03

Assessing Wool's Environmental Performance

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Over the past 50 years, the world has seen a dramatic shift in consumer and regulator attitude toward environmental damage. Rachel Carson's seminal 1962 best seller "Silent Spring" opened the eyes of the Western World to the dangers of DDT and its bio-accumulation in the food chain, and ultimately led to its banning. Similarly, Ralph Nader's 1965 campaign to hold US car manufacturers accountable for the dangers their products posed led to a strengthening of the framework and scope of consumer protection law.

Since then, consumer environmental awareness and environmental regulation have grown dramatically.

Informing Consumers, by Design

Reflecting the growing consumer consciousness of sustainability, brands, retailers and regulators have been moving to improve the environmental outcomes associated with their products and services. One manifestation of this has been a plethora of environmental sustainability schemes and product labels. These vary in degree of scientific rigour, and notable examples include the EU-Ecolabel Scheme, the EU product environmental footprint (PEF) system and the Sustainable Apparel Coalition's Higg Material Sustainability Index (MSI).

The science of sustainability is complex and evolving, and arguably the main assessment tool is now Life Cycle Assessment.

What is Life Cycle Assessment?

Life Cycle Assessment (LCA) is a full supply chain tool (cradle to grave) for assessing the impacts of a product or service. As a tool, LCA can help manage environmental impacts across supply chains, and help inform sustainable choice in garment design or purchase.

LCA has a process optimisation background, being first applied in simple factory production systems where the environmental costs of linear processes were estimable. It is a data-driven system, requiring detailed technical knowledge of all input resources and process outputs throughout the production system.

Ideally, LCA is applied across the entire life cycle of a product – from raw material production (cradle) to end of life disposal (grave) – and assesses environmental impacts across impact categories such as: greenhouse gas emissions, water use, and resource use and depletion. In practice, research often focuses on one part of the supply chain, and may be termed "cradle to gate" or "gate to gate" assessment, which has inherent limitations compared to full analysis.

International Standards

The practice of LCA has been codified and standardised. An ISO family of standards applies to LCA, which includes:

- ISO 14040 series of standards, applying to conduct of LCA for a single product or system.
- ISO 14020 series of standards, applying where comparisons between products are being made for commercial purposes.

Both are critical for the global apparel textile industry, especially the 14020 series which affects comparisons between wool and other textile fibres.

Limitations of LCA

As an environmental accounting system based on science, LCA is constantly evolving as knowledge deepens and the field of enquiry widens. Some weaknesses include:

- The circularity of biological systems, especially where resources are recycled (biodegraded);
- The costing of land use, especially where applied to comparisons of natural and oil-based fibres, since this requires estimation of land use impacts across time horizons.
- Impacts of chemical toxicity and biodiversity are difficult to assess, and no methods exist that incorporate impacts from microplastic pollution.
- Missing or incomplete data, as does any other science.

As with any other model based system, the quality of the assessment is only as good as the accuracy of the data inputs and the modelling methods that are used. Because LCA aims to be comprehensive, the data needs are very high and incomplete datasets or use of proxy data represents a potential weakness in any study.

IWTO is Investing in a Level Playing Field

IWTO and its funding partners have been investing to improve the quality of LCA science, and to ensure a level playing field where LCA is being applied to compare fibres, such as in SAC's Higg MSI. Major achievements have been:

- Development and international acceptance of biophysical methods for allocating impacts between co-products in sheep production systems (such as meat and wool)
- Publication of original research exploring the garment use phase, including conduct of global consumer wardrobe audits.
- Publication of a major review of micro-fibres, and the soon to be published review of chemical residues in wool.
- Completion of a major review of the SAC Higg MSI, relative to the ISO standards guiding conduct of comparative LCA – this is soon to be published.

But much is still to be achieved. Current research includes:

- Expanding the scientific understanding of consumer garment use, and how this can be improved to reduce environmental impacts from wool garments.
- Determining impacts from systems where supply and demand are changing, using consequential LCA methods.
- Comparative assessment of ISO compliant LCA of textiles using standardised inventory methods and data.
- Developing a methodology to cost the monomer production phase (will hopefully allow for meaningful comparisons of synthetic and natural fibres)
- Study of the biodegradation of wool, including the number and fate of wool microfibres formed during garment care

Since wool is a renewable, biodegradable, and durable apparel textile fibre, the wool industry has much to gain from robust and well-informed LCA comparing wool with other fibres. This research will enable the next generation of consumers to be well informed about how their product choices can be part of a sustainable future.

About IWTO

With a world-wide membership encompassing the wool pipeline from sheep to shop, the International Wool Textile Organisation represents the interests of the global wool trade. By facilitating research and development and maintaining textile industry standards, IWTO ensures a sustainable future for wool. The IWTO Wool LCA Technical Advisory Group is composed of LCA experts from around the world, kindly funded by Australian Wool Innovation and chaired by Dr Stephen Wiedemann of Integrity Ag & Environment. www.iwto.org