sheep farming is the blowfly strike, or myiasis⁷. The affected animal will rapidly deteriorate, causing increased breathing and heart rate, ammonia toxicity, coma and death.

Different treatments are possible for which one specific is called "mulesing". Today the following categories for mulesing of mobs exist:

- Mulesed: The removal of skin from the breech and/ or tail of a sheep using mulesing shears.
- Mulesed with Pain Relief: All sheep in this mob have been mulesed using a registered Pain Relief product.
- Ceased Mulesing: Wool from sheep where mulesing has ceased on the property. No lambs born on this property in the last 12 months have been mulesed. No purchased sheep are mulesed.
- Non-Mulesed: No sheep in this mob has been mulesed.

In order to respect the five freedoms of animal welfare and stop mulesing, the wool sector established standards and offers certificates like the National Wool Declaration from AWEX (including the desk-top and physical farm audits), in which the status of mulesing has to be declared⁸. Further wool initiatives and certifications are for example the Textile Exchange Responsible Wool Standard⁹ and the traceable ZQ-Merino standard¹⁰.

Unfortunately, still cases of animal maltreatments like tail docking - an accepted animal husbandry practise to prevent disease, as well as mulesing or injuries during shearing, are reported by animal rights organizations - about 99 cases in the last 5 years. In order to immediately establish a mitigation process, a close collaboration between the animal rights organizations and international wool organizations like the IWTO and brands / retailers, providing the necessary information, would be beneficial for all involved parties.

⁶ https://ec.europa.eu/food/animals/welfare_en

⁷ <https://www.farmhealthonline.com/US/disease-management/sheep-diseases/sheep-blowfly-strike/>

⁸

https://www.iwto.org/sites/default/files/files/iwto_resource/file/IWTO_Fact%20Sheets_Understanding%20Wool%20Declarations.pdf

⁹ <http://responsiblewool.org/>

¹⁰ <https://www.discoverzq.com/> & <http://www.zqMerino.co.nz/>

2.2 Climate change

Climate change is probably today's most challenging environmental concern. Wool is a renewable raw material with a limited contribution to the greenhouse gas was done by Andrew Barber and Glenys Pellow, from AgriLINK NZ, a member of The AgriBusiness Group in Pukekohe, New Zealand, which is shown in the table¹¹. Pasture management done in a holistic way can restore the fauna and act as a carbon sink (see next chapter with the Savory approach).

Textile fiber	Total energy value in MJ/kg fibre
Nylon	250
Acrylic	175
Polyester	125
Polypropylene	115
Viscose	100
Cotton	55
Wool	63

The main benefits of using wool fibers for climate change results in the use phase, due to its excellent odor and moisture management and to its intrinsic fiber structure. Wool garments require to be washed less times and at lower temperature than cotton or other natural fibers, no tumble dry and low temperature ironing (if required), to avoid any felting and shrinkage.

2.3 Land use, water and biodiversity

Oxford researchers studying land degradation in the Karoo in South Africa have noted that very high stock numbers in a "set stock grazing" system (sheep are kept in the same paddock) cause vegetation change and soil erosion leading to the formation of badlands. Soil erosion in Patagonia has triggered a desertification process that officials estimate threatens as much as 93 percent of the land.

In addition, faecal matter contaminates of waterways, as shown in a study conducted by the New Zealand government, caused by rainfall or irrigation generating overland flow that could result in considerable contamination of the waterways¹². Fresh drinking water is one of the world's most critical resources and in some regions the situation is likely to further deteriorate.

For above described reasons, according to the Savory Institute, an adequate pasture management, so called "planned grazing", has to be adopted so that the farming conditions mimic the natural ones as much as possible. The farm is then "a proxy for former herds and predators", trampling dry grass and leaving "dung, urine and litter or mulch", enabling the soil to "absorb and hold rain, to store carbon, and to break down methane". The Savory institute's (<https://www.savory.global/>) holistic pasture management approach can efficiently protect grasslands or even reclaim degraded land that was once desert.

Another example of integrated soil management is the ZQ-Merino (<https://www.discoverzq.com/>) program that requires growers to have a land environment plan that describes how land will be managed to avoid negative impacts. This includes water quality affected by effluent run off, silage pit leachate, fertiliser and agrichemical run-off, and excess sediment from earthworks.

Regarding water depletion, another important positive factor is that wool products do require less washing thanks to the wool's natural breathability that helps to defer the onset of sweating, which keeps the skin drier. When sweat does occur, wool absorbs

¹¹ <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.553.6556&rep=rep1&type=pdf>
¹²

<https://www.es.govt.nz/Document%20Library/Research%20and%20reports/Various%20reports/Science%20reports/Ecosystem%20health/Sheep%20as%20a%20potential%20source%20of%20microbial%20contamination%20in%20Southland.pdf>

the moisture but not the salts or other waste products in the sweat. The wool's complex chemical structure enables it to absorb and lock away odours within the fibre, where the bacteria that cause odour cannot thrive.

The "self cleaning" function of wool garments, when aired out, significantly release these odours and they will feel fresh again the next day. Odour-wearer trials conducted by the CSIRO⁵³ show that wool socks are preferred for both lack of odour after wearing and for lack of odour after washing, especially when compared to synthetic socks.

Finally, wool is a naturally biodegradable fibre that helps avoiding the pollution of the oceans with micro plastic. Some 83% of tap water samples collected from over a dozen countries on five continents tested positive for micro plastic, according to a study commissioned by data journalism outlet Orb¹³.

2.4 Socio – economic

Wool is an important economic factor for many sheep farmers with over 1 billion sheep generating over 2,1mkg greasy wool worldwide (see details in 3.1 wool market). Since the investment for Merino sheep's are quite important with an average price of AU\$148 per animal¹⁴, a sheep farmer needs several years (4-5 years) to have its return on investment.

2.5 Summary of sustainability issues

Wool is by far the most important animal fiber used in textiles and as for all products derived from animals, animal welfare is a key element for the HUGO BOSS sourcing strategy and no animal abuse would be tolerated. Wool products at HUGO BOSS are known for their long lasting quality and show great benefits for their low impact during the use phase; furthermore wool is an ideal raw material for the circular economy be it for re-use or recycling.

3 Wool sourcing

HUGO BOSS is sourcing wool through its yarn-, fabrics- or finished garment suppliers giving precise indication regarding quality and sustainability criteria.

3.1 Wool market

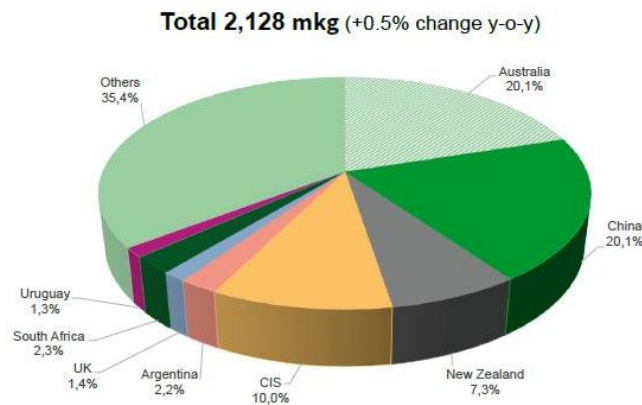
According to the most recent available figures, around 1,160 million kg (2015) of clean raw wool are produced by more than 1,163 billion sheep (2015) around the world¹⁵.

¹³ https://orbmedia.org/stories/Invisibles_plastics/multimedia

¹⁴ September 2018 AuctionsPlus: Weekly Livestock Market Comments

¹⁵ <https://www.iwto.org/wool-production>

Greasy 2015 (% share)



Source: Foreign Trade Statistics, International Trade Centre, Poimena Analysis & Delta Consultants



Superfine Merino wool prices lifted strongly in 2016/17 (about plus 50%). Prices surged further during the first six months of the 2017/18 season.

Thanks to the increased request for wool, the sales forecasts from the International Monetary Fund is expected to be higher in 2018 than in 2017. On the other side due to the extreme drought in Australia the expected amount of greasy Merino wool from Australia will be down by 6%¹⁶.

These two contrary trends will definitely affect sourcing due to insecurity of price and availability of certain wool qualities in the coming years.

3.2 Wool Quality

HUGO BOSS garments are of high quality and durability. Hence, wool fibers have to fulfil demanding quality requirements with a particular focus for the suits that require fine or even super fine Merino qualities, between 17 and 21 microns. That accounts less than 10% of the world wool production and is restricted to a few countries like Australia, New Zealand and South Africa. Most of the wool yarns are also blended wool qualities in order to achieve the requested HUGO BOSS specification.

Manufacturing garments with the appropriate wool fiber quality is crucial for two aspects of sustainability: high durability and reduced waste during production. The durability is an important part of our quality standards and influences the product's life cycle, meaning lower social and environmental impacts when good and long lasting wearing quality can be guaranteed. Waste during production coming from impurities or inadequate fiber strength increases material consumption and consequently affects negatively the environment.

3.3 Wool certification and initiative for more responsible wool

Initiatives exist that promote more responsible farming including animal welfare, non mulesed and an integrated pasture management:

The IWTO, as one of the biggest organization for wool, promotes the **National Wool Declaration (NWD)**. The Australian Wool Exchange¹⁷ managed the NWD since its introduction in 2008, with on farm inspections commencing in 2010. Annually, AWEX conducts (randomly selected): 1000 desk-top audits (i.e. requesting documentation from 1,000 farms) with 225 on farm inspections (of clips that have declared Non-Mulesed or Ceased Mulesing).

¹⁶ <https://af.reuters.com/article/commoditiesNews/idAFL3N1W326X>

¹⁷ AWEX <http://www.awex.com.au/publication/national-wool-declaration-nwd/>

The Textile Exchange (TE) **Responsible Wool Standard**¹⁸ (RWS) is an independent, voluntary standard. On farms, the certification ensures that sheep are treated with respect to their Five Freedoms and ensures best practices in the management and protection of the land.

ZQ Merino¹⁹ provides a marque of integrity for growers committed to 'the cessation of mulesing', animal welfare, fiber quality, environmental sustainability and social responsibility. The New Zealand Merino Company launched ZQ Merino in 2007 as the world's first ethical wool brand.

HUGO BOSS continuously reviews available standards and initiatives regarding their sustainability performance and how they fit into the HUGO BOSS supply chains and the quality requirements of the corresponding products.

3.4 Wool recycling and end of life

Wool is an ideal material for re-use and re-cycle, creating new products with a little lower quality requirement since the fibers, after a recycling process, do not have the same high quality standard as virgin fibers have, such as those used in HUGO BOSS suits. Wool's cradle-to-grave reality can involve two or three lives and a total active lifespan of 20-30 years (<https://www.iwto.org/work/wool-and-recycling>) and at the end of its life cycle wool is a biodegradable material as outlined in many studies like for example in the International Biodeterioration & Biodegradation 115, 2016²⁰. The conclusion in this study is formulated as following: "The biodegradation of wool starts quickly after burying the ropes in the soil. During the exposure the biodegradation takes place even in low temperature in winter season".

3.5 Monitoring the supply chain

Gaining full transparency in the wool supply chain is one of HUGO BOSS' key targets. With this aim, the company is working closely together with its suppliers, international wool organizations and well-known standards that support traceability and responsible wool throughout the supply chain. One of our collaboration is with ZQ-Merino for which HUGO BOSS has already set up a fully traceable supply chain verified by a third party auditing body. Furthermore, different traceability validation systems exist for the supply chain like "TF" promoted by Italy's Chambers of Commerce and managed by Unionfiliera. "TF" - Traceability & Fashion - certifies information regarding:

- Locations of the main production stages of the production chain
- The health values supporting the product, how environmentally friendly the product is and the manufacturer's social responsibility.

Additional system regarding their use for traceability will be verified and included for the sourcing at HUGO BOSS.

4 Taking action

HUGO BOSS will continue to make the impacts throughout the whole supply chain transparent, based on scientifically recognized methods like Life Cycle Assessment and

¹⁸ <http://responsiblewool.org/>

¹⁹ <https://www.discoverzq.com/>

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https://www.researchgate.net/profile/Jan_Broda/publication/325415811_Wool_biodegradation_IBB/data/5b0cfa60a6fdcc8c25366d5b/Wool-biodegradation-IBB.pdf

Impact Valuation. Additionally the company will take care about animal welfare and social wellbeing. Based on this knowledge, HUGO BOSS will closely collaborate with organizations like IWTO, the German Partner for Sustainable Textiles or responsible standards like ZQ Merino. A strong and historical commitment is given to animal welfare issues²¹ for which HUGO BOSS opposed to both animal testing, inappropriate animal husbandry and breeding methods. The company avoids farmed furs and exotic leather types and exclusively uses leather produced only as a by-product of the food industry.

HUGO BOSS already has set clear targets for non mulesed wool and will further engage for a sourcing of more responsible wool. All achievements related to defined targets will be monitored, published and, if necessary, the improvement programs will be strengthened.

²¹ <https://group.hugoboss.com/en/responsibility/products/animal-welfare/>