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WWF Position

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WWF POSITION ON TEXTILE CIRCULARITY

CLOSING THE LOOP ON TEXTILES

Summary

The textile industry needs to transition from a linear to a circular model to reduce its detrimental impact on the environment and society. Circular textile systems prioritize durability, responsible sourcing, frequent reuse, repairs, and end-of-life recycling. This approach emphasizes the well-being of stakeholders and the natural environment.

Achieving textile circularity requires industry-wide transformation and a multifaceted approach. This document provides actionable strategies for all stakeholders in the textile value chain to embrace circular practices:

1. Phase out overconsumption and overproduction.
2. Transition to 100% sustainably[1] sourced raw materials.
3. Eliminate production waste including from water, energy, and material inputs.
4. Address material waste from retail and e-commerce packaging.
5. Extend product lifetime through behaviour change, design, textile care and repair.
6. Implement effective reuse and return programs.
7. Develop sustainable textile-to-textile recovery and recycling solutions.
8. Tackle microfiber pollution from fibre fragmentation.

A call to action to stakeholders provides the basis for further work and discussion.

INTRODUCTION

Textiles are integral to various products, with apparel accounting for 60% of global fiber demand[2]. While circularity discussions mainly revolve around fashion, this position applies to all textile systems. The need for transition arises from issues such as excessive textile production, low utilization rates, and inadequate recycling.

ENVIRONMENTAL CASE FOR TEXTILE CIRCULARITY AND HUMAN IMPACTS

The linear economy of the textile industry has negative impacts on nature, people and even on the companies that apparently benefit through this linearity.

Textiles are resource-intensive across their lifecycle, contribute to the extraction of fossil fuels and deforestation and generate significant pollution. Sourcing raw materials for textile production places a significant demand on the natural environment in terms of land use, water demand, and chemical inputs – affecting biodiversity immensely[3]. The industry consumes 215 trillion litres of water per year, the equivalent of 86 million Olympic-sized swimming pools. Cotton cultivation uses 2,5% of the world's arable land, whilst wool production requires 278 hectares per tonne of fibre[4]. Production processes are estimated to release between 2% and 8% of global greenhouse gas emissions.[5]

Beyond production, the use and disposal of textiles also results in significant environmental impacts. Laundering of synthetic fibres like polyester – typically made from fossil fuels and found in about 60% of all garments – is responsible for around one-third of all microfiber pollution in the ocean.[6] These microfibers also have infiltrated humans and their food cycle. The demand for wood-based products, specifically pulp for man-made cellulosic textile production, is on the rise. While currently small in terms of volume, these sectors are characterized by high economic value and large levels of investment. If current growth trends continue, it will add to the pressures on global land.[7]

As textile production rises, so does the amount of textile waste, creating about 92 million tons of waste each year.[8] Because apparel and other textile products are often made of a combination of multiple natural and synthetic fibers, they are still uniquely hard to separate and to recycle properly. Globally, approximately 73% of all disposed textiles are either landfilled or incinerated rather than reused, repurposed, or recycled [9]. This especially puts pressure on the global south[10], where second-hand textile waste is sent, and where sorting, recycling and waste management systems often do not exist.

The social impacts of the textile industry are well documented, particularly those of the fashion industry. The fast fashion business model relies on low-cost production done at an extreme speed, which often results in textile production facilities that have gender-based violence and harassment, human rights abuses, child labour and other social impacts.[11] In many countries, including India and Bangladesh, over 50% of textile workers are paid less than the minimum wage.[12] Textile workers are also regularly exposed to toxins including cotton dust, pesticides, chemical agents, and other hazards.[13]

While efforts have been made to increase the overall sustainability of raw material sourcing and textile production, the system continues to be a linear, take-make-waste model driven by modes of fast production and consumption. Committed action to shift toward a circular textile future is necessary to preserve the future of our planet and the textile industry.

WWF'S VISION FOR A CIRCULAR ECONOMY OF TEXTILES

WWF's mission is to conserve nature and to build a future in which humans live in harmony with nature. WWF holds the position that a circular economy which functions within planetary boundaries[14] has the potential to both protect and regenerate nature and climate.[15]

In a circular textile system, all textiles are designed for durability, responsibly manufactured from sustainably sourced raw or recycled materials, frequently reused, repaired when needed, and recycled at end-of-life—the opposite of a linear, take-make-waste fast fashion and textile system. This circular system not only prioritizes the well-being of stakeholders throughout the industry supply chain and the health of the natural environment, but also generates new revenue streams and job opportunities.

APPROACHES TO ACHIEVE TEXTILE CIRCULARITY

To drive systemic change and achieve circularity within the textile industry, stakeholders within the value chain should adopt a multi-pronged approach that targets the industry's full lifecycle impact. The following eight approaches should be considered:

1. **Phase out overconsumption and overproduction**: Reduce frequent launches and high-consumption marketing. Prioritize durable, long-lasting textiles, encouraging consumers to maximize product use. Shift behaviour towards valuing resources and sustainable textile consumption.

2. **Transition to 100% sustainably sourced raw materials**: Source raw materials responsibly and eliminate hazardous chemicals from supply chains.

3. **Eliminate production waste (water, energy, materials)**: Minimize waste at all production stages in supply chains and consider innovative solutions leading to zero waste.

4. **Address waste from retail and e-commerce packaging**: Reduce, reuse, or recycle packaging. Research innovative options for limiting and eliminating packaging waste.

5. **Extend product lifetime through design, behaviour change, textile care and repair**: Encourage consumers to use textiles longer and care for their textiles. Offer mending and repair services and provide care information.

6. **Implement effective reuse and return programs**: Scale local reuse systems to reduce exportation of used clothing. Develop branded reuse and rental programs to limit new textile production.

7. **Develop sustainable textile-to-textile recycling solutions**: Prioritize mechanical recycling for existing textile waste while being cautious with chemical recycling due to environmental concerns. Focus on redesigning systems for sustainable collection and processing.

8. **Tackle microfiber pollution from fibre fragmentation**: Minimize fibre shedding throughout the product lifecycle. Design with low-shed materials, use controlled pre-washing during production, implement effective capture technology in wet processing facilities, add filters to washing machines and educate consumers. Support research and innovation for solutions.

THE APPROACHES IN DETAIL

1. Phase out overconsumption and overproduction

The current apparel and textile market is characterized by overproduction and overconsumption, yet many textile products go underutilized or entirely unused[16].

Companies should rethink their clothing and product launches, including decreasing the frequency of launches, conducting analysis to better anticipate demand of items, and adjusting production. Companies must also reconsider their marketing strategies, which are currently a huge driver of impulse purchasing; they should aim to shift away from promoting take-make-waste, high-consumption behaviour and move towards informing their customers on sustainable purchasing and usage options.

In a circular economy of textiles, apparel should be designed, produced, marketed, and consumed with the goal of longevity in mind. Companies should design and manufacture high-quality and long-lasting textiles by strengthening

stress points and using more durable options. Design and production of more durable textiles enables reuse, repair, and remanufacturing, all of which extend the life of the textile. Companies can then market these items as high quality and long-lasting, encouraging consumers to get the maximum use out of their items rather than focusing on what is trending or buying into the idea that newer is better.

2. Transition to 100% sustainably sourced raw materials

Clothing production has doubled in the last 15 years, driven by increased per capita consumption in mature economies, where 97% of clothing materials come from virgin feedstocks, including 63% from virgin plastic and 26% from cotton.[17] Altogether, it is estimated that synthetic fibres constitute 14% of global plastic production.[18]

Sustainable strategies must be implemented to source raw material inputs and recycled material for both natural and synthetic fibres, and to phase out hazardous chemicals and additives as they pose a risk to human health, the environment and textile recycling processes. When virgin materials must be used, they should be sourced according to ambitious criteria that assess the environmental impact of their production, their longevity of use, and their end-of-life impact.

Sustainably sourced and certified raw materials from natural fibres (e.g. certified cotton, certified wool, linen, and other materials) should be prioritized for use over synthetic materials. In some cases, however, synthetic fibres are needed to meet a certain performance standard (e.g. for athletic and outdoor gear). In these cases, biobased synthetic from sustainably sourced bioplastic feedstocks should be prioritized over synthetic fibres produced from fossil fuels[19] and seek substitution with better feedstocks.

Recycled content from non-textile sources like polyethylene (PET) bottles and other plastic packaging should not be prioritized for fibre production over new packaging and not marketed with sustainability claims since it does not discourage existing linear design and manufacturing practices. Many packaging producers and end users have recycled content targets and/or mandates to meet in line with broader circularity objectives. Recycled content from PET bottles also takes this material out of an already closed-loop recycling system - generally not able to be recycled again once in textile form, likely only downcycled or landfilled.

3. Eliminate production waste including from water, energy, and material inputs

Industrial (also referred to as pre-consumer) waste is generated in every stage of manufacturing: spinning, knitting/weaving, dyeing, apparel making, and finishing.[20] The cutting stage of garment manufacturing creates the largest amount of pre-consumer fabric wastage. It is estimated that 10 to 15% of the total fabric used for garment production already becomes waste at the cutting stage[21] and factories are often not allowed to feed textile offcuts into reuse processes.[22] Due to the absence of adequate waste management systems and technologies in most production countries, textile waste is mainly landfilled or burned in countries like Vietnam, Cambodia, or Sri Lanka.[23] [24] In Cambodia, 60% of all industrial waste in landfills comes from the garment industry.[25]

To minimize waste, producers can measure and manage the surplus fabric generated during manufacturing. By doing so, they can optimize their production processes, working towards achieving zero waste. Any unavoidable by-products, such as fabric offcuts, can be repurposed innovatively. These offcuts can find new life through collaboration with small-scale businesses or by incorporating them into newly established recycling processes, contributing to a more circular and eco-friendly production system generating green jobs.

In addition, it's essential to assess and optimize all resources and inputs in the production process. This entails improving water use efficiency and establishing closed-loop water systems to enhance water reuse and recycling. It also involves emission reduction and decarbonization through optimizing thermal and electrical energy systems and integrating renewable energy sources leading to carbon neutral manufacturing. This will include implementing waste heat recovery methods, electrifying processes, phasing out fossil fuels and unsustainable biomass for heat, investing in decarbonization measures, and using 100% renewable energy sources (particularly on-site solar photovoltaic and solar thermal). Using the science-based target guidelines can be a good starting point[26].

4. Address material waste from retail and e-commerce packaging

Textile production, retail and e-commerce result in single-use plastic and packaging waste. Significantly, 90% of all clothing produced is packaged in polyethylene bags (known as 'polybags'), and only 1-2% of these polybags are successfully recycled. This means almost 90 billion polybags and garment covers are landfilled or mismanaged each year.[27] Unfortunately, eliminating polybags is not a straightforward solution, as it could damage garments, making them unwearable and resulting in greater textile waste. Additional plastic and paper packaging in-scope for the industry includes hangers, tags, labels, and packaging used to mail online purchases.

More research and innovations are necessary to find a viable solution to safely reduce, reuse or eliminate, retail and e-commerce packaging to limit packaging waste from the textile value chain. Retailers are encouraged to eliminate unnecessary packaging, switch to reuse models wherever possible, shift to sustainable inputs for remaining packaging (e.g., certified paper packaging, recycled content, sustainably sourced bio-based film, etc.), and aggregate packaging waste for collection, including through in-store drop off, wherever possible. Looking at reuse, some companies are already offering returnable packaging services where e-commerce mailers can be dropped for free in any mailbox in the world, returned, cleaned, and used again.[28]

5. Extend product lifetime through behaviour change, design, textile care and repair

Extending product lifetime is key to saving resources. Individuals play an important role when it comes to shifting consumption to buying less, better quality and using textiles longer whilst caring for them. Behaviour change and information campaigns by different societal actors can play an important role in promoting green purchasing practices.

At the same time, producers can do a lot to make products last longer. Increasing longevity can be achieved for example through making parts more durable, making spare parts available, designing for disassembly, good care labelling, and advanced colour fastness. [29]

Proper textile care can minimize environmental impact – for example, decreasing energy and water use from laundering – and reduce the amount of microfiber release. In the laundering process, the selection of the water temperature plays a crucial role. Decreasing water temperature for laundry in Europe from 40 °C to 30 °C would save almost 3.5 million tons of CO_2 each year.[30]

Brands and retailers should empower consumers with the necessary knowledge and services they need to maintain the integrity of the textile product across its full lifetime. This includes providing textile care information and/or offering access to repair services as an in-store or mail-in option at a low cost to the customer, supported by engagement campaigns to encourage maximum utilization and repair.

Increased costs of durable textiles need to be addressed by policies where extended producer responsibility systems favour sustainable textiles and harmful practices are addressed through taxation and transformation of subsidy processes.

6. Implement and promote effective reuse and return programs

Over the past 15 years, apparel production has doubled while clothing utilization rates – the number of times an item is worn – have decreased by 36%.[31] In existing reuse and donation systems, such as textile collection and sorting, only about half of the used clothing is fit for reuse – most of which is exported – while about 25–50% is downcycled and 5–10% becomes waste.[32]

A majority of reused clothing is currently exported to Global South countries, which contributes to the overall carbon footprint of the industry from transportation and disrupts local economies.[33] Exporting used clothing can inundate communities in the Global South with low quality, cheap goods that suppress local textile markets and often end up landfilled regardless, simply shifting the burden of waste management from one country to another. For example, nearly 15 million used garment pieces enter Ghana every week, flooding the clothing market with poor quality second-hand items of which an estimated 40% are landfilled or end up in dumpsites, rivers or burnt in the open.[34] Successful reuse programs must scale reuse at local levels rather than defaulting to exporting used clothing and other materials.

Companies can increase reuse by creating branded reuse systems where items can be sold back, repaired if needed, and then resold to new customers. As branded reuse programs grow, efforts should be made to scale down production of new textile products using virgin materials.

Companies can also pioneer rental systems that allow them to profit consistently from a reused item. Rental systems can be offered for clothing, linens, gear, and furniture, and should be offered at a price point that incentivizes consumers to utilize these rental systems. Rental systems allow companies to meet consumer demands of access to a wide variety of clothing options and ensure that each textile item is used to its full potential. However, these systems must focus on limiting the environmental costs of transportation and cleaning to ensure they are more sustainable than alternatives.

7. Build sustainable textile-to-textile recovery and recycling solutions

Reduction, reuse, and repair must be prioritized to achieve a circular economy where textile products are recirculated for as long as possible and negative impacts are designed out. However, improved textile-to-textile recycling technologies need to be developed in addition to decreasing some of the 73% of textiles worldwide that end up in landfills or incinerated.[35]

Mechanical recycling is the most common form of recycling today. It refers to mechanical processing (sorting, washing, drying, chopping, grinding, and reprocessing) of material. Chemical recycling has been proposed to deal with textile waste, but these technologies are still in the development phase and therefore environmental benefits have not been proven. Based on currently available evidence, there are significant concerns that some of these technologies are energy-intensive and pose risks to human health[36].

Enabling conditions and supportive infrastructure are needed to enable effective sorting of materials and closed-loop recycling for textiles. At present, textiles that may otherwise be recyclable cannot always be properly processed due to fiber blends, and additions such as finishes and dyes made of harmful substances and fixatives. Thus, both fiber origin and inputs during processing – like harmful chemicals – must be taken into consideration when designing for recyclability from the outset and assessing the potential for recyclability at end-of-life. Scaling of any textile recycling should focus on ensuring textile-to-textile recycling and should take a holistic approach to redesigning systems to ensure sustainable collection and processing.

8. Address microfiber pollution from fiber fragmentation

Fabrics, textiles, and other fiber-based materials break down during production, use, and maintenance (e.g., laundering), resulting in the shedding of microfibers. Microfibers result from both natural fibers like cotton and from synthetic fibers like polyester. Synthetic microfibers are most concerning because they especially resist breakdown in the environment and are a primary source of microplastic pollution in land, air, waterways, and oceans.[37]

Yarn producers and clothing companies should address all parameters that influence fiber release throughout the lifecycle, including for both synthetic and natural fibers. Since microfiber discharge is highest during the first time an item is washed – due to residues from the production process – controlled pre-washing (using technology to capture and dispose of microfibers) during production can drastically reduce microfiber release. Filters can also be added to home washing and drying machines to reduce microfiber leakage into the wastewater, and companies and policymakers have a role to play in communicating this to consumers.

To mitigate and prevent microfiber pollution, a broad array of interventions is needed at every stage in the lifecycle of a textile from fabric design, dyeing, and manufacturing, to wearing, washing, and disposal at end of life. Actions that brands can take today are as follows:

1. Avoid synthetic fibers whenever possible.
2. Use low-impact, non-toxic dyes and treatments on all fibers and garments.
3. Produce high-quality garments that are designed for durability, reuse, and recyclability.

4. Support suppliers to adopt microfiber detection, measurement and capture technologies (such as membrane bioreactors, ultrafiltration etc.) which have the co-benefits of recycling water and generating lower effluent discharges during processing and finishing of textiles to tackle pre-consumer emissions.

5. Communicate/educate consumers on wash care to reduce and capture microfiber shedding (wash garments less often, use front-load washing machines, wash on cold, use shorter cycles, use liquid laundry detergent instead of powder, and use filters on washing machines to capture microfibers before they enter wastewater).

6. Invest in and support research, innovation, and organizations for developing testing methods, thresholds, and best practices to reduce the impacts of microfiber releases.

More research is needed into solutions for microfiber leakage. Companies must ensure that their attempts to address microfiber release are grounded in scientifically sound innovation. For example, responsibly sourced biobased synthetic textiles – while a preferred material input over fossil-based synthetics – do not solve for microfiber release nor do 'biodegradable' synthetic fibers and oxy-biodegradable additives.

CALL TO ACTION

A successful textile circularity strategy will be implemented within the framework of a circular system, rather than embedded into an existing, linear model. All stakeholders must shift their thinking to drive innovative solutions that will ensure stewardship of the planet's resources within a circular system and operate in harmony with nature's cycles.

The entire value chain – from farmers and petrochemical producers to garment designers, to collectors and waste management companies – has a role to play in creating and sustaining a circular textile economy.

WWF encourages each stakeholder group to act towards closing the loop on textiles:

- **Policymakers** should enforce eco-design requirements, enhance transparency, incentivize circular practices, establish mandatory Extended Producer Responsibility schemes, and strengthen the market for secondary raw materials.

- **Manufacturers** should improve production processes and use circularity as an opportunity to develop active partnerships with collectors and recyclers.

- **Brands** should build circular business models, create transparency across their supply chains, set public circularity goals, and shift marketing strategies to reflect the vision of circular textiles.

- **Consumers** should - whenever possible - shift purchasing habits to consume less and prioritize long-lasting textiles, access information about proper textile care, use reuse and repair systems, and advocate for sustainability.

- **Investors** should support circularity research and technology to make new and existing technologies, infrastructure, and materials available at scale.

- **Non-governmental organizations** should continue to drive change through thought leadership and as platforms for collective action.

We already have many of the tools needed to create, maintain, and scale a circular textile economy – now, we need actionable commitment to change. Using the approaches and enabling conditions outlined in this paper, stakeholders across the value chain and across the globe can work together to invest in and accelerate textile circularity.

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