



Spotlight on Pakistan

The **Islamic Republic of Pakistan** is host to several SMEP Programme interventions. Home to a population of more than 241 million people, the country is the fifth most populous in the world with a nominal Global Domestic Product (GDP) of US\$ 410.5 billion, ranking 42nd globally.

Industry is the second largest economic sector in the country, (~20-28% of GDP). The country also has a high reliance on export markets, particularly for textiles and leather products. Textiles alone make up more than 60% of total exports, with leather following closely behind. Together these sectors generate over US\$ 17 billion in export earnings, with almost US\$ 5 billion made up in the first quarter of 2025-26 alone. These sectors are also major sources of employment, with the textiles industry employing approximately 40% of the total labour force in Pakistan – 30% of whom are women – and supporting an estimated 15 million people both directly and indirectly.

Pakistan's economy is structurally tied to the textiles and leather industries, but this heavy reliance makes the economy vulnerable to demand and regulatory shifts. The increasing global focus on environmental protection, labour rights, and transparency has made sustainability a key lever for ensuring global competitiveness.

To address the potential economic shortfalls resulting from these regulatory shifts, the Trade Development Authority of Pakistan (TDAP) outlined plans to accelerate diversification of the export market, focusing on innovation, branding and logistical improvements. But a critical gap remains: there is an increasing urgency to address the harmful environmental and human health impacts of these industrial processes and the waste and greenhouse gases generated from them.

The total wastewater generated from industrial processes in Pakistan amounts to approximately 1.3 trillion m³ per year (~33% of total wastewater), with only ~1% effectively treated before being discharged to the environment. Textiles contributes 20% of wastewater production, and is the leading industrial water polluter in Pakistan, followed by the leather sector. The leather sector also produces copious amounts of organic waste, with ~30-50% of raw hide weight becoming waste disposed of in landfill or to the environment. These are often mixed with toxic chemicals, further polluting surface and groundwater resources and resulting in increased human health concerns.

With Pakistan facing an increasing water scarcity crisis and with climate change impacts becoming more severe, addressing the compliance gap can no longer be reactive. It must urgently be prioritised for sustaining trade and socio-ecological health.

Ready-Made Garments (RMG), Textiles and Apparel

The sector contributes approximately **8.5% to Pakistan's GDP**, comprises 46% of the total manufacturing sector in the country, and constitutes **over 60% of Pakistan's total exports**.

A highly water intensive industry, with dyeing processes alone **consuming ~200 tonnes of water/tonne of fabric**.

- Chemicals used in the textiles sector (both for manufacturing and waste recycling processes) are **highly polluting** to surface and groundwater resources, with little/no treatment prior to discharge.
- Pockets of compliance exist with those industry actors able to afford it addressing their wastewater pollution independently.

Pakistan's **textiles recycling industry is moderately developed**, mainly focusing on post-industrial textile waste.

- Pakistan handles **~1.6 million tonnes of textile waste** annually, including post-industrial (industrial waste) and post-consumer (discarded clothing) waste and secondhand clothing.

Tanneries and Leather

Leather, sourced as a by-product of the meat-industry, is the **3rd largest export industry in Pakistan** valued at US\$ 874 million in 2013 and **contributes ~4% to national GDP**, but this sector is stagnating with limited economic growth.

Leather processing, especially tanning, produces wastewater rich in chromium (a toxic heavy metal), sulphides and organic matter, making **wastewater highly toxic** and difficult to treat.

- It is amongst the top effluent producing sectors in Pakistan.

Leather processing also results in **organic wastes**, including fleshings, hair and trimmings, and sludge from the tanning process, with **~30-50% of the raw hide becoming waste**.

- These wastes are often **contaminated with heavy metals** and are disposed of in landfill or illegally, contaminating the environment and releasing greenhouse gas.
- Despite potential, the industry faces challenges in technology accessibility, cost-effectiveness, and waste segregation. But, cleaner production efforts, like chrome recovery plants and dust collector equipment, are underway.

Traceability of Supply Chains

Supply chain traceability matters because it enables transparency on the origin of products and the conditions of production, helping to identify environmental, social, and human-rights risks. Its importance is increasing as regulatory requirements, voluntary standards and global sustainability commitments intensify across global value chains. Firms now rely more heavily on traceability systems to verify sustainability claims and to access to global markets.

Pakistan is responding to this changing landscape through:

- The **National Compliance Centre** which is playing an important role in supporting exporters in meeting these international requirements.
- Creating a national digital backbone to support export and trade (the **Pakistan Single Window**) that in turn supports data verification for traceability at the border level.
- Several donor-funded, **product-level traceability pilots** are underway, (such as for cotton and leather) to demonstrate proof of concept to industry readiness for these evolving global requirements.

The SMEP Programme has funded four pilot projects in Pakistan to tackle pollution through innovative technologies and business models. These projects focus on two thematic areas:



Water and Oceans, and



Circular and Bio-economy

These pilot interventions are showing how innovative solutions can address environmental impacts and improve local livelihoods. SMEP emphasises long-term sustainability, investing to de-risk innovation and prove business cases that unlock commercial financing and scale. Through its partnership with UN Trade and Development (UNCTAD), SMEP supports policy development nationally and regionally, promoting cleaner production, waste management, and traceability to create an enabling environment for circular solutions.

Achievements* of SMEP's pilot projects in Pakistan

*Data recorded for between July 2024 and December 2025

Beneficiaries

664

beneficiaries
(DIRECT AND INDIRECT)
BENEFITTING THROUGH
SMEP PILOTS

Women: 52

Men: 572

Youth: 40

Tanneries and Leather

276 kilograms
ORGANIC TANNERY
WASTE DIVERTED
FROM LANDFILL

167 kilograms
SURFACTANT
PRODUCED FROM
ORGANIC WASTE

RMG, Textiles and Apparel

3,182 tonnes
TEXTILE WASTE
MECHANICALLY
RECYCLED

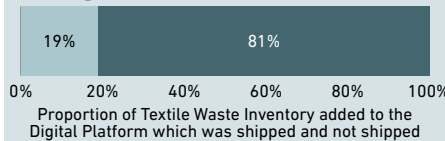
GHG Emissions Savings

433 tCO₂e
NET GHG
EMISSIONS SAVED

Traceability

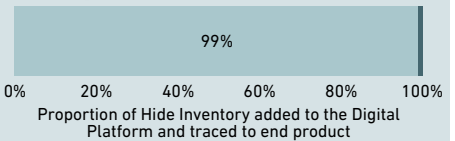
7,192 tonnes
TEXTILE WASTE
ADDED TO DIGITAL
TRACEABILITY TOOL

● Textile waste not shipped to end-user
● Textile waste shipped to end-user



100+ thousand hides
ADDED TO DIGITAL
TRACEABILITY TOOL

● Hides added to traceability platform
● Hides traced to end product



Implementation Site	Sector	Solution	Pollution Mitigation Benefits	Implementation Phase
---------------------	--------	----------	-------------------------------	----------------------

Textile Waste Traceability | Reverse Resources | National Textiles University

	Bangladesh and Pakistan	Textiles recycling and Traceability	An innovative combination of digital tools (a Software as a Service (SaaS) platform), standardised processes and a win-win business case.	The SaaS platform supports a standardised data-driven process, aligning goals towards textiles recycling, maximising business benefits and allowing the scaling of the circular business due to cost-efficiency and real-time market insight. This increases transparency and the rate of textile-to-textile recycling.	Operational and scaling in Pakistan
--	-------------------------	-------------------------------------	---	---	-------------------------------------

Satiana Waste Cluster Pilot | Reverse Resources | Closed Loop Fashion | KnowTex Solutions | National Textile University

	Satiana Waste Cluster, Punjab Region	Textiles recycling and wastewater treatment	A Blueprint for structured compliance measures for textile waste decolorisation, including better chemical and wastewater management practices and improved working conditions.	Assessments of local waste-handlers (largely informal) in the area revealed urgent gaps in compliance, risk management, and health and safety protections, particularly in chemical treatment and wastewater management. The project aims to improve working conditions, ensuring safer workplace health and safety; establish compliance standards, creating clear guidelines for chemical handling and wastewater management; and environmental protection, identifying effective wastewater treatment solutions to ensure it is managed responsibly and does not harm local water sources.	Operational and validating the pilot
--	--------------------------------------	---	---	---	--------------------------------------

SAFECONOMY | Northumbria University | Aston University | Bahuaddin Zakariya University | National Textile University | Access Group of Companies | SE Drop | Sapphire Finishing Mills

	Sapphire Textile Mills	Textile sector and wastewater treatment	Molecular Distortion Technology with integrated solar evacuated tube collectors for water heating (TRL8).	Molecular Distortion Technology involves using electrodes to apply an electric potential to the wastewater, thereby producing reactive species that oxidise and break down organic compounds in the water, reducing the effluent loads in wastewater set to local treatment plants. The solar technology facilitates water reheating up to 80-90°C, thus closing the loop within the circular economy of textiles and saving substantial heating energy, reducing GHG emissions.	Operational and validating the technology through trials at Sapphire Mills
--	------------------------	---	---	--	--

Pakistan Leather Sustainability | WWF Pakistan | Pakistan Council of Scientific & Industrial Research Centre | Leather Field Pvt Ltd | Punjab Agriculture and Meat Company | Information Technology University Lahore

	Lahore and Punjab	Tanneries sector and Traceability	A digital traceability toolkit to trace leather hides from direct suppliers/direct supplier farms to the factory. Valorise organic waste (fleshings, trimmings, etc.) produced through the tanning process. Reduce wastewater production through use of enzymatic unhairing as a chemical substitution.	The digital traceability tool will increase transparency, provide insights into the leather value chain and improve compliance with international environmental and human-health standards. The cleaner production methods and valorisation of organic wastes decreases the pollution load in wastewater (organic material and chemicals) and makes hair waste and other organic wastes (trimmings, fleshings, etc.) available for valorisation into a useful by-product, such as surfactant which can be used in the leather-making process, thereby enhancing circularity in the industry and saving GHG emissions.	Operational, with pilots on cleaner production mechanisms under way
--	-------------------	-----------------------------------	---	---	---



Partnership | Progress | Prosperity

The SMEP Programme is funded by UK International Development and is implemented in partnership with UN Trade and Development (UNCTAD), who provide Technical Assistance to the programme.



www.smepprogramme.org
March 2026