Global Gateway

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From Sustainable Consumption and Production to Circular Economy in the Textile and Leather Sectors in Asia

Analysis of SWITCH-Asia Grant Projects

Acknowledgements

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Abbreviations and acronyms

CE	circular economy
SCP	sustainable consumption and production
E&S	environment and social
ESG	environmental, social and governance
EU	European Union
GHG	Greenhouse gas
MSMEs	micro, small and medium-sized enterprises
PSC	[EU SWITCH-Asia] Policy Support Component
SCP	sustainable consumption and production
SCP	sustainable consumption and production (a component of SWITCH-Asia Programme)
SDG	United Nations Sustainable Development Goals
ToT	training of trainers
W2V	waste to value
WTO	World Trade Organization
UNDP	United Nations Development Programme
CEAP	Circular Economy Action Plan
ESPR	Ecodesign for Sustainable Products Regulation
CSDDD	Corporate Sustainability Due Diligence Directive
CSRD	Corporate Sustainability Reporting Directive
EPR	Extended Producer Responsibility
CNIS	China National Institute of Standardization
CO_2	Carbon Dioxide
EUR	Euro

Executive Summary

Asia is home to seven of the top ten textile and apparel exporters, as well as four of the top ten leather exporters. Every year, out of approximately 100 million tonnes of clothes produced, 92 million tonnes are discarded or destroyed worldwide due to changing fashion consumption patterns; this phenomenon is also growing in Asia. Globally, approximately USD 500 billion in value is lost every year from discarded clothing that is barely worn and rarely recycled. In addition, clothes release half a million tonnes of microfibres into the ocean every year, while garment production emits approximately 1,715 million tonnes of CO_2 and generates 92 million tonnes of waste annually. The textile sector ranks among the largest contributors to global greenhouse gas (GHG) emissions and environmental degradation.

The EU responded to the challenges of the triple planetary crisis through a comprehensive and evolving sustainability policy framework. In 2020, the EU launched the European Green Deal, aimed at achieving climate neutrality by 2050, alongside the Circular Economy Action Plan (CEAP), which identified textiles as a priority value chain requiring systemic transformation. Building on this, the EU adopted the EU Strategy for Sustainable and Circular Textiles in 2022, introducing measures to promote durable, repairable, recyclable, and energy-efficient textile products, while also strengthening market conditions for circular business models and sustainable consumption patterns. Additional policy instruments — including the Ecodesign for Sustainable Products Regulation (ESPR), the Corporate Sustainability Due Diligence Directive (CSDDD), the Corporate Sustainability Reporting Directive (CSRD), Extended Producer Responsibility (EPR) schemes for textiles, and initiatives related to waste shipment and digital product passports — further reinforce the EU's transition towards more transparent, resource-efficient, low-carbon, and socially responsible textile value chains. Together, these measures increasingly shape international market expectations and trade relations, including with major textile-producing countries in Asia.

The circular economy model and the principles of sustainable consumption and production (SCP) provide industries with a transformative perspective on how products are designed, produced, consumed, and managed throughout their life cycle. Within this broader policy context, the SWITCH-Asia Programme contributes to strengthening enabling environments, business practices, innovation ecosystems, and stakeholder capacities needed for the transition towards circular and sustainable textile systems in Asia. This is significant as the European Union (EU) is the biggest market for textile and garment products, followed by North America.

This report analyses eleven SWITCH-Asia grant projects, with a combined value of approximately EUR 24.7 million, implemented in Cambodia, China, India, Mongolia, Uzbekistan and Tajikistan to advance circular economy (CE) and sustainable consumption and production (SCP) practices in the textile and leather sector.

The analysis demonstrates that circular economy principles are widely reflected across the portfolio, particularly through resource-efficiency improvements, cleaner production practices, waste reduction and valorisation, recycling, renewable energy adoption, and environmental performance enhancement. At the same time, the findings reveal significant differences in the depth and scope of circular economy application across projects. Most interventions remain concentrated on production-stage improvements and end-of-life management, while comparatively fewer projects address upstream design considerations, product life extension, reuse, repair, and other higher-value circular strategies.

The assessment further reveals an evolution in the nature of circular economy interventions over time. Earlier projects focused predominantly on cleaner production, environmental compliance, and resource efficiency. More recent initiatives increasingly incorporate circular design, traceability systems, eco-labelling, Digital Product Passports, sustainable sourcing, green finance, and circular business models. This appears reflect a gradual shift from primarily technological interventions towards more systemic approaches that engage market mechanisms, value-chain relationships, investment readiness, governance systems, and emerging sustainability requirements.

Overall, the portfolio demonstrates the growing maturity of circular economy practice within the textile and leather sector. The projects provide evidence of a progressive transition from resource-efficiency and waste-

management approaches towards broader value-chain transformation, where innovation, competitiveness, traceability, market access, financing mechanisms, and sustainability performance increasingly reinforce one another. The findings suggest that circular economy implementation in the textile and leather sectors is becoming increasingly systemic, encompassing technological, market, financial, and governance dimensions alongside environmental objectives.

1. Objectives, scope and analytical approach

This report analyses the contribution of SWITCH-Asia grant projects to advancing circular economy (CE) and sustainable consumption and production (SCP) practices in the textile and leather sector in Asia. The objective of the assessment is to better understand how the projects contribute to the transition towards more circular value chains, while pointing at common approaches, emerging trends, gaps and opportunities for potential future interventions.

Since 2008, SWITCH-Asia has provided a total of 24 grant projects for the textile and leather sector in 13 countries. This analysis covers eleven SWITCH-Asia grant projects implemented or currently under implementation in Cambodia, China, India, Mongolia, Uzbekistan and Tajikistan (Table 1). Together, these projects address a broad range of challenges and opportunities across textile and leather value chains, including resource efficiency, waste management, cleaner production, renewable energy, sustainable sourcing, circular business models, traceability systems, market access and financing (Tables 2-6).

Table 1. Grant projects analysed

Project Name	Country/Year	Budget (EUR)	Lead Partner
1. **Effective waste management and sustainable development of the MSME tanning companies in the Kolkata Leather Cluster**	India (2020–2023)	3,124,992	Solidaridad Regional Expertise Centre, India
2. **Advancing sustainable production and consumption in cotton and textile value chains**	India (2022–2026)	1,983,563	Fairtrade International
3. **Promoting circularity in the Tamil Nadu leather clusters for solid waste management**	India (2022–2024)	2,800,323	Solidaridad Regional Expertise Centre, India
4. **Promotion of sustainable energy practices in the garment sector in Cambodia**	Cambodia (2020–2024)	2,995,748	Global Green Growth Institute - Cambodia
5. **SteP EcoLab – Sustainable textiles: production and ecolabelling**	Mongolia (2018–2022)	1,867,329	Agronomes et Véterinaires Sans Frontières
6. **STeP EcoLab II: Sustainable Textile Production and Eco-Labelling in Mongolia**	Mongolia (2025-2028)	1,875,000	Agronomes & Vétérinaires Sans Frontières (AVSF)
7. **Capacity building in the Mongolian vegetable tanned yak leather cluster on bio-leather and bio-leather products**	Mongolia (2022–2025)	1,305,956	European Profiles S.A.
8. **Transitions to CE practices in textile and apparel MSMEs along the life cycle of Huzhou and Shaoxing**	China (2022–2025)	2,973,263	China National Institute of Standardization (CNIS)
9. **RUTSIS – Reviving Uzbekistan's and Tajikistan's sustainable ikat and silk**	Uzbekistan and Tajikistan (2020–2023)	2,012,796	Adelphi Research gGmbH

Project Name	Country/Year	Budget (EUR)	Lead Partner
10. Catalysing the Green Transition of India's Textile & Apparel Value Chain	India (2025–2028)	1,870,000	Intellecap Aavishkaar Group
11. Green Threads: Enhancing Sustainability in India's Textile Recycling Clusters	India (2025-2028)	1,875,003.80	Foundation for MSME Clusters

The assessment combines a review of available project documentation, questionnaire responses from grant recipients, and relevant literature on CE SCP, and textile-sector sustainability. It also considers relevant European Union policy and regulatory developments to provide context on the evolving sustainability requirements affecting textile and leather value chains. The assessment applies the SWITCH-Asia analytical framework (see Section 2) to examine how project interventions contribute to circularity within business operations and influence thier value chains. The framework evaluates projects against the key dimensions of the circular economy transition, including resource efficiency, resource circularity, resource substitution, life-cycle coverage, innovation, enabling conditions and market transformation. As some projects remain at an early stage of implementation, the assessment primarily reflects the direction, design and emerging results of project interventions rather than their full long-term impacts. Overall, the analysis is indicative in nature, aiming to identify common patterns, approaches and lessons across the portfolio rather than to undertake an in-depth evaluation of each project.

Before presenting the assessment through the circular economy analytical framework, provided a thematic synthesis of the grant portfolio by identifying the principal development challenges addressed by the projects and the corresponding interventions implemented in response. Looking across the portfolio reveals common priorities, recurring approaches and broader lessons that are not always apparent from individual project analyses. Building on this synthesis, the identified interventions are interpreted through the SWITCH-Asia analytical framework and classified as circular strategies, circular innovations and circular enablers. These two complementary perspectives provide a more complete understanding of the portfolio: the thematic synthesis explains what challenges the projects sought to address and the solutions they introduced, while the analytical framework shows how those interventions contribute to the transition towards more circular textile and leather value chains. More detailed project-level analyses are provided in Annex I, illustrating how different combinations of interventions were applied in specific national and sectoral contexts.

2. Guiding analytical framework

The analytical framework applied in this report is grounded in Circular Economy (CE) concepts and dimensions while drawing on Sustainable Consumption and Production (SCP) principles to provide a broader sustainability perspective. In its general interpretation CE is about ensuring that production and consumption systems prioritise renewable and less harmful resource inputs, maximise resource efficiency by keeping resources in use for as long as possible while fulfilling societal needs, and minimise resource losses from the system. SCP complements this perspective by addressing the wider environmental, social and economic implications of production and consumption systems. It emphasises life-cycle thinking, sustainable resource management, behavioural change and the decoupling of economic growth from environmental degradation. Together, CE and SCP enable a more comprehensive assessment of sustainability transitions by examining not only how resources are managed and circulated, but also how production and consumption patterns, market conditions and enabling environments contribute to broader sustainable development outcomes.[1]

Box 1. Sustainable consumption and production

Sustainable consumption and production (SCP) refers to 'the use of services and related products, which respond to basic needs and bring a better quality of life while minimising the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardise the needs of future generations' (UNEP, 2010).

In a nutshell, SCP aims at increasing resource efficiency while simultaneously promoting sustainable lifestyles, decoupling economic growth from environmental degradation, and doing more with fewer resources. SCP is the principle behind UN Sustainable Development Goal (SDG) 12 - Ensure sustainable consumption and production patterns.

SCP emphasises a holistic approach to bring about systemic change. It is built around three main objectives:

- **Decoupling environmental degradation from economic growth.** This refers to doing more and better with less, increasing net welfare gains from economic activities by reducing resource consumption, degradation and pollution throughout the entire product life cycle, while improving the quality of life. 'More' goods and services are delivered with 'less' resource consumption, environmental degradation, waste and pollution.
- **Applying life cycle thinking.** This refers to enhancing the sustainable management of resources and achieving resource efficiency throughout both the a) production and consumption phases of a product's life cycle, including resource extraction, the production of intermediate inputs, distribution, marketing, use, waste disposal, and b) re-use of products and services.
- **Seizing opportunities for developing countries and 'leapfrogging'.** SCP contributes to the eradication of poverty and the attainment of the Sustainable Development Goals (SDGs). For developing countries, SCP offers opportunities such as the creation of new markets, green and decent jobs, and a more effective, welfare-generating management of natural resources. It is an opportunity to 'leapfrog' to more resource-efficient, environmentally responsible, and competitive technologies, bypassing the inefficient, polluting, and ultimately expensive stages of development experienced by developed economies.

The integration of SCP principles is particularly relevant for the analysis of the SWITCH-Asia grant portfolio. Several of the earlier projects were designed primarily to advance SCP objectives and were developed before circular economy concepts became widely adopted in policy and business discourse. Nevertheless, many of these interventions promoted resource efficiency, waste reduction, cleaner production, sustainable resource management and life-cycle thinking, which are now recognised as important building blocks of circular

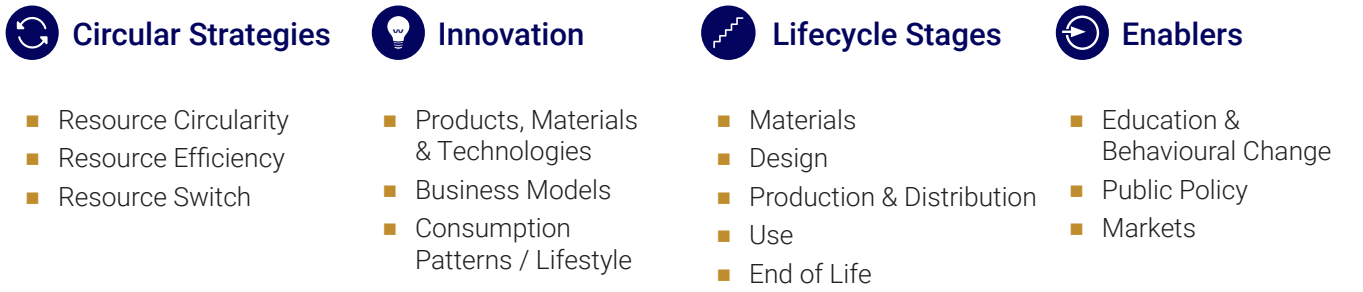
1 SCP and CE are distinct concepts that emerged at different stages in the evolution of sustainability thinking, with SCP preceding CE. The subsequent evolution of CE has led to considerable conceptual overlap in some interpretations. In this document, SCP is treated as the broader framework for sustainable production and consumption, while CE focuses specifically on the management of resource inputs, circulation and losses.

economy transition. Drawing on SCP principles therefore makes it possible to capture the contributions of these earlier projects within a CE analytical framework, while also tracing the evolution of project approaches towards more explicit and systemic circular economy practices.

For the purposes of this analysis, CE is understood as an approach that seeks to maintain the value of materials, products and resources throughout their life cycle while reducing dependence on virgin resource extraction and minimising waste generation.

The analytical framework examines project interventions through four interconnected dimensions of circular economy transition: **Circular Strategies**, **Innovation**, **Life-Cycle Stages**, and **Enabling Conditions** (Figure 1).

Figure 1. Circular economy dimensions



The first dimension, **Circular Strategies**, focus on three interrelated circular strategies that might be pursued by the projects: the use of renewable and/or less harmful materials ("resource substitution"), extending the use, re-use and recovery of products, materials and components within production and consumption systems ("resource circularity"), and reducing resource consumption and waste generation through improved design, production and consumption practices ("resource efficiency").

The second dimension, **Innovation**, examines the extent to which projects promote innovation in products, materials and technologies, business models, and consumption patterns and lifestyles. Innovation is a critical enabler of circular economy transition, as the implementation of circular strategies often depends on new technical, organisational and market solutions. The framework helps to point how projects contribute to and support innovation in advancing circular economy objectives.

The third dimension, **Life-Cycle Stages**, analyses where interventions occur along the value chain and product life cycle, including material selection, product design, production and distribution, product use, and end-of-life management. As circular economy strategies and innovations can influence multiple stages of the life cycle, this perspective helps identify whether projects focus on specific stages or adopt a more comprehensive life-cycle approach.

The fourth dimension, **Enabling Conditions**, highlights the factors that support or accelerate the transition towards circular economy practices and indicate if the projects worked with influencing those conditions. These include education and capacity development, public policy and regulatory frameworks, and market mechanisms that create incentives for the adoption and scaling of circular solutions.

Together, circular strategies, innovations and enabling conditions form the analytical framework used in this report. Examining these dimensions across the product life cycle makes it possible to identify how projects contribute to circular economy transition, where interventions are concentrated, and what gaps and opportunities remain for advancing circularity and sustainability in the textile and leather sector.

Box 2. Circularity Practices in Textile Sector

A circular economy approach in the textile industry calls for fundamental changes throughout the entire life cycle of textile products, including design changes in upstream processes to ensure that clothes can be recycled, repaired, reused, and more sustainably managed. Such changes entail sharing, leasing, reusing, repairing, refurbishing, remanufacturing, and recycling existing materials and products for as long as possible, while reducing the extraction and consumption of virgin resources.

The textile and apparel industries are composed of a variety of sub-sectors that encompass the full production cycle, from raw materials (fibres) to semi-processed materials (yarn, woven and knitted textiles, together with their finishing processes) and finally to finished products for household, industrial, and commercial use. Similarly, the global leather industry encompasses a number of interconnected activities, beginning with the preservation of raw hides and skins, followed by the preparation, tanning, and finishing of leather, and finally the manufacture of a variety of consumer and industrial leather products. Resource consumption and environmental concerns arise throughout the entire value chain and product life cycle, from agricultural fibre and raw hide production to chemical processing and tanning, yarn and fabric manufacturing, product manufacture, product use, and the management of products at the end of their life cycle.

It is critical to emphasise that a circular economy in the textile sector encompasses far more than end-of-pipe solutions and should not be viewed solely as a means of improving waste management efficiency (i.e. fewer resources, less energy, and less waste). Rather, the transition towards a circular economy (CE) represents a fundamental paradigm shift and transformation of industrial systems towards models in which materials and products retain their value for as long as possible, waste generation is minimised, and resources are continuously circulated within the economy. In such systems, waste is increasingly understood as a valuable secondary resource — or, ideally, the concept of waste itself is progressively designed out through product durability, circular design, repairability, reuse, disassembly, remanufacturing, and recycling within biological or technical cycles.

3. Sector Context and Emerging Circular Economy Requirements

3.1. Global and Regional Sector Trends

According to the World Trade Organization (WTO), Asia continues to play a dominant role in global textile and apparel trade and manufacturing, hosting many of the world's leading textile and garment exporting economies (WTO, 2023).[2] Today's textile and apparel supply chains are highly interconnected, with sophisticated sourcing and production networks spanning multiple countries and continents.

China has established itself not only as a major producer and exporter, but also as a major importer of textile and apparel products, while increasingly outsourcing parts of production to countries within and outside Asia, including Bangladesh, Myanmar, Vietnam, and Ethiopia. The Central Asian countries — including Tajikistan, Kazakhstan, Uzbekistan, Kyrgyzstan, and Turkmenistan — continue to serve as important sourcing bases for primary textile inputs such as cotton, silk, wool, and hides/skins. At the same time, several countries in the region are increasingly seeking to strengthen domestic value addition, textile processing capacities, and sustainable production approaches.

Global fibre production continues to grow rapidly. According to Textile Exchange's *Materials Market Report 2024*, global fibre production reached approximately 124 million tonnes in 2023 and continues to increase significantly (Textile Exchange, 2024).[3] Polyester remained the most widely produced fibre globally and synthetic fibres continue to dominate global production, reflecting increasing dependence of the textile sector on fossil-fuel-based feedstocks.

Global clothing production and consumption patterns also continue to accelerate. Although precise global production figures remain difficult to verify due to limited industry transparency, estimates suggest that up to 100 billion garments are produced globally every year (UNDP, 2023). According to estimates by the Circular Fibres Initiative, USD 500 billion in value is lost every year due to discarded clothing that is barely worn and rarely recycled (Circular Fibres Initiative 2017). This is echoed by the Ellen MacArthur Foundation (2017) indicating that clothing production nearly doubled between 2000 and 2015 increasing from approximately 7 kg to 13 kg per person annually, while the average number of times a garment was worn before disposal declined significantly during the same period.[4] Over the past decade, emerging Asian markets have seen a rise in textile consumption and are taking the share away from Europe and North America. Fast fashion is also the leading trend in the Asian markets.

According to the Boston Consulting Group (2017)[5], if current population and consumption growth trends continue, global apparel consumption could increase by approximately 63% by 2030, from 62 million tonnes in 2017 to approximately 102 million tonnes annually – the equivalent of more than 500 billion T-shirts.

These trends are driven not only by production systems but also by changing consumer behaviour. Consumer purchasing decisions are becoming increasingly important in determining the sustainability trajectory of the textile industry, since consumption patterns can either reinforce or help transform existing production systems. This applies to private consumers, business-to-business transactions, and public procurement practices alike. While consumers are increasingly paying attention to issues beyond price and style — including quality, environmental sustainability, transparency, and ethical production — fast fashion and increasingly ultra-fast fashion business models continue to dominate global markets.

The rapid expansion of textile production and consumption has substantial environmental consequences. In addition to generating significant resource losses, the textile sector is also a significant source of pollution. Clothes release half a million tonnes of microfibres into the ocean every year – the equivalent of more than

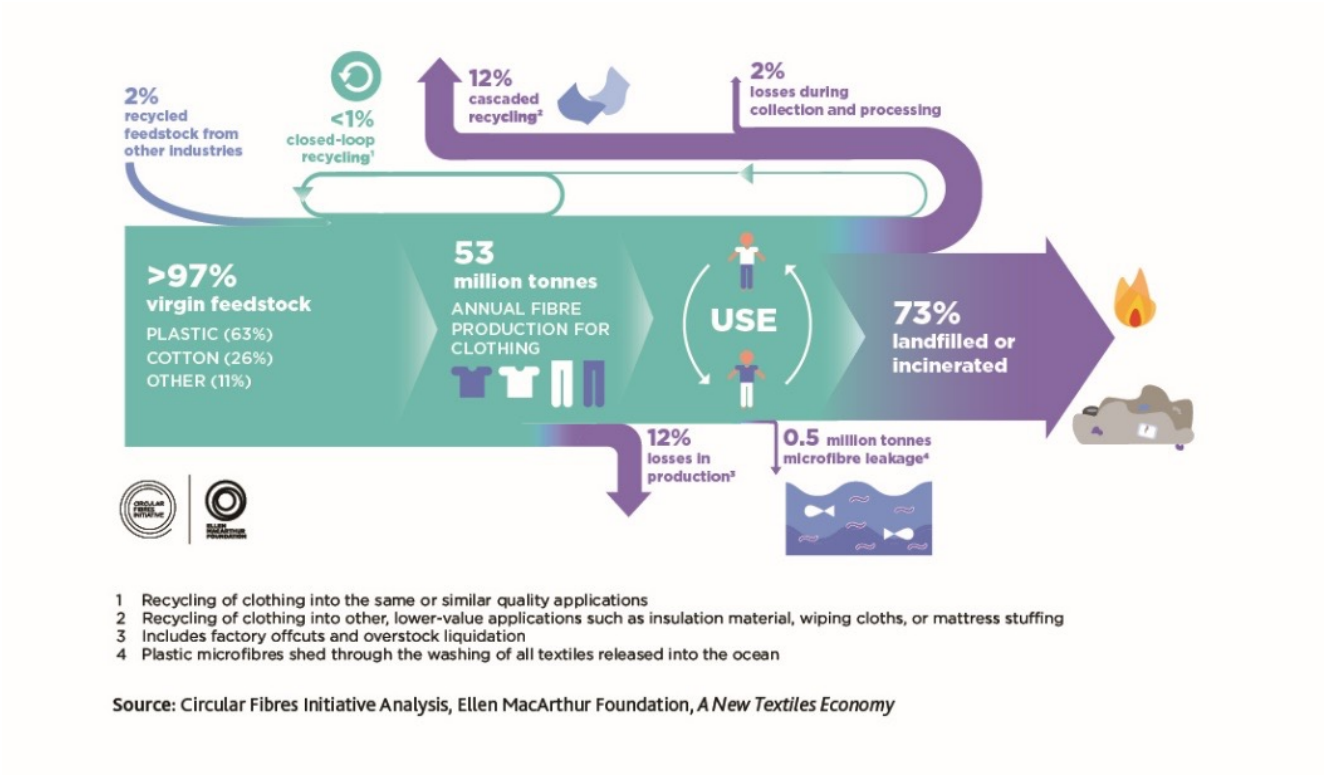
2 World Trade Statistical Review 2023
3 https://textileexchange.org/knowledge-center/reports/materials-market-report-2024/?utm_source=chatgpt.com
4 Ellen MacArthur Foundation, *A new textiles economy: Redesigning fashion's future* (2017)
5 https://globalfashionagenda.org/resource/pulse-of-the-fashion-industry-2017/

50 billion plastic bottles. Overall, water consumption is likely to increase by 50% from 79 billion m^3 in 2015 to 118 billion m^3 in 2030. Emissions of CO_2 are expected to rise by 63%, from 1,715 million tonnes to 2,791 million tonnes, while waste generation will jump from 92 million tons to 148 million tonnes, an increase of 62%. In addition, chemical use and discharge, land acquisition for growing natural fibres, and use of pesticide/herbicides, as well as demand for petroleum-based feedstock for synthetic fibres, are all expected to increase as a result of the rise in demand in the textile sector.

Alongside its environmental footprint, the textile sector also has significant social implications. Textiles account for about 34% of the total employment in the manufacturing sector across key Asian production countries. However, the minimum wages in this industry are less than half of what can be considered a living wage, and the inequality is even higher for the women workers who make up the majority of the textile workforce in Asian countries. These problems are more strongly witnessed in Asia where textile manufacturing is undertaken.

Together, these trends expose structural inefficiencies throughout textile value chains. Large quantities of virgin materials continue to enter production systems while valuable fibres, garments and textiles leave them prematurely as waste. This growing mismatch between resource inputs and retained value highlights the importance of circular economy approaches that seek to extend product lifetimes, improve resource efficiency, increase fibre recirculation and substitute renewable or less harmful materials.

Figure 2. Global market flows of clothing in 2015[6]



3.2. EU Sustainability Requirements and Their Relevance to Asian Producers

As the European Union remains one of the most important export destinations for Asian textile and leather products, its evolving sustainability and circular economy framework increasingly shapes production practices, investment decisions, traceability requirements and market access across Asian value chains. The following overview highlights the policy developments most relevant to export-oriented companies and to the analysis of the SWITCH-Asia projects presented in this report.

In 2020, the European Union launched the European Green Deal, a set of policy initiatives with the overarching

6 https://content.ellenmacarthurfoundation.org/m/6d5071bb8a5f05a2/original/A-New-Textiles-Economy-Redesigning-fashions-future.pdf

aim of achieving EU climate neutrality by 2050. Its main objective is to drive sustainable development towards a cleaner environment, more affordable energy, smarter transport, green jobs, and an overall better quality of life for people in Europe and globally. It comprises ten elements, one of which is sustainable industry.

To operationalise the Green Deal, the Circular Economy Action Plan to give a future-oriented agenda for attaining a cleaner and more competitive Europe in collaboration with economic actors, consumers, citizens, and civil society organisations. Its goal is to accelerate transformational change necessary by the European Green Deal, while also expanding on CE initiatives that have been in place since 2015.

Within this broader framework, the EU Strategy for Sustainable and Circular Textiles was adopted in March 2022 in response to the growing environmental and social impacts associated with global textile value chains. The Strategy aims to improve the sustainability, competitiveness, resilience, and innovation capacity of the textile sector, while supporting the transition towards more circular textile systems. It promotes more durable, repairable, reusable, and recyclable textile products, encourages the use of recycled fibres, addresses the presence of hazardous substances, and seeks to strengthen markets for textile reuse and recycling. The Strategy also identifies fast fashion and rapidly changing consumption patterns as important sustainability challenges for the sector.[7]

Since the adoption of the Textile Strategy, the EU regulatory framework for sustainable products and circular economy has continued to evolve. One important development is the Ecodesign for Sustainable Products Regulation (ESPR), Regulation (EU) 2024/1781, which entered into force in 2024. The Regulation establishes a framework for setting product-specific sustainability requirements related to durability, reparability, recyclability, resource efficiency, recycled content, and environmental information. Textiles are identified among the priority product groups under this framework. The Regulation also includes provisions enabling the future development of Digital Product Passports aimed at improving traceability, transparency, and access to product-related sustainability information.[8]

Another important development concerns textile waste management. Under existing EU waste legislation, Member States are required to establish separate collection systems for textiles from January 2025 onwards. In parallel, ongoing discussions and revisions related to the Waste Framework Directive aim to further strengthen textile waste management systems and support broader implementation of Extended Producer Responsibility (EPR) approaches for textiles across the EU.[9]

In addition, the revised EU Waste Shipment Regulation adopted in 2024 aims to strengthen controls and traceability related to waste exports and to reduce environmental risks associated with international waste trade. This development is relevant to the textile sector given the significant cross-border movement of used textiles and textile waste.[10]

The EU has also strengthened its broader sustainability governance framework in ways increasingly relevant for textile and garment value chains. The Corporate Sustainability Due Diligence Directive (CSDDD) and the Corporate Sustainability Reporting Directive (CSRD) introduce stronger requirements related to environmental and human rights due diligence, sustainability reporting, transparency, and supply-chain accountability for companies operating in or connected to the EU market.[11,12] In parallel, Directive (EU) 2024/825 on empowering consumers for the green transition aims to address misleading environmental claims ("greenwashing") and strengthen consumer information related to product durability, reparability, and sustainability characteristics, including for textile products.[13]

Against this backdrop and following the logic of the analytical framework, the following section will analyse SWITCH-Asia grant projects in the textile and leather sector to see how they contribute to addressing environmental and social issues through the lens of CE and SCP.

7 https://environment.ec.europa.eu/strategy/textiles-strategy_en
8 https://eur-lex.europa.eu/eli/reg/2024/1781/oj/eng
9 https://environment.ec.europa.eu/topics/waste-and-recycling/waste-framework-directive_en
10 https://environment.ec.europa.eu/topics/waste-and-recycling/waste-shipments_en
11 https://finance.ec.europa.eu/financial-markets/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en
12 https://commission.europa.eu/topics/business-and-industry/doing-business-eu/sustainability-due-diligence-responsible-business/corporate-sustainability-due-diligence_en
13 https://eur-lex.europa.eu/eli/dir/2024/825/oj/eng

4. Understanding circularity-related actions in grant projects

4.1. Grant Projects Analysis

The analysis begins with a thematic synthesis of the grant portfolio, identifying the principal development challenges addressed by the projects and the interventions implemented in response (Tables 2-6). Examining the portfolio as a whole helps reveal common priorities, approaches and lessons that are not always apparent from individual project analyses.

The identified interventions are subsequently interpreted through the SWITCH-Asia circular economy analytical framework and grouped according to their primary contribution as circular strategies, circular innovations or circular enablers. Together, these complementary perspectives explain both the problems the projects sought to address and how their interventions contribute to the transition towards more circular, resource-efficient and competitive textile and leather value chains. Detailed project-level analyses are presented in Annex I.

Issues Addressed by the Projects

All examined grant projects were designed in response to a range of development issues identified across the life cycle of the textile and leather industry. A few of the projects focus on material selection, design, and consumer behaviour, while the majority pertain to the production and distribution stages. Issues identified by the grant projects are categorised in the following table.

Table 2. Issues identified by the projects

Category	Issue
Awareness	• Limited awareness and knowledge about sustainable production practices and technologies • Lack of awareness on GHG emissions from the industry and technical knowledge on sustainable energy consumption to lower emissions
Policy & Regulations	• Progressive regulations from international markets (espessially the EU) demanding more sustainable, ethical and quality-focused products and their value chains • Lack of industry-specific supporting policies and standards to transpose national level strategies focusing on raw material optimisation, green design, green consumption, waste textile recycling
Resources	• Excessive use of water, energy, and chemicals during production and finishing processes
Pollution	• Untreated effluent and high-polluting solid waste from the production processes
Technology	• Lack of innovation in key technologies for large-scale development of recycled fibres and bio-based chemical fibres

Category	Issue
Knowledge & Capacity	• Lack of technical and market knowledge about waste management • Lack of data and transparency to enable sustainable value chains • Lack of knowledge sharing among actors in the industry (especially among MSMEs) • Loss of traditional (and more sustainable) techniques in dyeing
Market & Consumers	• Doubts about a valid business case for switching to sustainable/circular production • Low market demand for sustainable products and buyer's price sensitivity (in India) • Missing market linkages to sustainable products in Europe • Circular design, as a source solution, is still at the concept advocacy stage, and the circularity of products is not yet the priority in existing green design policies, standards and practices
Finance	• Perceived high-investment requirements for switching to circular/sustainable productions • Limited access to finance for greener production investments
Labour	• Poor working conditions in factories

Circular Strategies employed by the projects

As a response to the above-mentioned challenges, a variety of solutions are being applied to deploy circular strategies, innovations, and enablers. Some solutions are designed to solve specific problems, while others are more generally geared toward improving rules or regulations, increasing market pressures for sustainable products, and bolstering businesses' ability to adapt to changing requirements and behaviours. A summary of the solutions implemented by the grant projects is presented below. The full details of each grant project are available in Annex I.

Table 3. Circular Strategies

Challenge	Solution
High-polluting wastewater and solid waste from the manufacturing processes	• Create a public-private sector platform to create a sector-specific waste management strategy and/or a roadmap • Provide technical assistance to help MSMEs minimise effluent and solid waste by recycling production waste and repurposing low-value waste to value-added products • Introduce new techniques for cleaning and processing hides in order to lower the biological organic content in wastewater • Introduce best practices (e.g. use of multiple wash basins instead of running water, and water filtration systems for rinsing/washing silk threads) to minimise water consumption and improve wastewater quality

Challenge	Solution
Excessive use of water, energy, and chemicals during production and finishing processes	• Promote efficient technologies, a renewable energy switch, and good operations management to lower the consumption of water, energy, and chemicals with demonstrated benefits (e.g. cost savings, GHG reduction, lower health hazards) for MSMEs • Support an evaluation of the social and environmental impact of textile processors (including jointly identifying workable solutions) • Introduce guidelines on water/energy efficiency, use of low-impact chemicals, wastewater management, animal welfare and social responsibility for industry actors (in Mongolia), in support of the voluntary Code of Practice and relevant national standards • Provide training on reducing the use of fixing agents for natural dyes (e.g. aluminium acetate) to achieve desired colours and shades
Limited awareness and knowledge about sustainable production practices and technologies	• Promote the adoption of circular design practices through capacity building activities such as training of trainers (ToT), and training of companies and pilots • Promote the implementation of resource efficiency measures

Table 4. Circular Innovations

Challenge	Solution
Lack of technical and market knowledge about waste management	• Introduce green technology and sustainable tanning processes to minimise waste pollution and water saving from the production process • Utilise solid waste through recycling solutions
Lack of technical knowledge of sustainable materials and practices	• Introduce best practices and certification, quality control, consolidated sustainable raw materials sourcing, and the creation of a platform for existing eco-labelling schemes for animal fibres
Lack of innovation in key technologies for large-scale development of recycled fibres and bio-based chemical fibres	• Introduce new business opportunities for 'waste-to-value' products • Introduce 'waste-to-value' products • Support adoption of 'waste to value' (W2V, e.g. across tannery clusters
Loss of traditional (and more sustainable) techniques in dyeing to modern (but unsustainable) practices	• Promote use of traditional/ environmentally friendly dyes among local manufacturers • Support the circular design of all products using traditional production methods • Alin products, e.g. Ikat, with sustainable performance criteria • Build consumers' awareness of sustainable/traditional textile products

Table 5. Circular Enablers

Challenge	Solution
Poor working conditions	• Support an adoption of fair trade and traceability systems in which the environment and social sustainability performances of companies will be evaluated • Support the creation of the Sustainable Textiles Sector Index, in which MSMEs will be required to report on their ESG while also increasing their opportunities for green funding from financial institutes
Low market demand for sustainable products and buyer's price sensitivity	• Indirectly support demand creation for 'waste-to-value' products, to alleviate poverty and improve livelihoods • Implement campaigns to inform consumers (domestically and internationally) about sustainable textile products • Drive the adoption of green & fair procurement, requiring sustainable textile products from MSMEs in operational and reporting mechanisms
Missing market linkages to sustainable products in Europe	• Participate in trade fairs and road shows to raise buyers' awareness and facilitate sales in Europe • Support quality improvement and eco-labelling systems
Limited access to finance for greener production investments	• Facilitate dialogue between financial institutes and MSMEs for sustainable textile products • Helps financiers identify/prioritise sustainable products and offer flexible financial instruments • Support development of business cases for MSMEs to access financial support
Limited awareness and knowledge about sustainable production practices and technologies	• Introduce leather-processed material to make new products (e.g. purses, handbags) • Introduce a 'waste-to-value' approach to make eco-bricks from tannery production waste and indirectly support creation of 'waste-to-value' products, alleviating poverty and enhancing livelihoods
Lack of knowledge sharing among actors in the industry (esp. MSMEs)	• Develop a digital platform for sustainable and circular technologies and systems for the textiles sector
Doubts about the validity of the business case for switching to sustainable, circular production	• Facilitate integration to global greener value and supply chains for the Vegetable Tanned Yak Leather Cluster members • Establish process control and traceability systems in companies • Organise workshops with private & public investors/financing institutions to explore and promote green finance opportunities
Perceived high investment requirements for switching to circular/ sustainable productions	• Provide technical assistance for the preparation of at least 5 finance-ready concepts on resource efficiency and CE practices for financiers, plus matchmaking events with potential financiers

Challenge	Solution
Lack of awareness on GHG emissions from the industry and technical knowledge on sustainable energy consumption to lower emissions	• Stimulate the development of new markets for climate neutral and circular products • Support the development of climate action plans for the textile industry (in Huzhou and Shaoxing) focusing on reduced water/energy uses and mitigation of carbon emissions from textile waste
Progressive regulations from international markets (esp. the EU) demanding more sustainable, ethical and quality-focused products and their value chains	• Support the creation of a circular textile roadmap, guidelines for eco-design and recycling standards (in collaboration with targeted European cities) as well as recommendations for climate actions • Examine and disseminate trading requirements with international markets for supply chain stakeholders • Conduct a needs assessment of leather products manufacturers and exporters. • Training on consumer demands and the legal requirements related to eco-labelling and trading of goods
Lack of industry-specific supporting policies and standards to transpose national level strategies focusing on raw material optimisation, green design, green consumption, and waste textile recycling	• Develop specific tools and guidelines for sector specific Environmental and Social (E&S) risk assessment

Table 6. Cross-cutting Issues

Challenge	Solution
Lack of reliable data and transparency to enable sustainable value chains	• Develop a Digital platform for sustainable and circular technologies and systems for the textiles sector (India) • Strengthen institutional capacities and arrangements to adopt enforcement measures and improve data availability supporting the sector's switch to sustainable energy consumption
Circular design, as a source solution, is still at the concept advocacy stage, and the circularity of products is not yet the priority in existing green design policies, standards and practices	• Support a framework for co-developing a sectoral roadmap and a voluntary code of practice that embodies processors' pledges to adopt more sustainable production methods, analyses existing regulations for adjustment, and develops tools and guidelines for sector-specific E&S risk assessment • Support the development of courses on E&S management for textile engineers, provide ToT courses for professors, and mainstream it into the official curriculum; offer marketing

4.2. Main observations

1. Circular economy interventions remain concentrated on production-stage resource efficiency and waste management

Across the portfolio, circular economy interventions are primarily concentrated at the production and end-of-life stages of the value chain. Most projects focus on improving production processes, reducing water, energy and chemical consumption, managing waste streams, and recovering value from production residues. Examples include the Kolkata Leather Cluster project's introduction of desalting technologies, water-saving equipment, and conversion of leather waste into secondary products; the Tamil Nadu leather project's waste-to-value pilots that transform sludge and leather scraps into products such as syntans, handbags and paver blocks; and the Cambodia garment sector project's focus on energy efficiency and renewable energy adoption. More recent initiatives such as Green Threads and *Catalysing the Green Transition of India's Textile & Apparel Value Chain* further strengthen recycling and resource recovery through textile-to-textile recycling, Textile Recovery Facilities, and recycled fibre applications.

These interventions generate important environmental and economic benefits and contribute meaningfully to circular economy objectives. However, fewer projects address upstream circular strategies such as product design, durability, repairability, reuse, and product life extension. Notable exceptions include the Huzhou and Shaoxing project, which promotes circular design and eco-design guidelines, the Uzbekistan-Tajikistan Ikat project, which optimises textile design to minimise offcuts, and newer projects that incorporate design-for-recyclability and Digital Product Passports.

The findings suggest opportunities to complement existing resource-efficiency and waste-management approaches with higher-value circular strategies that retain products, components, and materials at their highest utility throughout the life cycle.

2. Innovation is evolving from technological solutions towards business model and market innovation

The grant portfolio demonstrates a clear evolution in the understanding and application of innovation within circular economy interventions. Earlier projects primarily approached innovation as a technological challenge aimed at improving the environmental performance of production processes. Innovation centred on cleaner production technologies, resource efficiency, renewable energy, waste treatment and recovery, recycling technologies, and the introduction of environmentally preferable materials. For example, the Kolkata Leather Cluster project focused on cleaner tanning processes, water and chemical efficiency, and the valorisation of leather waste into products such as paver blocks, tallow oil and other secondary materials. Similarly, the Promotion of Sustainable Energy Practices in the Garment Sector in Cambodia introduced renewable energy systems and energy-efficient technologies to reduce environmental impacts, while the first STeP EcoLab project in Mongolia promoted cleaner production alongside eco-labelling as a means of improving environmental performance and product recognition. These projects primarily sought to increase resource efficiency and reduce pollution within existing production systems.

Subsequent projects progressively broaden the concept of innovation beyond technological solutions. Technological improvements remain important, but they increasingly support new ways of organising production, managing value chains and creating commercial value. The Green & Fair Fashion project combines traceability tools with sustainability certification, responsible sourcing and stronger producer–buyer linkages. The Mongolian Yak Leather project complements innovations in vegetable tanning and bio-leather production with green business planning and improved positioning of sustainable leather products within international markets. Likewise, the Reviving Uzbekistan's and Tajikistan's Sustainable Ikat and Silk project links environmentally improved production with product differentiation and the promotion of traditional textiles in higher-value markets.

The newest generation of projects demonstrates an even more systemic understanding of innovation. Innovation increasingly encompasses circular business models, finance, market creation and ecosystem development. The Transitions to Circular Economy Practices in Textile and Apparel MSMEs along the

Life Cycle in Huzhou and Shaoxing project explicitly supports the development and testing of circular business models, business incubation, mentor matching, finance-ready concepts and circular roadmaps for industrial parks. The Catalysing the Green Transition of India's Textile & Apparel Value Chain project combines technological innovations—including recycled and bio-based materials, Life Cycle Assessment, Digital Product Passports and shared recovery infrastructure—with engagement of international brands, financing mechanisms and alignment with emerging European sustainability requirements. Similarly, Green Threads extends technological innovation through textile-to-textile recycling, traceability and Digital Product Passports while simultaneously developing Sustainable Cluster Branding, strengthening market differentiation and mobilising green finance. The second phase of STeP EcoLab similarly expands beyond eco-labelling towards traceability, Digital Product Passports, Extended Producer Responsibility, consumer awareness and policy dialogue.

Taken together, these projects illustrate a significant evolution in the role of innovation. Earlier interventions viewed innovation primarily as a means of improving technologies and production efficiency within firms. More recent projects increasingly recognise that successful circular economy transitions also require innovation in business models, value-chain organisation, market relationships, financing mechanisms and governance arrangements. Technological innovation therefore remains an essential foundation but is increasingly embedded within broader innovation ecosystems that enable firms to improve competitiveness, access new markets, comply with emerging sustainability requirements, attract investment and create commercially viable circular business opportunities. The portfolio thus demonstrates a gradual transition from technology-driven innovation towards systemic innovation, where technological, organisational, financial and market innovations reinforce one another to accelerate circular transformation across textile and leather value chains.

3. The portfolio is evolving towards more systemic and market-oriented circular economy approaches

A noticeable distinction emerges between earlier and more recent grants. Earlier projects tended to focus on cleaner production, environmental compliance, resource efficiency, and waste management. More recent projects increasingly combine technological interventions with traceability systems, eco-labelling, sustainable sourcing, market transformation, finance mobilisation, and regulatory preparedness.

For example, Green Threads introduces Digital Product Passports, traceability mechanisms, sustainable cluster branding, and green finance mobilisation. Catalysing the Green Transition incorporates life-cycle assessment, decarbonisation roadmaps, recycled and bio-based fibres, shared infrastructure, and alignment with ESPR and DPP requirements. STeP EcoLab II expands from eco-labelling towards traceability, EPR discussions, Digital Product Passports, consumer engagement, and policy reform.

This evolution reflects a growing recognition that technological improvements alone are insufficient to achieve systemic transformation. Increasing attention is therefore being paid to enabling conditions that strengthen market demand, financing, standards, governance systems, and investment readiness. Examples include Green & Fair Fashion's support for traceability systems, sustainability certification, sustainability-focused digital platforms, green finance, and linkages between Indian producers and EU brands; Green Threads' mobilisation of green finance and development of cluster-wide traceability systems; and Huzhou and Shaoxing's support for finance-ready concepts and investor matchmaking.

These developments indicate a gradual shift from project-level technical innovations towards ecosystem-building approaches capable of sustaining and scaling circular economy transitions.

4. International sustainability requirements are addressed and influencing transformation

The analysis suggests that emerging international sustainability requirements are becoming important drivers of circular economy transition within the textile and leather sector. Several of the newer projects explicitly respond to growing demands related to traceability, sustainability reporting, product transparency, circular product design, and responsible sourcing.

Projects such as Green Threads, Catalysing the Green Transition, STeP EcoLab II, and Green & Fair Fashion

increasingly incorporate elements aligned with emerging frameworks such as the Ecodesign for Sustainable Products Regulation, Digital Product Passports, sustainability certification schemes, and supply-chain transparency requirements. Rather than treating compliance solely as a regulatory obligation, these projects increasingly position sustainability performance as a source of competitiveness, market access, and investment attractiveness.

This trend suggests that future circular economy interventions are likely to become increasingly linked to broader market transformation processes, where environmental performance, traceability, transparency, and circularity are integrated into business strategies and international trade relationships.

5. Conclusions

The analysis of SWITCH-Asia grant projects in the textile and leather sector demonstrates that the portfolio has made a meaningful contribution to advancing circular economy and sustainable consumption and production practices in Asia. The projects have addressed important environmental and competitiveness challenges across textile and leather value chains, including water and energy use, chemical intensity, effluent and solid waste management, access to finance, traceability, certification, and market linkages. Eleven grants, with a combined value of approximately EUR 24.7 million, have supported interventions across several life-cycle stages in Cambodia, China, India, Mongolia, Uzbekistan and Tajikistan.

At the same time, the analysis shows that circular economy approaches are not yet applied systematically across the full textile and leather life cycle. Most projects contribute meaningfully to one or more circular economy dimensions — resource efficiency, resource switch, or resource circularity — but many remain concentrated on production-stage improvements, waste management, waste valorisation, recycling, and cleaner technologies. These interventions are important and often generate tangible environmental and economic benefits, but they do not always address upstream and higher-value circular strategies such as sustainable product design, durability, repairability, reuse, remanufacturing, circular business models, and changes in consumption practices.

This concentration on production-stage interventions should be understood in context. Many Asian textile and leather MSMEs operate primarily as manufacturers within global value chains and often have limited influence over product design, branding, retail models, and consumer behaviour, which are shaped largely by international buyers and brands. Therefore, the production focus reflects both the current leverage points available to projects and the practical needs of MSMEs. Nevertheless, future interventions could strengthen systemic impact by engaging more deliberately with upstream actors, including brands, designers and buyers, as well as downstream actors involved in repair, reuse, collection, recycling and consumer-facing markets.

A positive evolution is visible in the more recent grants. Newer projects increasingly integrate traceability, Digital Product Passports, eco-labelling, green finance, cluster branding, business model development, and alignment with emerging EU regulatory and market requirements. This suggests that circular economy practice within the portfolio is maturing from a focus on technical improvements towards broader value-chain transformation, market readiness and competitiveness.

The main conclusion, therefore, is not that circular economy principles are absent, but that their application remains uneven and still developing. Future SWITCH-Asia support can build on the strong base already created by helping projects move from targeted improvements towards more integrated circular strategies. Priority areas include circular design, business model innovation, traceability and transparency systems, green and transition finance, sustainable public procurement, policy coherence, and stronger engagement with brands, retailers, financiers, industry associations and consumers. This would help position circular economy not only as an environmental agenda, but also as a pathway for industrial competitiveness, market access, resilience and sustainable trade.

ANNEX 1 Detailed analysis of grant projects

1. Effective waste management and sustainable development of the MSME tanning companies in the Kolkata Leather Cluster

Theme: Textiles & Leather **Duration:** 2020-2023 **Total Budget:** EUR 3,124,992 (EU contribution 80%)

SDGs: Goal 6: Clean water and sanitation, Goal 8: Decent work and economic growth, Goal 9: Industry innovation infrastructure, Goal 12: Responsible consumption and production, Goal 17: Partnerships for the goals

	Textile Life Cycle				
	Materials	**Design**	**Production & Distribution**	**Use**	**End of Life**
Circular Strategies (Resource circularity, efficiency, and switch)			• Improved solid waste and effluent management through technical capacity building of SMEs and industry partners		• Establishes an effective public-private platform that brings all the key stakeholders together to develop a waste management strategy and a roadmap
Innovations (Products, Materials & Technologies: Business models; and Consumption Patterns & Lifestyle)			• Introduces green technology and sustainable tanning processes to minimise waste pollution and water saving from the production process		• Utilises solid waste through recycling solutions
Enablers (Education & Behavioural Change; Public Policy; and Market)			• Provides sustainable tanning practices and management training for workers • Facilitates access to finance for participating tanneries to adopt sustainable manufacturing processes and new technology		

Challenge: Kolkata Leather Cluster is one of the largest leather clusters of India, housing around 350 tanneries and more than 4,000 leather goods manufacturing units (mostly SMEs). The cluster produces leather goods and accessories, such as shoes, gloves, wallets and belts for the domestic and EU markets, providing direct employment to around 60,000 workers. The sector has huge growth potential for the EU market and the West Bengal government has ambitious plans to expand the Kolkata leather complex to facilitate the growth. However, the sector is plagued with many environmental health issues including effluent water and high polluting solid waste such as fleshing, off-cuts and sludge from the tanning process in addition to workers' health and safety conditions.

Contribution to Circular Economy: The project implements **Circular Strategies** by introducing new practices and green technology to micro, small, and medium-sized enterprise (MSMEs) tanneries in order to optimise tanning processes and improve solid waste management through recycling solutions and effluent management (i.e., resource efficiency). Green technologies **(Innovations)** applied include the desalting machine which removes salt from hides before it enters the soak process resulting in lower Dissolved Solids (TDS) in the effluent by 35%, saves water during washing, and lower the likelihood of soil infertility downstream. Additional water savings are achieved through retrofitting solenoid valve onto a conventional fleshing machine and installation of a water flow meter in wet and beamhouse operations, resulting in 35% and 50% water saved respectively. The enzyme-assisted dehairing process reduces effluent sulfide levels by 98% making the probability of Hydrogen Sulfide Gas formation non-negligible. All these solutions enhance effluent quality (COD, BOD, TDS, and TSS) while decreasing the Common Effluent Treatment Plant (CETP) load. In addition, pickle-free tanning reduces fresh salt consumption, effluent TDS, and chrome (responsible for the carcinogenic effect) while removing sulfuric acid from chrome tanning. The introduced weighing system also aids in water and chemical conservation. To keep output resources within the system, the project assisted in the conversion of production waste (e.g., chrome shavings, leather scraps, leather trimmings) into leather-like products as well as turning solid waste sludge into paver blocks and extracting tallow from the fleshing process to make tallow oil (used in paint, lubricant oil, poultry feed, etc.). Access to international markets will be supported by a Dutch wholesaler/retailer of luxury goods (Dugros). Moreover, the project facilitates the establishment of a roundtable/platform with representatives from the West Bengal Department of Micro & Small-scale Enterprises, Calcutta Leather Cluster Tanneries Association, financial institutions, and Leather Manufacturing Organisations, among others, as well as educating workers on sustainable tanning practices and management to reduce health and safety risks, and risks to public health and the environment as a way to strengthen the **Enablers**.

Sustainable Consumption and Production: SCP principles are applied by implementing best practices and green technologies to reduce solid waste and effluent, thereby reducing the amount of harmful organic and chemical substances in the environment. Technologies introduced also help to lower emissions, contributing to a low-carbon society transition. The project assists MSMEs in testing and implementing more sustainable manufacturing processes in order to reduce their environmental footprint. It also contributes to the development of government officials' and stakeholders' capacities in SCP tools and approaches.

Alignment with EU Frameworks: The project contributes to the EU Green Deal's policy area on mobilising industry for a clean and circular economy and responds directly to the EU Circular Economy Action Plan and the EU Strategy for Sustainable and Circular Textiles by demonstrating recycling solutions for production waste and green technology to reduce effluents thereby enhancing the sector's competitiveness for the export markets, especially to the EU.

Circular and Sustainable Outcomes: The project supports the transition to a low-carbon, resource-efficient, and circular economy, as well as economic prosperity and poverty reduction. It also promotes inclusive sustainable growth in the tanning industry. As previously mentioned, a number of initiatives are put into place to reduce the effluent loads of TDS, COD, BOD, Sulfide, Cr, and TSS, and solid waste is recycled into useful products. Green finance is facilitated to support future SCP/CE solutions, and sustainable tanning practices and management for employees are also provided to enhance the production process and working conditions. Although these solutions support the circular economy and concepts of sustainable production and consumption, the implementation of their principles is limited to the production/distribution and end-of-life stages of the life cycle, leaving room for solutions in other stages.

2. Switching to green & fair fashion: Advancing sustainable production & consumption in cotton and textile value chains

Theme: Textiles & Leather **Duration:** 2022-2026 **Total Budget:** EUR 1.983.563,00 (EU contribution 80%)

SDGs: Goal 8: Decent work & economic growth, Goal 9: Industry innovation infrastructure, Goal 12: Responsible consumption & production, Goal 13: Climate action

	Textile Life Cycle				
	Materials	**Design**	**Production & Distribution**	**Use**	**End of Life**
Circular Strategies (Resource circularity, efficiency, and switch)			• Reduced water usage and harmful chemicals during the production process		
Innovations (Products, Materials & Technologies: Business models; and Consumption Patterns & Lifestyle)	• Develop a digital platform for sustainable and circular technologies and systems for the textiles sector in India. • Support green business development for textile MSMEs				
Enablers (Education & Behavioural Change; Public Policy; and Market)			• Support creation of the enabling framework for sustainable production system	• Establish linkages with brands and retailers in India and the EU to increase demands for sustainable textile products • Supports incorporation of Green and Fair Public Procurement practices – based on good practices achieved by Fairtrade at EU and MS level	
Cross-cutting	• Support the establishment of the product traceability and certification compliance systems • Facilitates access to green finance for investing in sustainable practices				

Challenge: India is the world's second largest exporter of textile products after China, involving more than 300,000 registered MSMEs. Yet, the industry has caused severe ecological and social problems throughout the supply chain. For many years, the sector is under increasing pressure from the demanding global brands and stores, environmentally concerned consumers, and international legislators to address sustainability. The biggest challenges to increasing sustainability are a lack of reliable data and transparency to enable sustainable value chains; limited awareness and knowledge about sustainable production practices and technologies; doubts about a valid business case for switching to sustainable and circular production processes and its perceived high investment requirements; low market demand for sustainable products and buyers' price sensitivity in India; missing market linkages to Europe and access to finance to fund the greener production system.

Contribution to Circular Economy: The project implements **Circular Strategies** through the reduction of water and chemical usage during production while promoting the adoption of the fair-trade system by Indian cotton farmers and MSMEs in the textile industry throughout the supply chain. Fairtrade model is based on responsible business practices, respect for the environment, fairer prices for farmers, and better treatment for workers—all of which can be viewed as **Innovations** which constitute the circular economy model. The fair-trade model will be promoted through a benchmarks system which covers the living wages for textile workers, a participatory community-based approach to tackle child labourers, resource efficiency (e.g., water, chemical), and traceability, among others. The project will create a Business-to-Business (B2B) digital platform on sustainable and circular technologies, systems, and innovations in collaboration with textiles and technology industry partners to share knowledge and data pertinent to the Indian context for various circular and sustainable production processes spanning the entire textile supply chain. The platform will list circular and sustainable India-based solution suppliers. This comprises resource-efficient circular fibres, organic, bio, and microbial dyes, sustainable dyeing and curing equipment, green energy solutions, creative packaging, and circular waste management. Case studies of Indian MSMEs that have embraced sustainable and circular production strategies will be featured (through blogs and videos). In addition, to strengthen the **Enablers**, through events and direct interactions, the project will connect brands and merchants in India and the EU to facilitate access to sustainably produced textiles. Campaigns will inform Indian and European consumers about sustainable and circular textile products. The project will also support green & fair public procurement practices, increase sustainability parameter integration in operational and reporting mechanisms to support greater adoption of sustainability practices by textile MSMEs, and facilitate access to finance for the adoption of green/sustainable practices by supply chain actors as well as product traceability and certification systems. Finally, by creating the Sustainable Textiles Sector Index, the project will improve the ability of Indian financial institutions to evaluate green projects. MSMEs that use this new index to report on their ESG will therefore have more opportunities to use green financial services for their production. By committing to and adopting sustainable and circular production processes, MSMEs could gain additional benefits from this access to green finance framework.

Sustainable Consumption and Production: The project applies SCP principles by promoting/supporting the adoption of the fair-trade system throughout the supply chain. This is expected to result in reduced consumption of water and chemicals during the production process (i.e., doing more with less resources, decoupling environmental degradation from economic growth). Through the fair-trade system promotion, working conditions, fairer prices and wages, and market penetration will be improved leading to improved livelihoods, poverty eradication, green and healthy environment, and shared prosperity across the supply chain.

Alignment with EU Frameworks: The project contributes to the EU Green Deal's policy area on mobilising industry for a clean and circular economy and responds directly to the EU Circular Economy Action Plan and the EU Strategy for Sustainable and Circular Textiles by securing and improving employment for sector workers while improving their surrounding communities' health. It takes into account EU trade policy, which prioritises sustainability issues, while also focusing on Indian exports to Europe. The project also intersects with two of the European Green Deal's priority policy areas. increased ability of Indian cotton farmers and MSMEs in the textile industry to adopt more socially and environmentally responsible production techniques throughout the textile supply chain:

Eliminating pollution: keep water streams clean and preserve biodiversity in lakes, rivers and wetlands.

Sustainable product policy: support the circular design of all products and reduce waste significantly, especially in resource-intensive sectors such as the textile industry.

Further, the project also incorporates elements from India's National Guidelines on Responsible Business Conduct and the EU Green Deal's ESG reporting standards.

Circular and Sustainable Outcomes: Despite its recent project launch in May 2022, this project has laid out plans to achieve circular and sustainable production and consumption outcomes by leveraging the successes made by another SWITCH-Asia grant project that actively targets consumers (e.g., educational institutions) and businesses in India to adopt more sustainable consumption practices. Through active marketing, social media interaction, etc., the project is expected to increase consumers awareness and create demands for sustainable textiles in at least 50,000 urban customers in India, in collaboration with schools, colleges, fashion institutes, I/NGOs, development organisations, business leaders, and fashion platforms. Finally, the digital platform, being created with support from the project, is expected to build capacities, support, and connect various actors in the supply chain to work together toward a circular and sustainable textile sector in India. If successfully implemented, this will be one good example of how a SWITCH-Asia grant can help drive the CE and SCP models in a holistic manner.

3. Promoting circularity in the Tamil Nadu leather clusters for solid waste management

Theme: Textiles & Leather **Duration:** 2022-2024 **Total Budget:** EUR 2,800,323 (EU contribution 80%)

SDGs: Goal 6: Clean water & sanitation, Goal 8: Decent work & economic growth, Goal 9: Industry innovation infrastructure, Goal 12: Responsible consumption & production

	Textile Life Cycle				
	Materials	**Design**	**Production & Distribution**	**Use**	**End of Life**
Circular Strategies (Resource circularity, efficiency, and switch)			• Improved solid waste and effluent management through technical capacity building of SMEs and industry partners		
Innovations (Products, Materials & Technologies: Business models; and Consumption Patterns & Lifestyle)	• Introduces leather-processed material to make new products (e.g., purses, handbags)		• Introduce new business opportunities for 'waste-to-value' products • Introduce 'waste-to-value' products, • Support adoption of W2V across tannery clusters	• Indirectly support demand creation for 'waste-to-value' products; alleviating poverty and enhancing livelihoods	
Enablers (Education & Behavioural Change; Public Policy; and Market)		• Facilitate access to finance for SME tanneries • Support business case development for SMEs			

Challenge: Tamil Nadu's leather tanning industry entails 500 medium- and small enterprises (MSMEs) and employs about 40,000 workers. The industry is one of the most polluting due to its chemical production processes. While the Tamil Nadu clusters have Common Effluent Treatment Plants (CETP), high waste levels (organic and chemical) pose a serious challenge to the industry's sustainability. Solid waste is currently dumped at secured landfill sites. However, these are above capacity and pose serious environmental pollution and public health hazards. MSMEs lack technical and market knowledge about waste management, as well as funding to make the necessary changes. In India, limited collaboration and knowledge exchange among clusters and firms is stifling wide-scale adoption and creating synergies.

Contribution to Circular Economy: SWITCH-Asia will employ resource circularity, resource efficiency, and resource switch principles (i.e., **Circular Strategies**), by incorporating new methods and technology (i.e., **Innovations**), to enhance solid waste and effluent management, optimise tanning operations, and reduce costs. Using the 'waste-to-value' approach, the project collaborates with the tannery cluster to conduct pilots aimed at transforming solid waste sludge into products with added value, such as syntan, paver blocks, leather-processed handbags, and computer mouses. With the desalting machine, salt from the preservation of raw hides will be collected and utilised in the same process, resulting in anticipated 33 percent reduction of the Total Dissolved Solids (TDS) in the tannery's wastewater discharge and cost savings associated with treating it. The grant project will investigate a new technique for halving the use of sodium sulfide, a hazardous chemical, in the dehairing process by mixing enzymes to loosen the animal hair. In addition, it will support the tanneries in retrofitting the fleshing machine by installing a solenoid valve to increase the water efficiency of the fleshing process. These improvements are expected to result in considerable cost savings, new business prospects, improved livelihood opportunities, reduced greenhouse gas emissions, and providing more employments which will also contribute to poverty reduction for nearby communities. For strengthening the **Enablers**, the grant project also assists SMEs in establishing business cases and easing access to financing for SME tanneries, thereby addressing the lack of funds required to implement the essential reforms. At the policy level, the project advocates a broader use of the circular economy and techniques outside leather clusters.

Sustainable Consumption and Production: As described, the use of innovations and green technology to reduce solid effluent, wasteful resources, and toxic chemicals demonstrates the 'doing-more-with-less' approach where negative environmental effects can be decoupled from economic growth. The waste-to-value circular products is another example of how resource can be maintained within the economic system, albeit with different products. For sustainable consumption, the project will support the identification of prospective clients for the reprocessed waste-to-value products to close the circularity loop. Through the project's planned interventions, SCP principles will be implemented throughout the life cycle from material sourcing to post-consumer disposal and recycling.

Alignment with EU Frameworks: The project contributes to the EU Green Deal's policy area on mobilising industry for a clean and circular economy and responds directly to the EU Circular Economy Action Plan and the EU Strategy for Sustainable and Circular Textiles by demonstrating recycling solutions for production waste and green technology to reduce effluents thereby enhancing the sector's competitiveness for the export markets, especially to the EU.

Circular and Sustainable Outcomes: This project has demonstrated the clear and tangible benefits of the CE and SCP models (i.e., reduced GHG emissions by 20%, reduced water usage by 50%, and 33% reduced use of sodium sulfide, as well as improved farm yields/quality and new business opportunity from the by-product manure from the fleshing and raw trimmings), in addition to enhanced economic prosperity, health, and poverty reduction of sector workers and surrounding communities, solid waste reduction and more efficient use of resources. Given these benefits, it is anticipated the practices and systems introduced by the project will be sustained beyond the life of the project. This is another successful application of the CE and SCP models through a SWITCH-Asia grant initiative.

4. Promotion of sustainable energy practices in the garment sector in Cambodia

Theme: Textiles & Leather **Duration:** 2020-2024 **Total Budget:** EUR 2,995,748 (EU contribution 86.94%)

SDGs: Goal 7: Affordable and clean energy, Goal 8: Decent work and economic growth, Goal 9: Industry innovation infrastructure, Goal 11: Sustainable cities and communities, Goal 12: Responsible consumption and production, Goal 13: Climate action

	Textile Life Cycle				
	Materials	**Design**	**Production & Distribution**	**Use**	**End of Life**
Circular Strategies (Resource circularity, efficiency, and switch)			• Promotes efficient technologies, switch to renewable energy and good operations management		
Innovations (Products, Materials & Technologies: Business models; and Consumption Patterns & Lifestyle)			• Facilitates the conduct of external energy audits in 50 garment factories, demonstrating the potential benefits of more sustainable energy practices. • Inform interested manufacturers about appropriate technological solutions		
Enablers (Education & Behavioural Change; Public Policy; and Market)			• Provide technical assistance and training adapted to needs • Facilitates access to appropriate technical and financial services including a guarantee fund to support their switch towards sustainable energy practice		
Cross-cutting	• Institutional arrangements and capacities are developed for adoption of enforcement measures and improve data availability supporting the sector's switch to sustainable energy practices				

Challenge: Cambodia's garment industry employed 847,419 people in 2017, making up 86 percent of the overall industrial employment. Over 620,000 jobs are supported by exporting factories (pre-covid 19). The sector's growth is seen in its rising energy demand, with total final consumption rising by roughly 11% between 2010 and 2015. As a result, the sector's GHG emissions has also doubled (2002-2012). The predominant use of unsustainable, non-traceable cheap fuelwood contributes to the country's rapid forest depletion and further exacerbates the sector's ecological footprint. Cambodia's garment Industry is losing its edge compared to other countries like Bangladesh, Myanmar, and Viet Nam, due to its high energy costs, increase in the monthly minimum wage, lagging infrastructure, productivity, and logistics. The cost of electricity from the national grid in Cambodia is the highest in ASEAN making the average energy cost per ton of garments at USD 560, or 16.7% of the total production costs, which is the higher than neighbouring countries.

Contribution to Circular Economy: Building on ambitious targets set by international brands to which Cambodia garment factories are supplying products, this project implements **Circular Strategies** by promoting efficient energy technologies and switch to a renewable energy choice for the sector to reduce production costs and lower the environmental footprint through a regulatory scheme called 'GMAC Model Green Factory Program, which is a tool to guide factories in implementing sustainable energy practices (e.g., establishing energy standards, energy audits, energy management, and renewable energy). Energy audit reports produced so far recommend technological solutions such as rectifying the air compressors, installation of solar systems, installation of high-efficiency class (IE3/IE4) motor, installation of efficient lighting systems, replacing/insulating/optimising the boiler, and replacing existing fan with BLDC fans (i.e., **Innovations**). These solutions are expected to create demand for industrial EE services and technologies and create better market conditions for the supply of such services and technologies. Finally, it facilitates access to technical support and financial services (i.e., **Enablers**) including a guarantee fund for a switch towards sustainable energy practices.

Sustainable Consumption and Production: Sustainable production was achieved by the adoption of best practices and technologies to reduce energy demand during production, introduction of a regulatory framework and a series of measures to encourage private investment for the adoption of energy efficiency measures and renewable energy supply, and exchanges between the international textile companies to harmonise their requirements for sustainable production to enable a smoother transition for supply chain actors. These solutions are intended to result in a sustainable production with a particular focus in the production and distribution phase of the life cycle.

Alignment with EU Frameworks: The project contributes to the EU Green Deal's policy area on mobilising industry for the clean and circular economy and responds directly to the EU Circular Economy Action Plan on improving the business and regulatory environment for sustainable and circular textiles targeting circular materials. Finally, it supports the EU Strategy for Sustainable and Circular Textiles by supporting innovation and investments for the industry through a guarantee fund with a targeted capitalisation of US$ 5 million by 2023, which would leverage US$ 25 million in bank loans to EE projects by 2035.

Circular and Sustainable Outcomes: By developing a demand for industrial EE services and technologies and improving market conditions for their supply, the project opens up an estimated US$ 120-150 million energy efficiency market for energy service businesses, technology providers, and local financial institutions. A 20% increase in garment energy efficiency will boost energy productivity by 31% by 2030 and save $2 billion in energy costs. By 2025, 175,000 tCO_2e of GHG emissions will be averted. The project is expected to boost the attractiveness of Cambodian garments to high-end foreign consumers with environmental policies by reducing SME garment manufacturers' average energy intensity to 33.6 GJ/ton garment by 2025 from 42 GJ/ton in 2017. While these matrices are impressive, the project does not apply the CE and SCP principles in a comprehensive manner and across the supply chain. No or little attentions are given to material selection, design, and post-consumption stages, as well as workers conditions.

5. STeP EcoLab - Sustainable Textile Production and EcoLabelling in Mongolia

Theme: Textiles & Leather **Duration:** 2018-2022 **Total Budget:** EUR 1,867,329.76 (EU contribution 80%)

SDGs: Goal 12: Responsible consumption and production, Goal 13: Climate action

	Textile Life Cycle				
	Materials	**Design**	**Production & Distribution**	**Use**	**End of Life**
Circular Strategies (Resource circularity, efficiency, and switch)			• Evaluates the social and environmental implications of textile processors, including the joint identification of workable solutions. • Through the voluntary code of practice and the MNS 6926:2021 National standard, manufacturers are provided with guidelines on water/ energy efficiency, use of low-impact chemicals, waste water management, animal welfare, and social responsibility.		

	Textile Life Cycle				
	Materials	**Design**	**Production & Distribution**	**Use**	**End of Life**
Innovations (Products, Materials & Technologies: Business models; and Consumption Patterns & Lifestyle)	• Promotes best practices on raw material sustainability, quality improvement & control and sustainable certification. • Creates a multi-stakeholder platform to foster/promote the convergence and extension of existing animal fibres eco-labelling schemes. Consolidates sustainable raw material sourcing options for Mongolian textile processors.				

	Textile Life Cycle				
	Materials	**Design**	**Production & Distribution**	**Use**	**End of Life**
Enablers (Education & Behavioural Change; Public Policy; and Market)			• Develops courses on E&S management tailored for textile engineers, followed by a Training of Trainers course for professors and integration of the content in the official curriculum. • Offers Mongolia Wool & Cashmere Association marketing and communication assistance for environmental-friendly products. • Organises and takes part in trade shows in Europe and Mongolia to link producers and suppliers with the sustainable products market.	• Conducts a behavioural study of Mongolian and European consumers	
Cross-cutting	• Provides a framework for the co-development of a sectoral roadmap and a voluntary code of practice (VCP) that embodies the processors' pledges to adopt more environmentally friendly manufacturing methods. • Analyses the existing regulation to build the case for regulatory adjustments. • Develops specific tools and guidelines for sector specific Environmental and Social (E&S) risk assessment.				

Challenge: Mongolia's cashmere and wool industry, which is based on traditional pastoralist livelihoods, is the country's second most important sector after the extractive industry. However, because of rising competition from international processors, it is now dealing with new issues (sourcing and production). Consequently, there is a need to develop a production system that is more quality-driven as well as a niche market among end users. In order to adopt more environmentally friendly production techniques, lower GHG and overall pollutant emissions, and increased share of locally processed leather, wool, and cashmere to up to 80% by 2030, the sector has recently been the focus of the Government of Mongolia and its Sustainable Development Vision. The 2018 National Cashmere Program aims to produce market-competitive niche products in Mongolia and introduce eco-friendly technology. Parallel to this, a number of organisations have been regularly assisting the upstream value chain by examining the environmental effects and problems with pasture degradation that

herder families in rural Mongolia experience as their main difficulties. Virtuous behaviours have emerged within this conundrum, prompting participants to embrace more ethical and quality-focused behaviours (among herders and within the financial industry thanks to progressive regulations).

Contribution to Circular Economy: The project conducts an assessment of environmental and social risks of textile processors and identified workable solutions. To enable circular economy, it supports a framework for the co-development of a sectoral roadmap and a voluntary code of practice that embodies the processors' pledges to adopt more sustainable production methods, analyses the existing regulation for adjustment potentials, and develops tools and guidelines for sector-specific environmental and social (E&S) risk assessment. The project supports the development of courses on E&S management for textile engineers, provided a Training of Trainers course for professors, and mainstreamed it into the official curriculum, offered marketing and communication support to the Mongolia Wool and Cashmere Association for sustainable textile products, and facilitates connections between suppliers and consumers in Europe, as well as conducting consumers' behavioural study of Mongolian and European consumers on the eco-friendly textile products.

On **innovations**, the project focuses its support on material sustainability by introducing best practices and certification, quality control, consolidated sustainable raw materials sourcing, and the creation of a platform for existing eco-labelling schemes for animal fibres. In addition, the project supports the identification and development of a project pipeline for international and domestic green finance operators and built the capacity of MWCA members to access finance. we work with the National federation of Pasture Users' Groups /NFPUG/ and Sustainable Cashmere Union for origin traceability system / RMTS- raw material traceability system/, linking herders' cooperatives directly to processing companies, aiming to cut the middle-men. Also, collaborating with MWCA as one of the main partners, the team encourages processing companies to keep the highest possible quality through Mongolian Noble Fibre certification label.

Sustainable Consumption and Production: Sustainable production was promoted through the introduction of best practices on sourcing sustainable materials and manufacturing process, optimising cost-saving measures. A roadmap and voluntary code of practice were also co-created for processors to adopt sustainable production approaches. Responsible consumption is being forged through the consumers' behavioural study for both Mongolian and European consumers to better understand their preferences and aversions and plan a market strategy for sustainable Mongolian textiles.

Sustainable Outcomes: The assistance of the project that developed the Voluntary Code of Practice in 2020, which is greatly valued by the Mongolian Wool and Cashmere Association, has provided a basis for the Ministry of Food, Agriculture, and Light Industry to create the MNS 6926:2021 National standard. The primary objective of the standard is to outline the fundamental principles of sustainable textile production, its principal criteria, and the methodology for assessment, verification, and certification. As a result, sustainable sourcing and production practices have been improved, leading to an increase in brand recognition internationally. Optimising resources leads to cost savings and a reduction in negative environmental impacts. In addition, a platform for animal fibre eco-labelling schemes has been established, and sustainable raw material options have been consolidated.

Alignment with EU Frameworks: The project contributes to the EU Green Deal's policy area on mobilising industry for the clean and circular economy and responds directly to the EU Circular Economy Action Plan on applying the new sustainable product framework including developing eco-design measures to ensure that textile products are fit for circularity, tackling the presence of hazardous chemicals, and empowering business and private consumers to choose sustainable textiles.

6. Capacity building to the Mongolian vegetable tanned yak leather cluster on bio-leather and bio-leather products

Theme: Textiles & Leather **Duration:** 2022-2026 **Total Budget:** EUR 1.983.563,00 (EU contribution 80%)

SDGs: Goal 8: Decent work & economic growth, Goal 9: Industry innovation infrastructure, Goal 12: Responsible consumption & production, Goal 14: Life below water

	Textile Life Cycle				
	Materials	**Design**	**Production & Distribution**	**Use**	**End of Life**
Circular Strategies (Resource circularity, efficiency, and switch)			• Supports a reduction of environmental impact from the production process by reducing waste from the cleaning and improper processing, as well as losses related to the current (incomplete) collection of hides. • Improves resource efficiency		
Innovations (Products, Materials & Technologies: Business models; and Consumption Patterns & Lifestyle)	• Establishes through training a sustainable, high-quality, and traceable supply of domesticated yak hides that are available as raw materials for the developing vegetable tanning industry.	• Preparation of green business plans for Cluster members	• Supports increased production of sustainable, environmentally friendly, and export-ready yak leather product production by increasing productivity and efficiency of the manufacturing processes for leather products, including tanning and finishing		• Supports manufacturing of associated bio-leather products with greater scope for recycling.

Enablers (Education & Behavioural Change; Public Policy; and Market)			• Increase the skills of sustainable manufacturing and marketing among MSMEs in the vegetable-tanned yak leather cluster and other leather industries. • Examine and disseminate trading requirements with international markets for supply chain stakeholders.	• Conduct a needs assessment of leather products manufacturers and exporters. • Training on consumer demands and the legal requirements related to eco-labelling and trading of goods.	
Cross-cutting	• Facilitates integration to global greener value and supply chains for the Vegetable Tanned Yak Leather Cluster members • Establishing process control and traceability systems in companies • Organises workshops with private & public investors/financing institutions to explore and promote green finance opportunities.				

Challenge: Mongolia's tanning industry is one of the most significant industries. Yet, it still relies on outdated facilities, machinery, and other technicalities, thereby demanding more attention to ecologically friendly, green technology and the circularity of products. About 20% of manufacturers produce processed leather, but this figure is declining as a result of quality issues related to resilience, odour, and skin harm. Most companies only process up to the wet blue stage. Yaks make up one million of Mongolia's 10.4 million bigger domestic cattle, and all but 5% of them are concentrated in just six areas. Yaks are particularly well suited to the local environment, supporting the livelihood of many households in the yak-raising regions by producing a variety of goods, including milk, fibres, cashmere, hair, meat, and hides, with fewer drawbacks than other animals. Today, mineral (chrome) tanning dominates the production of leather. This process, along with related synthetic-based finishing techniques, is very energy and water intensive and polluting in terms of waste production and effluent emissions. There are numerous prospects for reducing inputs and outputs and promoting greener, more ecologically friendly production in the manufacturing of full grain vegetable leathers, as well as in vegetable tanning as a whole. Yak distribution and population limitation offer a chance to create a sustainable value chain that is unique. Additionally, upstream integration might give leather companies the chance to consolidate supply, lower wastage, and increase the value of the products made in Mongolia.

Contribution to Circular Economy: The project supports and promotes circular economy throughout the life cycle stages, from raw materials selection to design, production, distribution, consumption and end-of-life. On **Circular Strategies**, the project supports improving resource efficiency (e.g., water, chemicals, energy) and the reduction of waste from cleaning and improper processing, as well as minimising losses related to the current (incomplete) collection of hides. This is done through training and technical assistance. On **Innovations**, the project supports the establishment of sustainable and traceable supplies of domesticated yak hides (i.e., raw materials for the emerging vegetable tanning industry); assists in the development of green business plans for Cluster members; supports increased production of sustainable, ecologically friendly, export-ready yak leather products by boosting the productivity and efficiency of leather product manufacturing processes, including as tanning and finishing; and facilitates the production of bio-leather goods with increased recycling potential. In addition, the project enhances the manufacturing and marketing skills of MSMEs in the cluster of vegetable-tanned yak leather and other leather sectors; examines and

disseminates international trading requirements to supply chain stakeholders; conducts a needs assessment of leather products manufacturers and exporters; conducts training on consumer expectations and the regulations surrounding eco-labelling and international trade. Moreover, it facilitates integration to global greener value/supply chains for the Vegetable Tanned Yak Leather Cluster members by establishing process control and traceability systems in companies, as well as creating prospects for green funding by hosting workshops attended by private and public investors and financial institutions, all of which aim to strengthen the **Enablers** for enhanced circularity.

Sustainable Consumption and Production: Sustainable production is implemented through the introduction of new manufacturing techniques which are expected to bring about a reduction of waste (input and output) and energy use during the production process. This is done through training and technical assistance that focus on the use of alternative processing to eliminate the use of materials that constrain recycling. Capacities of MSMEs will be built through training which will focus on improving raw material quality (for tannery workers), animal husbandry, disease risks and mitigation (for herders), flaying and fleshing techniques (for slaughterhouses), and preservation and storage (for traders & merchants). Technical support will be provided to participating tanneries to implement the low energy and emissions in the finishing operations as well as in the design & installation of the effluent treatment system. Sustainable consumption will be fostered by changing the consumers' perception of leather products as a by-product from the cattle and dairy industry. Along with bringing more suitable technology, the project will also give people more knowledge (on leather and its alternatives) to help them make informed decisions and push manufacturers to cater to consumers' needs more. Additionally, the project will raise awareness of (and integration with) other livestock development efforts, which increasingly place an emphasis on 'productivity' rather than just 'production'.

Alignment with EU Frameworks: The project is directly linked to the EU Priority to 'Support MSMEs in reducing the environmental impact of their industrial production, improving resource efficiency and adopting circular economy practices'. The project also contributes to the EU Green Deal under the following pillars:

- **Fresh air, clean water, healthy soil and biodiversity** by introducing circularity in the yak leather production process, reducing environmental impact in terms of pollutants and toxic chemicals, optimisation of resources management leading to less waste and less utilised resources;
- **Future-proof jobs and skills training for the transition** by building the capacity of relevant stakeholders (from herders to traders and merchants) on sustainable techniques, practices, and processes that lead to sustainable yak leather products;
- **Globally competitive and resilient industries** by providing support for clustering, development of green business plans, minimised energy consumption for production, introducing all levels of Mongolian yak leather production stakeholders into the global green supply chain, thus enhancing their competitiveness and ensuring their place among global suppliers.

In accordance with the EU Circular Economy Action Plan, the project also addresses the design of sustainable products and circularity in production processes. The project's other goals include developing safe products and non-toxic material cycles, safeguarding the environment against the most dangerous chemicals and their toxic mixes, and eventually attaining a world free of chemical pollution. As part of the EU Green Deal, this relates to the 'Chemical Strategy for Sustainability'.

Circular and Sustainable Outcomes: This project applies the CE and SCP principles throughout the entire product life cycle by focusing on decoupling environmental footprint from economic growth, adopting best practices and management for green production, as well as creating standardised and traceability systems to advance sustainable leather products and boosting consumer demand to increase market penetration; all of which are anticipated to result in circular and sustainable outcomes. While tangible results are being achieved, this project may be another excellent example of how the CE/SCP models can be applied in the real world to produce tangible benefits.

7. Transitions to circular economy practices in textile and apparel MSMEs along the life cycle in Huzhou and Shaoxing

Theme: Textiles & Leather **Duration:** 2022-2025 **Total Budget:** EUR 2,973,263.38 (EU contribution 80%)

SDGs: Goal 12: Responsible consumption & production, Goal 13: Climate action

	Textile Life Cycle				
	Materials	**Design**	**Production & Distribution**	**Use**	**End of Life**
Circular Strategies (Resource circularity, efficiency, and switch)		Promotes the adoption of circular design practices through capacity building activities (ToT), training of companies and pilots.	Promotes the implementation of resource efficiency measures.		
Innovations (Products, Materials & Technologies: Business models; and Consumption Patterns & Lifestyle)		Supports the development of sustainable and circular business models through a ToT workshop, pilots initiation, and replication of the pilots in industrial parks	Initiates an innovation challenge for start-ups and mentor matching with companies.		
Enablers (Education & Behavioural Change; Public Policy; and Market)			Supports the development of climate action plans for the textile industry in both cities focusing on reduced water/energy uses and mitigation of carbon emissions from textile waste		
Cross-cutting	• Supports the creation of a circular textile roadmap, guidelines for eco-design and recycling standards (in collaboration with targeted European cities) as well as recommendations for climate actions in both cities. • Provides technical assistance for the preparation of at least 5 finance-ready concepts on resource efficiency and CE practices for financiers, plus matchmaking events with potential financiers.				

Challenge: China's Jiangsu and Zhejiang Provinces are the hubs of the textile industrial clusters. In Zhejiang's Shaoxing City, 90% of the textile and apparel is produced and distributed by MSMEs, despite being less competitive and developed than MSMEs in other countries. The industry now faces many challenges towards a transformation to a circular economy: (1) Lack of innovation in key technologies for large-scale development of recycled fibres and bio-based chemical fibres; 2) Existing policies such as the raw material optimisation strategy, green design, green consumption, waste textile recycling are mainly national guiding policies, more systematic and industry-specific supporting policies and standards are still missing; 3) Circular design, as a source solution, is still at the concept advocacy stage, and the circularity of products is not yet the priority in existing green design policies, standards and practices; and 4) Consumers' awareness of green consumption has improved, but currently consumption behaviour lags behind.

Contribution to Circular Economy: The project promotes **Circular Strategies** through resource efficiency measures and circular design practices by textile manufacturers of the two cities through capacity-building activities for trainers, training of companies, and pilots implementation and scale-up. Based on an analysis of the value chains and life cycle analysis of products in both cities, the project identifies best practices for circular textile production. Through the web portal TheSwithcers.org, the ARC-SCP/RAC's Eco-design Tool will be made available to help SMEs to better understand, define, and undertake circular innovation via life cycle and systemic thinking. The project facilitates **Innovations** through a 3-day workshop conducted by MedWaves for key sector stakeholders and business support organisations to foster a local business ecosystem leading to the development of sustainable and circular business models. Eight pilot projects will be selected through a competitive process for implementation and a scale-up in industrial parks afterward. Moreover, the project will define challenges based on the material flow analysis and stakeholder consultation, calls for solutions for each challenge, and organises co-creation events to design the solutions. Following this process, at least five start-ups will be matched with selected companies for further support in rolling out their business plans. To strengthen circular **Enablers**, the project will support the development of circular textile roadmaps for both cities as well as the industry guidelines for eco-design and recycling standards. In addition, it will also provide policy recommendations for the revision of Huzhou and Shaoxing city climate action plans focusing on water/energy reduction and carbon mitigation from the pre-consumer processes.

Sustainable Consumption and Production: Sustainable production will be fostered through capacity-building activities focusing on designing resource efficiency, circular innovation, system thinking, and eco-design as well as the pilots implementation. Also envisioned is technical assistance for the preparation of financial proposals to for financially feasible concepts linked with potential financiers. Circular textile roadmaps and industry guidelines for eco-design and recycling standards will also be created for both cities. Project support and activities do not appear to be centred on enhancing sustainable consumption as much as sustainable production, although the innovation challenges activity may present a chance to bridge this gap.

Alignment with EU Frameworks: The project adheres to the EU Green Deal and the EU Circular Economy Action Plan, both of which highlight the textile industry as a top priority. Reduced demand for natural resources, sustainable growth, and job creation are all benefits of the shift to a circular economy. Additionally, the project helps train people in skills necessary for the transition to a circular economy and make sustainable textiles from China available to consumers in the EU.

Circular and Sustainable Outcomes: Documented outputs and intended outcomes include stronger MSME capacity for circular practices, policy and incentive development at local level, improved access to finance for circular textile investments, and practical tools for implementation. Publicly available outputs include the 2024 EU–China Benchmark Baseline Study, the Benchmarking Guide on Circular Textiles for Chinese MSMEs, and an access-to-finance workstream that supported feasibility studies for selected projects. Later project communication also points to work on worker upskilling, recycling infrastructure, green finance, carbon labelling and chemical traceability.

8. Reviving Uzbekistan's and Tajikistan's Sustainable Ikat and Silk

Theme: Textiles & Leather **Duration:** 2020-2024 **Total Budget:** EUR 2.012.796,40 (EU contribution 80%)

SDGs: Goal 6: Clean water and sanitation, Goal 8: Decent work and economic growth, Goal 9: Industry innovation infrastructure, Goal 12: Responsible consumption and production

	Textile Life Cycle				
	Materials	**Design**	**Production & Distribution**	**Use**	**End of Life**
Circular Strategies (Resource circularity, efficiency, and switch)			• Training focusing on reducing the use of fixing agent of natural dyes (Aluminium Acetate) to achieve desired colours and shades. • Introduce the use of multiple wash basins (instead of running water) and water filtration system for rinsing/washing silk threads.		
Innovations (Products, Materials & Technologies: Business models; and Consumption Patterns & Lifestyle)	• Promotes use of traditional/ environmentally friendly dyes	• Supports the circular design of all products • Aligns Ikat products with sustainable performance criteria		• Increase the awareness among local and international buyers of Ikat on sustainable consumption and production of Uzbek/ Tajik silk/Ikat products through trade fairs and business matching.	

	Textile Life Cycle				
	Materials	**Design**	**Production & Distribution**	**Use**	**End of Life**
Enablers (Education & Behavioural Change; Public Policy; and Market)			• Organises regional events, cooperation exchanges in the B2B format and other events with the participation of silk producers • Introduces eco-labelling and ultimately creating opportunities for international recognition of environmentally friendly silk and ikat products from Uzbekistan and Tajikistan. • Creates a list of certified/reliable local/ international suppliers of synthetic dyes for local ikat /silk producers.	• Stimulate the development of new markets for climate neutral and circular products	
Cross-cutting	• Initiates a policy dialogue for promoting sustainable ikat/silk production • Establishes local and cross-regional relationships for building new supply chains • Supports training and advisory capacities of local educational/vocational institutions through tailored training modules				

Challenge: Tajikistan and Uzbekistan are linked by a long and common history, culture and religion. Since ancient times, the silk production and processing traditions of Uzbekistan and Tajikistan have shaped the Central Asian region making the two countries an integral part of the 'Great Silk Road'. Silk has remained the trademark of many contemporary home-grown designers and fashion brands in Uzbekistan, who use Central Asian Ikat, a unique textile, which is patterned by dyeing the threads before weaving. Having been separated from Western markets for over 200 years, high-end fashion houses start showing increasing interest in the unique, high-quality designs and colour combinations, of the Ikat from Central Asia. While Uzbekistan inherited few silks production sites, Tajik sericulture has almost vanished in view of the turmoil following dissolution of the USSR and the long-lasting civil war. Due to the continuous emigration and destruction of traditional textile production, much of the knowledge about traditional sericulture and ikat textiles was largely lost. In addition, industrial textile production processes, especially dyeing methods, have replaced traditional textile production in Tajikistan and Uzbekistan contributing to pollution of the environment and water sources of communities.

Contribution to Circular Economy: **Circular Strategies** are promoted through the reduction of the fixing agent in the dyeing process, and minimisation of water use during rinsing/washing of silk threads by using multiple wash basins equipped with water filtration systems to ensure quality while minimising resource use. General circular economy principles of 'eliminate and circulate' are embedded in the training of ikat/silk makers resulting in increased awareness and practice to achieve the circularity goal. The project applies **Innovative solutions** through the promotion of traditional and environmental-friendly dyes; optimal design of fabric width (60 cm) to minimise textile offcuts; turning textile offcuts into smaller items and souvenirs to minimise waste. Circular design is introduced to all ikat products to meet the internationally accepted sustainable standards for textiles. Training sessions are provided for local educational institutions to gain in-depth principles and techniques on sustainable textile processing and marketing. Buyers' awareness of these culturally unique products is raised through international trade fairs while new global market opportunities are pursued for these ikat/silk products. Finally, to bolster the **Enablers** for circular economy, the project helps facilitate the exchange of buyers and silk producers through regional, B2B, and other events to boost demands; introduces eco-labelling to promote international recognition of Uzbek and Tajik silk and ikat products; and lists certified/reliable local/international synthetic dye providers for ikat/silk producers. Moreover, the project will assist in the establishment of local and cross-regional relationships for the purpose of creating new supply chains; starts a policy dialogue to support sustainable ikat/silk production; and supports local educational/vocational institutions' capacity for training and advisory work by providing them with specialised training modules.

Sustainable Consumption and Production: The project promotes sustainable production by optimising the resources (e.g., water, dyes) during production while maintaining the same level or improved results (i.e., colours, shades, ready fabrics). Sustainable performance criteria are applied to the design and manufacturing processes to enhance marketability while policy dialogues were facilitated to promote sustainable silk/ikat production. A needs assessment was conducted to inform enterprises about sustainable production possibilities in the value chain followed by training focused on revitalising and modernising the manufacturing processes. Consumer awareness is raised on sustainable ikat and silk production processes whereby increased demands for the products in global markets are targeted. The project, however, does not focus on the end-of-life stage of the life cycle.

Alignment with EU Frameworks: The project addresses sustainable development as a key EU priority based on balanced economic growth and price stability, a highly competitive market economy with full employment and social progress, and environmental protection. Further, it will foster circular manufacturing practices in line with the EU's upcoming extension of the Circular Economy Action Plan by introducing zero waste techniques in Ikat manufacturing. This is in line with the EU Green Deal ambitious plan to boost climate neutrality, for instance by promoting sustainable consumption and production practices. The project has synergies with three policy focus areas of the European Green Deal: (i) Sustainable industry: stimulate the development of new markets for climate-neutral and circular products; (ii) Eliminating pollution: keep waste streams clean and preserve biodiversity in lakes, rivers and wetlands; and (iii) Sustainable product policy: support the circular design of all products and reduce waste significantly, especially in resource-intensive sectors such as the textile industry.

Circular and Sustainable Outcomes: To date, the project has made good strides toward achieving its intended objectives. Since the project's inception, it has successfully incorporated the principles of SCP and farming into the training facilities managing the production of cocoons in Tajikistan, followed by training for farmers and trainers to share the information. The ikat production process, which entails the preparation, design, dyeing, and weaving of silk thread, also incorporates the SCP concept. While policy briefs were created to inform policymakers, numerous policy dialogues at the national and regional levels have also been held to promote SCP and CE principles. To create and strengthen networks of value chain actors and to offer a platform for collaboration, one regional and several national business matchmaking events were held. A regional mapping of the current dyes and supplier networks is currently being done, along with analysis of sustainability criteria. Another upcoming notable activity involves the collaboration of local designers (up to 20 designers) and European designers to produce a sustainable collection of ikat clothing. With these supports and interventions lined up, it is anticipated the CE/SCP principles will be more fully sustained in the value chains of silks and ikat in both countries. Sustainable outcomes will likely be determined by tangible benefits shared by various actors in the ikat and silk production/trade ecosystems.

9. Catalysing the Green Transition of India's Textile & Apparel Value Chain

Theme: Textiles & Leather **Duration:** 2025-2028 **Total Budget:** EUR 1.87 million (EU contribution 80%)

SDGs: Goal 5 Gender Equality; Goal 7, Affordable Energy, Goal 8: Decent work and economic growth, Goal 9: Industry innovation infrastructure, Goal 12: Responsible consumption and production

	Textile Life Cycle				
	Materials	**Design**	**Production & Distribution**	**Use**	**End of Life**
Circular Strategies (Resource circularity, efficiency, and switch)	Switch -Transition from conventional raw materials (cotton, polyester) to recycled and bio-based fibres, with lower environmental impact, is promoted (Ex- introduction of next-gen materials such as hemp and flax for the home textile industry in Karur)	Efficiency -Embed LCA (Life Cycle Assessment) into decision making for material and production techniques	Efficiency -Focus on improvements in production processes resulting in energy, water and chemical reduction Circularity -Promotion of effluent treatment technologies which increase use of recycled water with lesser energy Switch -Promotion of solutions and technologies reducing or eliminating usage of fossil fuels (Ex – use of biomass and heat pumps in place of coal for steam requirements)		Resource Circularity -Support establishment of cluster level TRFs (Textile Recovery Facilities) to collect and sort textile waste

	Textile Life Cycle				
	Materials	**Design**	**Production & Distribution**	**Use**	**End of Life**
Innovations (Products, Materials & Technologies: Business models; and Consumption Patterns & Lifestyle)	Materials -Commercial validation of alternative materials through trials with manufacturers and brands (Ex- Testing of hemp and nettle fibres with supply chain of global brands)	Technologies -Introduction of Digital Product Passport (DPP) linked traceability systems and tools	Technologies -Technical assistance, solution showcases, cluster/MSME demonstrations and implementation support for low-carbon solutions and technologies such as waste heat recovery, heat pumps, wastewater treatment, etc. -Support in creation of cluster level shared infrastructure for resource recovery and efficiency (Ex- shared biomass briquetting plant, common effluent treatment plant).	*Consumption Patterns* *-Indirectly influencing consumer behaviour through integration of traceability throughout the textile value chain via DPP implementation*	Technologies -Identification of textile-to-textile recycling technologies with techno-commercial feasibility

	Textile Life Cycle				
	Materials	**Design**	**Production & Distribution**	**Use**	**End of Life**
Enablers (Education & Behavioural Change; Public Policy; and Market)	Market - Market pull created via brand engagement (H&M, Decathlon and other European brands) influencing upstream material shifts Education & Behavioural Change -Low carbon solution showcases on material and resource to create market linkages between manufacturers and solution providers.	Education - Create awareness amongst manufacturers through trainings on tools such as LCA and GHG accounting for informed design choices.	Market -Alignment with EU regulatory frameworks influencing production practices among export-oriented MSMEs Education & Behavioural Change -Cluster level baseline and decarbonisation roadmap for informed decision making on adoption of technologies Financial Linkage -Create direct linkages between manufacturers and green financiers to provide favourable financing for adoption of technologies. Public Policy -Synthesis of on-ground learnings across clusters that can inform policy dialogue and enable replication of decarbonisation models.		Financing -Provide access to green finance for entrepreneurs establishing textile-to-textile recycling (Ex- for a polyester recycling plant in Surat cluster)
Cross-cutting	Gender inclusion is treated as a cross-cutting principle in MSME and finance support.				

Challenge: India's textiles and apparel sector is economically significant but environmentally intensive. The sector contributes 2.3% of GDP, 13% of industrial output and 12% of export earnings, while employing more than 45 million people, around 60% of them women. MSMEs are responsible for ~80% of production but face major transition barriers: limited technical capability on decarbonisation/circular economy/ESG, low awareness of and access to circular or low-carbon solutions, and weak access to climate finance. The sector requires about USD 93.9 billion in investment to scale decarbonisation solutions.

Contribution to Circular Economy: The project delivers a strong contribution to the circular economy across the textile lifecycle, with the most tangible impact at the **production stage** through integrated resource efficiency, resource switching, and resource circularity interventions for MSMEs. It promotes a shift to lower-impact materials and enables adoption of low-carbon technologies and processes improving energy, water, and chemical efficiency. The project also drives innovation via material trials, traceability systems (e.g., Digital Product Passports), and shared infrastructure (for recycling, effluent treatment, etc.), with enablers such as capacity building, technical assistance, access to latest technologies and green finance.

Sustainable Consumption and Production: The project is strongly focussed on **Sustainable Production** through its focus on enabling a resource efficient and low carbon production. This is done through capacity building sessions on regulatory frameworks, resource measurement frameworks such as LCA and GHG accounting and sustainability reporting. The program would undertake cluster level baselining to provide a tailored decarbonisation roadmap with clear impact areas to guide the investments of the manufacturers into resource efficient and circular production processes. The program would enable shift to sustainable production by creating linkages with low carbon solution providers who would enable a shift from resource and emission heavy materials and processes such as fossil fuels to resource efficient and circular materials and processes such as biomass briquettes.

Alignment with EU Frameworks: The programs interventions are linked to the latest EU regulations such as ESPR and aims to help EU-linked export-oriented manufacturers build more transparent and traceable supply chains. The program is designed to help the manufacturers respond to Scope 3 emission expectations associated with the Corporate Sustainability Reporting Directive. More broadly, the project's emphasis on circularity, cleaner production, supply-chain transparency and decarbonisation is consistent with the EU Strategy for Sustainable and Circular Textiles.

Circular and Sustainable Outcomes: The program has three pathways, capacity building, technical assistance and access to low carbon technologies to achieve the expected outcomes. Capacity building & Technical assistance is expected to improve MSME understanding of circular economy and decarbonisation, develop readiness to comply with upcoming EU regulatory frameworks and build in-house capacity to measure and report emissions and resource use. The production processes are expected to become more resource efficient, circular and low emission through adoption of low-carbon and circular technologies, materials and process improvements.

By the end of three years, the program targets to provide capacity building support to 250-400 MSMEs, high touch technical assistance to 50-75 MSMEs, and promote 16-18 low-carbon solutions.

10. STeP EcoLab II: Sustainable Textile Production and Eco-Labelling in Mongolia

Theme: Textiles & Leather **Duration:** 2025-2028 **Total Budget:** EUR 1,875,000 (EU contribution 80%)

SDGs: Goal 8: Decent work and economic growth, Goal 9: Industry innovation infrastructure, Goal 12: Responsible consumption and production

	Textile Life Cycle				
	Materials	**Design**	**Production & Distribution**	**Use**	**End of Life**
Circular Strategies (Resource circularity, efficiency, and switch)	• Certified sustainable raw-material sourcing • Traceability and ecolabel credibility	• Eco-design agenda referenced through EU textile policy alignment	• Resource efficiency (energy and water) • Cleaner production • Resource circularity / recycling • Resource switch where feasible	• Market pull for sustainable textile products	• Recycling agenda reflected in policy and roadmap discussions
Innovations (Products, Materials & Technologies: Business models; and Consumption Patterns & Lifestyle)	• Responsible Nomads ecolabel • Certified sourcing mechanisms	• Exposure to EU eco-design and product-policy requirements	• GHG accounting pilots Improved sustainability claims • Environmental and social impact management	• Consumer and buyer awareness on sustainable Mongolian textiles	• Textile recycling and EPR discussed in policy capacity building
Enablers (Education & Behavioural Change; Public Policy; and Market)	• Support to high-potential herder organisations • Training on rigorous certified practices	• Workshops on ESPR, EU Ecolabel and Digital Product Passport	• MSME capacity building • Green finance access • Policy recommendations and advocacy	• Awareness raising among national and international consumers	• Policy dialogue on circularity, recycling and EPR for textiles
Cross-cutting	• Gender and vulnerable-group inclusion, green finance, policy reform, traceability, and stronger links between herders, processors, finance institutions, and buyers				

Challenge: Mongolia's cashmere sector is economically important and accounts for around 40% of the world's cashmere fibre, but the project page identifies persistent barriers to scaling sustainable consumption and production. These include limited availability of certified sustainable raw materials, weak traceability and credibility of sustainable value chains, limited capacity among processing MSMEs, restricted access to affordable finance, and weak regulatory frameworks and enforcement.

Contribution to Circular Economy: The project contributes mainly at the materials and production/distribution stages. It promotes resource circularity and resource efficiency through certified sustainable raw-material sourcing, stronger traceability and ecolabelling, lower energy and water use in processing, recycling/circularity measures, and cleaner production practices. It also supports greener business relations between herder organisations and processors, while linking MSMEs and HOs to tailored green finance.

Sustainable Consumption and Production: STeP EcoLab II applies SCP levers on both the supply and market sides: sustainable and certified fibre sourcing, improved environmental and social impact management in factories, greenhouse-gas accounting, consumer and buyer awareness, and stronger market claims for sustainable Mongolian textile products.

Alignment with EU Frameworks: According to the SWITCH-Asia project page, the action is explicitly linked to the European Green Deal and related EU textile policy instruments. Planned workshops cover the EU Strategy for Sustainable and Circular Textiles, the Ecodesign for Sustainable Products Regulation, EU Ecolabel for textile products, Extended Producer Responsibility for textiles, the Digital Product Passport, and the Circular Economy Action Plan. The page also notes alignment with Gender Action Plan III.

Circular and Sustainable Outcomes: Expected outcomes include wider uptake of certified sustainable practices by herder organisations, improved SCP performance and market credibility of textile MSMEs, better access to tailored green finance, and policy measures that support sustainability in the textile sector. The project page expects MSMEs and herder organisations to be respectively 10% and 5% more successful in obtaining green loans. Press coverage of the launch also reports that Phase I had already increased certified and traceable raw materials tenfold, worked with more than 20 domestic manufacturers, and contributed to adoption of the MNS 6926-2021 Sustainable Textile Production standard, which Phase II now builds on.

11. Green Threads: Enhancing Sustainability in India's Textile Recycling Clusters

Theme: Textiles & Leather **Duration:** 2025-2028 **Total Budget:** EUR 1,875,003.80 (EU contribution 80%)

SDGs: Goal 5 Gender Equality, Goal 9: Industry innovation infrastructure, Goal 12: Responsible consumption and production

	Textile Life Cycle				
	Materials	**Design**	**Production & Distribution**	**Use**	**End of Life**
Circular Strategies (Resource circularity, efficiency, and switch)	Traceability of textile waste inputs; improved segregation and transparency of recycled feedstock through a Textile Material Traceability Mechanism (TMTW).	Promotion of recycled fibre use and circular material choices through cluster sustainability branding criteria and guidance on recyclability and durability.	Adoption of resource-efficient and lower-carbon production practices, technology upgrading, and shared infrastructure such as Common Facility Centres (CFCs).	Improved product transparency through Digital Product Passports (DPP) and sustainability branding to inform buyers and consumers.	Strengthening textile-to-textile recycling and upcycling, increasing diversion of textile waste from landfill and supporting circular material recovery.
Innovations (Products, Materials & Technologies: Business models; and Consumption Patterns & Lifestyle)	Cluster-wide traceability of textile waste inputs and improved segregation to ensure transparent and quality recycled feedstock.	Sustainable Cluster Brand (SCB) promoting circular product specifications, higher recycled content, and design for recyclability.	Adoption of Sustainable Production Practices (SPP), technology upgrading, and Common Facility Centres (CFCs) to improve resource efficiency, testing, and innovation capacity.	Digital Product Passport (DPP) pilots and sustainability branding to provide transparent product information and support responsible purchasing decisions.	Strengthening textile-to-textile recycling and upcycling and improved management of textile waste streams to maximise material recovery.
Enablers (Education & Behavioural Change; Public Policy; and Market)	Capacity building for MSMEs on sustainability requirements for recycled materials; training on improved waste segregation, traceability, and responsible sourcing of textile waste inputs.	Behavioural change through cluster branding standards discussions, stakeholder engagement, and knowledge exchange to promote circular design principles and responsible material choices.	MSME training on sustainable production practices; technical support for technology upgrading; mobilisation of green finance; capacity building for financial institutions; cluster workshops to support adoption of circular production systems	Buyer engagement and sustainability communication through branding and traceability systems to strengthen buyer confidence and informed consumption choices.	Policy learning and knowledge sharing to support improved textile waste management systems and enable wider replication of circular textile cluster models.

Challenge: India's textile recycling clusters in Panipat, Amroha, and Bhojpur play a crucial role in the country's circular textile economy, supporting thousands of MSMEs and providing significant employment. However, despite their economic importance, these clusters face growing sustainability and competitiveness challenges. Production processes are largely dependent on outdated machinery, resource-intensive practices, and fragmented supply chains, resulting in high energy and water consumption, elevated carbon emissions, and inconsistent feedstock quality.

At the same time, global regulatory frameworks such as the European Green Deal, Ecodesign for Sustainable Products Regulation (ESPR), and Carbon Border Adjustment Mechanism (CBAM) are tightening environmental and traceability requirements for textile exports. Domestically, MSMEs must also prepare for sustainability disclosure frameworks such as Business Responsibility and Sustainability Reporting (BRSR Core).

Most enterprises in these clusters operate with limited access to green finance, low digital maturity, and minimal technical capacity to adopt resource-efficient technologies or digital traceability systems. As global buyers increasingly demand ESG-compliant and traceable supply chains, these structural and institutional gaps risk limiting MSMEs' access to international markets and preventing the clusters from moving up the value chain in a low-carbon textile economy.

Contribution to Circular Economy: The **Green Thread project** aims to strengthen the contribution of India's textile recycling clusters—particularly Panipat—to a more sustainable and circular textile economy. Building on the cluster's global role in recycled textile production, the project will support MSMEs in transitioning toward more resource-efficient, transparent, and market-compliant production systems.

The approach combines **circular economy interventions with enabling ecosystem support**. Key actions include developing a **Sustainable Cluster Brand**, establishing a **traceability mechanism for recycled textile materials**, promoting **sustainable production practices**, and advancing **resource efficiency and upcycling** across the value chain. Pilot **Digital Product Passports** aligned with the Ecodesign for Sustainable Products Regulation will be introduced for selected products.

The project will also contribute to **policy dialogue and institutional learning** by generating policy briefs, facilitating stakeholder consultations, and sharing recommendations with national and state authorities. In parallel, it will engage financial institutions such as Small Industries Development Bank of India to explore green finance pathways and improve MSME access to financing for technology upgrading and sustainable production investments.

Sustainable Consumption and Production: The *Green Threads* project promotes more resource-efficient and lower-carbon textile production within recycling clusters by supporting MSMEs to improve energy and water efficiency, reduce emissions, and adopt safer and more inclusive workplace practices. It strengthens transparency and traceability across the recycled textile value chain, enabling enterprises to better align with emerging sustainability requirements. By linking production improvements with stronger communication to buyers and markets, the project also contributes to more informed purchasing decisions and encourages a shift toward responsible consumption patterns in the textile sector.

Alignment with EU Frameworks: The project is designed to support MSMEs in aligning with emerging EU sustainability requirements that increasingly shape global textile trade. In particular, it responds to the objectives of the European Green Deal by promoting improved traceability, transparency, and responsible resource use within textile recycling value chains. The project will facilitate preparedness for regulatory developments such as Ecodesign for Sustainable Products Regulation requirements on Digital Product Passport, stronger sustainability reporting and due-diligence expectations, and evolving rules on textile waste movements. Through resource-efficiency improvements, reduced emissions, and enhanced circular use of textile waste, the initiative also contributes to broader European and global objectives on circular economy transition and climate mitigation.

Circular and Sustainable Outcomes: The project aims to deliver measurable progress toward circular and sustainable textile production within recycling

clusters. Key targets include enabling **100 MSME leaders and their supply-chain partners** to adopt a **Sustainable Cluster Brand**, and supporting **100 MSMEs and associated actors** in implementing a **traceability mechanism for recycled textile materials**. The project will pilot **25 Digital Product Passports** aligned with emerging EU sustainability requirements and facilitate the adoption of **Sustainable Production Practices by 1,000 MSMEs** across the cluster ecosystem.

In addition, the initiative will support the development of **10 Common Facility Centres** to improve shared access to modern processing and resource-efficient technologies. Through engagement with financial institutions and green investment mechanisms, the project aims to **mobilise approximately €10 million in green finance** to support technology upgrading and sustainability investments among **250 MSMEs**. Overall, the project will also **build the capacity of around 250 ecosystem stakeholders across five countries**, strengthening collaboration, knowledge exchange, and the transition toward more circular and transparent textile value chains.

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