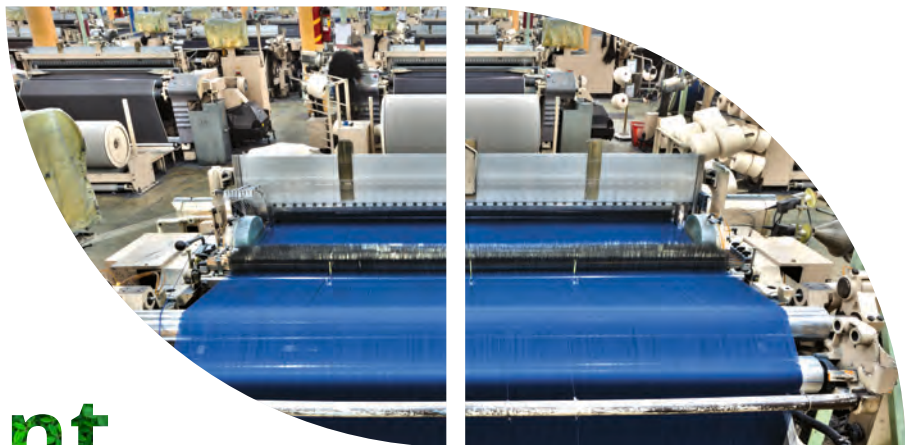




DRIVING **Pollution Abatement**

**in Leather & Textile MSMEs
in South Asia**



Solidaridad



Solidaridad



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गजेन्द्र सिंह शेखावत
Gajendra Singh Shekhawat



जल शक्ति मंत्री
भारत सरकार
Minister for Jal Shakti
Government of India

08 DEC 2021

FOREWORD

The Micro, Small and Medium Enterprises (MSME) sector plays an important catalytic role for economic development through enterprise creation and employment generation. With more than 44.7 million enterprises, this sector generates more than 100 million jobs, next only to the agriculture sector. It also contributes around 45 percent of total industrial manufacturing. One of the important MSME sectors is the leather sector, which is a top 10 forex earner of the country and provides employment to millions of people. However, with the changing scenario, the sector needs to constantly adapt and move up in the value chain as well as strengthen its competitiveness in local as well as global markets. However, pollution issues are a key hindrance to the development of this sector. Out of several other polluting industries, the Kanpur tannery sector also finds its place in the list of biggest pollution contributors in River Ganga.

The Namami Gange mission was launched with the objective to work on a comprehensive and multi-sectoral approach to achieve Nirmal and Aviral Dhara. This initiative for the Kanpur-Jajmau cluster holds a place of great strategic importance as it has effectively worked on strengthening the partnership between India and the Netherlands. The project, in partnership with Dutch companies, followed a multi-stakeholder participatory approach for pollution prevention in the Kanpur-Jajmau cluster, to introduce techno-commercially viable eco-friendly technologies and practices for the tanneries for effective waste management, both effluents from tanneries and solid waste generated from the cluster. The documentation of these efforts in its present form needs commendation and I heartily endorse it.

I congratulate all the partners and stakeholders for producing these much-needed sustainable innovations, which is the need of the hour.

(Gajendra Singh Shekhawat)



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Dr. Shatadru Chattopadhyay

Managing Director,
Solidaridad Asia

MSMEs are the growth drivers of Asia, contributing to an estimated 41% of each country's GDP, playing a critical role in job creation, innovation and economic growth. South Asian economies derive a bulk of their foreign exchange earnings from production in a few sectors, including leather goods, textiles and apparel. More than 95 per cent of the total trade in leather and leather products in the region involves Bangladesh, India, Pakistan and Sri Lanka.

Leather industry is one of the oldest manufacturing industries catering to both domestic and international demand since the mid-nineteenth century. The industry employs more than 5.5 million people, collectively in India, Bangladesh and Sri Lanka. While the tannery operations are male-dominated, women make up for 30% of the workforce in leather goods and manufacturing.

While the leather and textiles sector is a key contributor to growth, it faces criticism from environmental agencies for high chemical consumption, poor chemical handling, and for causing severe pollution with detrimental effect on public health and environment.

The South Asian leather and textiles sector faces several challenges – lack of sustainable benchmarking, weak adoption of best practices and product diversification, poor traceability, and negative perception of buyers and brands regarding industries' non-compliance.

Over the last few years, policymakers in South Asia are increasingly focusing on supporting MSMEs, with leather and textiles identified as a priority sector owing to its immense potential in providing employment and contribution to foreign exchange. The Indian Leather Development Programme, for instance, highlights a number of priorities including support to the country's leather clusters to meet the prescribed pollution control discharge norms and environmental issues.

At Solidaridad, Pollution and Water were identified as among the organisation's key strategic areas in the multi-annual plan (2021-2025). I commend our Leather and Textiles team in Asia for identifying the key sectoral issues and mobilising projects to address pollution abatement, and water- and waste-management issues in the sector with a public-private partnership approach to ensure replication and scalability. With support from our partners and the industry, these projects now serve as a blueprint for other labour-intensive industries facing similar challenges, especially pulp and paper.

Going forward, our next Multi-annual Strategic Plan will also integrate health with pollution as both are inextricably tied, with a focus on the downstream impact on local communities. Waste-to-value models, which have been appreciated by our partners as well as the industry, will be scaled up with brands. Supporting the tanneries to reduce their carbon footprint and making them carbon-neutral continues to be a key agenda. The latest audit and life cycle assessment of our interventions in five selected tanneries, conducted by TÜV SÜD South Asia, revealed significant achievements, with each tannery surveyed averting an estimated 150 tonnes of CO₂eq per year in greenhouse gas emissions (Scope 2 and Scope 3) through just three technical innovations (desalting, water optimisation and accurate weighing) at the process level.

Globally, mandatory compliances on addressing human rights, environmental risks, and corporate responsibility are on their way. The European Union Corporate Sustainability Due Diligence Directive (EUCSDDD), for instance, aims to promote sustainable practices and fair working conditions across high-impact sectors including leather and textiles. In response to this evolving regulatory landscape, we have developed a Compliance Toolkit specifically tailored for MSMEs in the leather and textile sectors. It provides a clear framework for assessing their compliance with the CSDDD, covering both environmental and social metrics.

With an eye to the future, I am confident we will continue to work towards 'change that matters'.

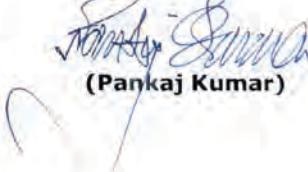
पंकज कुमार
PANKAJ KUMAR
सचिव
SECRETARY



भारत सरकार
जल शक्ति मंत्रालय
जल संसाधन, नदी विकास
और गंगा संरक्षण विभाग
GOVERNMENT OF INDIA
MINISTRY OF JAL SHAKTI
DEPARTMENT OF WATER RESOURCES,
RIVER DEVELOPMENT & GANGA REJUVENATION

MESSAGE

'The Multi-stakeholder Participatory Approach for Pollution Prevention and Efficient Water Use in Kanpur-Unnao Leather Cluster', a project by Solidaridad, is an outcome of the Memorandum of Understanding between the Government of India and the Government of the Netherlands. I am sanguine that the program will contribute towards the health of the river basin. Water is an important asset and key driver of socio-economic growth in the country, which is aligned to the Millennium Development Goals. Thus, the sustainable development of water resources, occupies a place of significance. This project has a role to play in ensuring water quality through prevention, control and abatement of water pollution. Various challenges need to be addressed to pave the path for the growth of Indian small-scale sector, including wastewater management. Such projects provide an answer to such challenges through sustainable development, maintenance of quality and efficient use of water resources to meet the growing demand of this precious natural resource.


(Pankaj Kumar)



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Tatheer Raza Zaidi

Asia Head - Pollution Management in MSMEs,
Solidaridad Asia

With great pleasure, I share with you 'Driving Pollution Abatement in Leather & Textile MSMEs in South Asia', a publication that highlights our seven-year growth path in the Leather and Textiles sector in India, Bangladesh and now Sri Lanka.

Our team has dedicatedly worked towards addressing the complex challenges of the sector with a focus on embedding sustainability in the leather and textiles clusters.

The pollution impact of the leather and textiles sector – air, land and water – is threatening its credibility and competitiveness. Thus, integrating sustainability into the leather and textiles operations is imperative for its survival. For greening the supply chain, successful pilot demonstrations of best practices and technologies is required. We are thankful to our donors and the consortium of partners and technical experts for collaborating and providing an enabling environment for the diffusion of green innovations in the leather and textiles clusters.

In collaboration with the Netherlands Enterprise Agency, Government of Netherlands, and the National Mission for Clean Ganga, Government of India, Solidaridad initiated its first project in 2017, focused on introducing viable solutions in the leather tanning value chain to minimise pollution at source. The project emerged as our flagship programme and received acknowledgement at prestigious national and international forums. This success encouraged us to replicate the learnings to other leading leather geographies in India. With the support of European Union under its SWITCH Asia grant, Solidaridad scaled up the learnings from North India to East and South India leather clusters, covering three out of four key leather geographies in the country.

We are replicating these learnings to the adjoining countries of Bangladesh and Sri Lanka, and are engaging stakeholders for opportunities in other relevant geographies like Thailand in Southeast Asia.

We are also grateful to senior representatives from the Government of India, the Government of the Netherlands, and the European Union in acknowledging these initiatives at several platforms and paving a sustainable way forward for the leather clusters.

Based on our proven success in the leather sector, the National Mission for Clean Ganga, Government of India, encouraged Solidaridad to replicate the successful model to the textiles sector, with a project focused on the Panipat Textile Cluster.

Our science-backed interventions in solid waste management through circularity, water and energy optimisation, effluent reduction and our deployment of low-cost digital tools are supporting the MSME units in leather and textiles to adopt best practices and reduce their carbon footprint.

The model on pollution abatement in the MSME manufacturing sector holds immense potential for further scaling in other relevant sectors.

This publication will guide you through Solidaridad and partners' viable and effective interventions in tanneries and textile units – as well as our long-term vision for sectoral transformation in Asia.

I also highly appreciate the contribution of senior technical advisers of Solidaridad, project teams from Kolkata, Kanpur, Tamil Nadu, Panipat, and our communication team led by Kritika Banerjee in bringing this document to fruition.

जी अशोक कुमार, भा.प्र.से.
महानिदेशक
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G Asok Kumar, IAS
DIRECTOR GENERAL
NATIONAL MISSION FOR CLEAN GANGA



भारत सरकार
जल शक्ति मंत्रालय
जल संसाधन,
नदी विकास और गंगा संरक्षण विभाग
GOVERNMENT OF INDIA
MINISTRY OF JAL SHAKTI
DEPARTMENT OF WATER RESOURCES,
RIVER DEVELOPMENT & GANGA REJUVENATION



Message

This unique Indo-Dutch programme has successfully introduced and implemented eco-friendly solutions and commercially viable technologies in the MSME clusters and brought together key public and private stakeholders to address the common challenges of pollution abatement around the Ganga Basin. Demonstrations carried out under the project have provided great competitive advantages to the tanneries in the form of integrated water management solutions, effective waste management, better workplace safety and health of workers. This project has the potential to be replicated to other polluting clusters which will enable the industries to jointly realize the vision of river rejuvenation. This project provides a great opportunity to the MSME tanneries in improving their competitiveness.

I personally visited the Center of Excellence established under the ongoing project i.e. indeed a state of art kind of an infrastructure providing trainings to the Tannery workers on the eco- friendly technical interventions.

We acknowledge the strong and holistic approach adopted by Solidaridad and partners in providing sustainable solutions and paving a path towards success.

Dated : 03rd Nov 2022


(G Asok Kumar)



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MESSAGE

It has been my utmost pleasure to see the upward journey of Solidaridad in the leather sector in India and be a part of this growth. This case study booklet showcases best practices and eco-friendly technologies that have been introduced, wherein local resources have been mobilized which has made these technologies cost-efficient and feasible for the tanners to adopt. These global and national recognized green solutions have provided better branding to the Kanpur industry and enabled their competitiveness. It can be a great reference guide for the people in the leather industry who intend to work on water and waste management solutions.

This booklet captures the multi-pronged approach adopted by the project for bringing together the key public and private stakeholders for addressing the common challenges of pollution abatement and rolling out the project at a macro level. The approach adopted by the project to sustain the impacts of the introduced solutions is a unique aspect. The Centre of Excellence established under the project is a clear example of the project's sustainability.

(D.P. Mathuria)

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SUSTAINABLE DEVELOPMENT GOALS





1

MSME SECTOR in Asia

Overview of the Micro, Small and Medium Enterprises (MSME) Sector in Asia

MSMEs make up the majority of South and Southeast Asian economies and account for nearly half of the region's GDP. Together, they play a critical role in job creation, innovation and economic growth.

South Asian countries derive most of their foreign exchange earnings from production in a few sectors, including leather goods, textiles and garments. A bulk of the trade in leather and leather products takes place in Bangladesh, India, Pakistan and Sri Lanka.

Asia

India accounts for
13%
of leather production
globally;

it is also the second-largest leather footwear producer in the world. In the textiles and apparel sector,
India accounts for 4%
of the global trade

while the sector's share in India's overall export basket was

10.33%
in 2021-22¹⁻²



Bangladesh meets the demand for about

10%
of the world's total leather market.

During FY 2021-22 it exported garments worth

US\$42.6 billion³⁻⁴



In Sri Lanka, the textile and apparel sector

is a leading industry, as far as manufacturing and exports are concerned.

The footwear and allied industries,

which are directly and indirectly employing 400,000 people,

are also a key contributor to the country's economy⁵⁻⁶



1. "Leather Industry and Exports," India Brand Equity Foundation, last modified April 2024, <https://www.ibef.org/exports/leather-industry-india>.
2. "Textiles and Apparel," Invest India, accessed May 29, 2024, <https://www.investindia.gov.in/sector/textiles-apparel#>.
3. Mansur Ahamed, "A Report on Leather and Leather Goods Industry of Bangladesh," JB Group Research Department, JBBC Corporation, <https://jbbc.co.jp/wp-content/uploads/2014/08/A-Report-on-Leather-Leather-Goods-Industry-of-Bangladesh.pdf>.
4. Helen Chin, et al., *Country Sourcing Report* Issue 20, Hong Kong: Fung Business Intelligence, 2022, https://www.fbicgroup.com/internal-site/wp-content/uploads/documents/CSR2022_ENG.pdf.
5. Naweena Weerasinghe, et al., "Sustainability practices and organizational performance during the COVID-19 pandemic and economic crisis: A case of apparel and textile industry in Sri Lanka," *PLoS One* 18, no. 7 (2023), <https://doi.org/10.1371/journal.pone.0288179>.
6. "Sector Overview-Footwear & Leather Products Sector," Ministry of Industries, Sri Lanka, accessed May 30, 2024, <https://www.industry.gov.lk/web/wp-content/uploads/2023/02/sector-overview-footwear-and-leather-final.pdf>.

Challenges & Opportunities

Despite their many contributions, the operations of MSME units in the leather and textiles industries are water-intensive and are known to cause pollution.

Leather and textile MSMEs require significant access to natural resources such as water and land, which are limited in nature. Excessive water consumption can lead to scarcity, which in turn can exacerbate socio-economic disparities and tensions between different stakeholders in a geography-local communities, residents, workers and activists, for instance.

Leather and textile units also often discharge untreated or inadequately treated wastewater (with pollutants such as heavy metals, chemicals, and organic matter) and solid waste (in the form of trimmings, shavings, hair, fleshings, buffing dust, sludge salt and more). Besides causing severe environmental pollution – air, water and soil – this waste also leaves behind a large carbon footprint. They contaminate water sources, endanger ecosystems, clog landfills, degrade soil, and adversely affect agricultural practices and produce. Among those most affected and impacted by the pollution are the marginalised sections of society.

Greening of the leather and textile supply chain is the need of the hour.

Globally, regulations are being adopted mandating the observance of comprehensive due diligence processes for companies, addressing human rights, environmental risks, and corporate responsibility. For instance, the European Union Corporate Sustainability Due Diligence Directive (EUCSDDD) aims to promote sustainable practices and fair working conditions across high-impact sectors including leather and textiles. The EUCSDDD also mandates large brands with over 1,000 employees and net turnover of €450 million in EU to identify, report, address, and mitigate human rights and environmental risks in their operations and supply chains, promoting decent work conditions and pollution abatement. Many of these large brands have their supply chains in Asia, in turn necessitating that the sub-contractors and suppliers (MSMEs in India, Bangladesh, Sri Lanka) to these brands also align their practices with the rigorous standards. For MSMEs, this is a challenge given the considerable time and investment required to comply. However, it is also an opportunity for the leather and textile MSMEs in Asia to gain a competitive edge in the EU market, appealing to a growing demographic of consumers demanding ethically produced goods.

Solidaridad has been working with MSMEs in the leather and textiles sector to embed sustainability in their operations.

The Leather Programme in Asia, in collaboration with the governments of the Netherlands and India, has advanced sustainable practices in the leather sector. From initiatives focusing on water optimisation and effluent reduction, to bringing circular economy principles to tanneries and converting waste into value-added products, to working with industry stakeholders to develop a Leather Trade Intelligence Portal that allows tanneries to self-assess and declare their environmental and social performance, thus enhancing their business prospect while providing customers information about the sustainable practices adopted by the supplier in making the product.

Further, we believe it is imperative to empower and upskill the tannery workforce. To that end, Solidaridad has forged a strategic partnership with the Council for Leather Exports (India) to train 150,000 workers over 5 years on innovative and circular practices and create a green and skilled workforce in India – and shape a sustainable future for the industry.

Recognising the significant environmental footprint of the textile sector, Solidaridad's Textiles Programme in Asia advocates for pollution reduction and the implementation of circularity at the processor level. By fostering supportive business ecosystems, we strive to enhance the livelihoods of workers by promoting green jobs and ensuring decent working conditions.

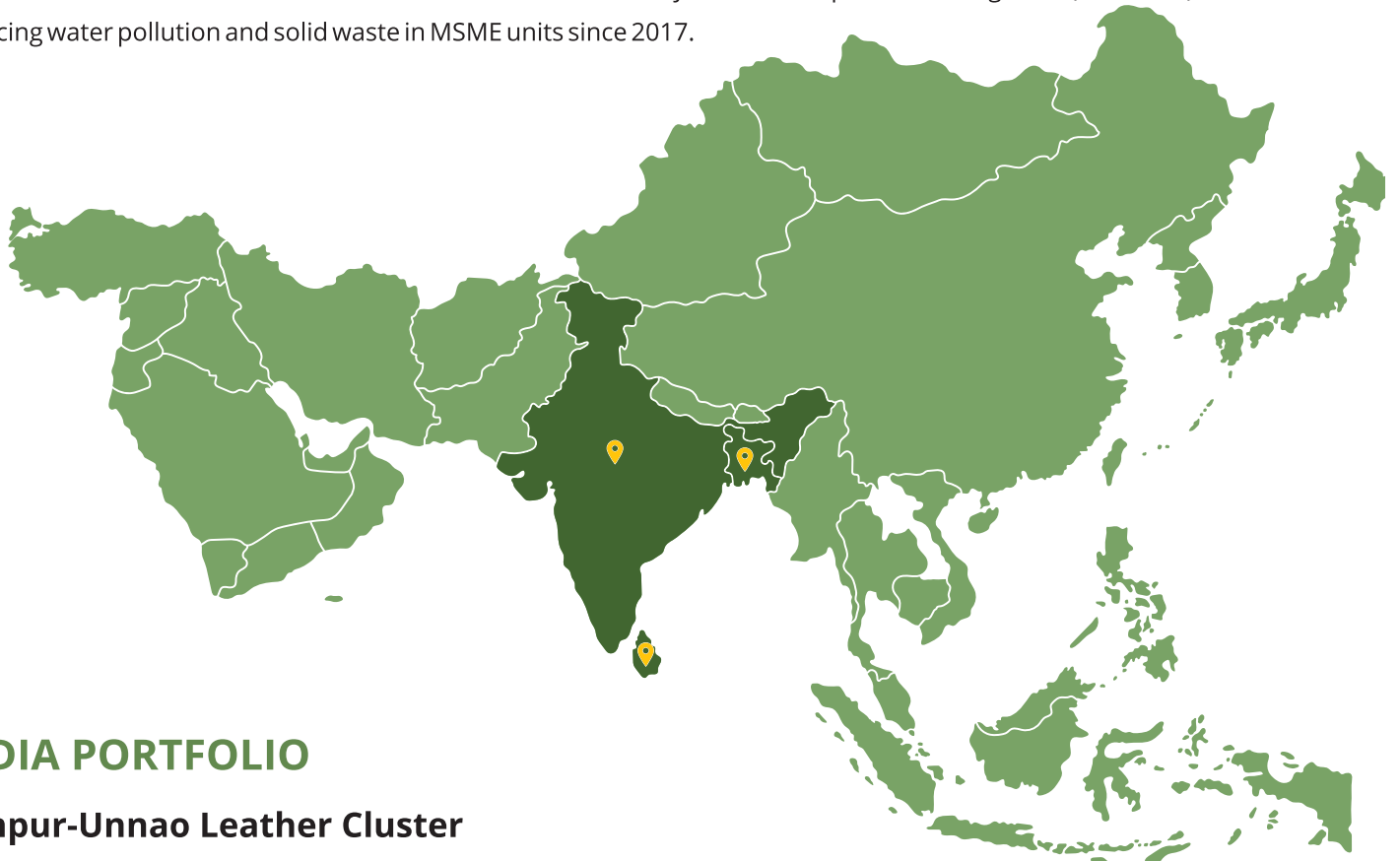


2

OUR GROWING Footprints in Asia

Towards Waste Management and Pollution Mitigation: Our Growing Footprints in Asia

In the leather and textiles sector, Solidaridad has been actively involved in pollution mitigation (at source), reducing water pollution and solid waste in MSME units since 2017.



INDIA PORTFOLIO

Kanpur-Unnao Leather Cluster

Solidaridad initiated its first project in the leather sector in 2017 to make the Kanpur leather cluster more sustainable and contributed to the objectives of the National Mission for Clean Ganga. Supported by the Sustainable Water Fund (FDW) programme of the Dutch government, the five-year project⁷ reduced the effluent water discharged into the Ganga by at least 40% and introduced alternative technologies and processes at tanneries with a reduced environmental impact. The project successfully demonstrated scientific models on water savings and reduction of the toxic effluents from the waste water.

Immediate beneficiaries were the 250,000 workers in the regional tanning and leather industry (30% female) as well as the 30,000 smallholder farmers who depend on the re-use of the wastewater for their agricultural production (crops and dairy).



OUR PARTNERS:

Stahl and PUM along with Uttar Pradesh Leather Industry Association (UPLIA), Small Tanners Association (STA), Central Leather Research Institute (CLRI) and Ganga Pollution Control Unit (GPCU)

7. Pollution Prevention and Efficient Water Use in Kanpur-Unnao Leather Cluster project

Bantala (Kolkata) Leather Cluster

In 2020, Solidaridad expanded its efforts to Kolkata, with a key focus on solid waste management. Supported by the European Union under its SWITCH-Asia Programme, the project⁸ complemented West Bengal government's vision of making Bantala leather cluster a leading leather geography in Asia, while reducing its environmental footprint and improving health and safety conditions of the workers, thus, contributing to the achievement of the Sustainable Development Goals (SDGs).

A circular approach to waste management and demonstrating scientific models of turning solid waste into value-added products – sludge to paver blocks, leather trimmings to the bonded sheet and leather articles, buffing dust to coating material – have been central to this project.



OUR PARTNERS:

Il Politecnico Internazionale per lo Sviluppo Industriale ed Economico (PISIE), the Calcutta Leather Complex Tanners Association (CLCTA), Stahl and Dugros

Tamil Nadu Leather Cluster

Solidaridad entered the Tamil Nadu cluster in 2022 with circular and sustainable solutions to address the problem of inadequate waste management at Tamil Nadu's four clusters – Ambur, Pallavaram, Ranipet and Vaniyambadi. The project is directly working with 100 tanneries and 1,000 workers in the clusters. Seen as a whole, the project's solutions are indirectly benefiting 500 small and medium enterprises (SMEs) and 40,000 workers.

Funded by the European Union under its SWITCH-Asia programme, the project⁹ has synergies with two policy focus areas of the European Green Deal: eliminating pollution and sustainable product policy.



OUR PARTNERS:

Politecnico Internazionale per lo Sviluppo Industriale ed Economico (PISIE), Indian Finished Leather Manufacturers and Exporters Association (IFLMEA), Council for Leather Exports, and Tata International Limited

Panipat Textile Cluster

Based on the success of Solidaridad's interventions in pollution abatement in leather clusters, we are now partnering with the Ministry of Jal Shakti, Government of India to replicate the implementation model for the textiles cluster in Panipat to address the larger issue of pollution at the Yamuna basin.

8. Effective Waste Management and Sustainable Development of the MSME Tanning Companies in Kolkata Leather Cluster (Bantala) project

9. Promoting Circularity in the Tamil Nadu Leather Clusters for Solid Waste Management project

Kicked off in 2023, the project¹⁰ is focused on: techno-economically viable solutions to the Dyeing and Bleaching (Textile) enterprises to reduce water consumption by around 30% and chemical consumption by around 25% in volume to control the pollution load at source; improve occupational health and safety standards; improve the efficiency of Primary Effluent Treatment plants; introduce a digital portal to assess the performance of the respective enterprises; promote circularity by establishing models on utilisation of solid waste into valuable products to further improve the competitiveness of the Panipat Textile Cluster in the national and international markets.



OUR PARTNERS:
Northern India Textile Research Association (NITRA) and Panipat Dyers Association and TANATEX Chemicals

BANGLADESH PORTFOLIO

In Bangladesh too, Solidaridad Asia is working actively in the leather, textiles and apparel sectors for the holistic development of a green and circular economy. Our interventions and partnerships are aimed at strengthening the overall performance of Bangladesh leather, textiles and apparel sectors in domestic and international markets through the development and promotion of good practices and cleaner technologies, reskilling and upskilling of workers, creation of green jobs and establishment of better market linkages.



OUR PARTNERS:
Bangladesh Tanners Association (BTA), the Bangladesh Finished Leather, Leather Goods and Footwear Exporters Association (BFLLEA), and the Bangladesh Garment Manufacturers and Exporters Association (BGMEA)

SRI LANKA PORTFOLIO

Recently, the Government of Sri Lanka has endorsed Solidaridad as its technical partner, enlisting its support and guidance in the relocation of leather enterprises to a dedicated cluster in Valaichchenai.

Drawing on our expertise, we are assisting the relevant ministries with infrastructure development mapping, planning proper disposal for solid, liquid and gaseous emissions, providing technical assistance during commissioning of pollution control systems and training local technical staff.

10. Pollution Prevention and Efficient Waste Management of Panipat Textile Cluster to Optimize the Trade Potential project



3

SOLIDARIDAD

Strategy

Solidaridad Strategy

There are four critical components to Solidaridad's strategy for Leather and Textiles programmes in Asia. These are:

Good Practices

In multiple clusters across Asia (in Kanpur, Kolkata, Tamil Nadu, and Panipat, for instance), tannery units, leather- and textile-manufacturing enterprises and workers are being supported with training on and provision of technologies and equipment that optimise water use, and reduce discharge of effluents, waste, GHG emissions and carbon footprints significantly. These include equipment such as desalting machines, water-flow metres and waterless fleshing rollers, and technologies such as the smart water-saving system (SWaSS) and enzyme-based dehairing, among others. Additionally, workers in the leather industry are also being supported through the provision of personal protective equipment (PPE) and training sessions on occupational health and safety (OHS) regarding the safe use of chemicals and how to administer first-aid.

Supportive Business Ecosystem

Solidaridad's waste-to-value approach provides a viable solution to the waste-management problem faced by the leather industry in India. In the Tamil Nadu cluster, eco-particle boards (EPBs) created from solid waste (such as chrome shavings) are being used to make utility and fashion items such as handbags, totes, laptop bags, jewellery boxes, clutches, among other items. Pilot-demonstration units are being developed at Ranipet and Chennai to fully explore the business potential and provide employment for workers, especially women.

Additionally, we are working with micro-entrepreneurs, especially women, supporting them with training to produce high-value products from waste. Sher Banu, founder of Libua Fashions, in Tamil Nadu, has been able to



establish vital market linkages. The stylish bags made out of EPBs at her unit were displayed at an international fashion show. "Market linkages are a boon for women entrepreneurs like me," says Banu whose unit now employs 15 people, of whom 10 are women.

Moving forward, we plan to train nearly 500 artisans (with a minimum 50 per cent of women, inclusive of persons with disabilities) in Tamil Nadu by 2025.

Enabling Policy

Propelling leather and textiles clusters towards sustainable practices and building significant momentum in fostering environmental responsibility needs a policy nudge. Our science-backed innovations in Kanpur-Unnao have been endorsed by the Uttar Pradesh Pollution Control Board for inclusion in the charter on pollution prevention in the leather sector by the Central Pollution Control Board under India's Ministry of Environment, Forest and Climate Change.

The government in West Bengal has endorsed our desalting intervention. Our low-cost innovation is now mandatory for any tannery unit operating in the Calcutta Leather Complex. The desalting machine developed by Solidaridad and partners reduces the consumption of water and power during the leather processing stage, leading to overall reduction of the carbon footprint of the tanneries.

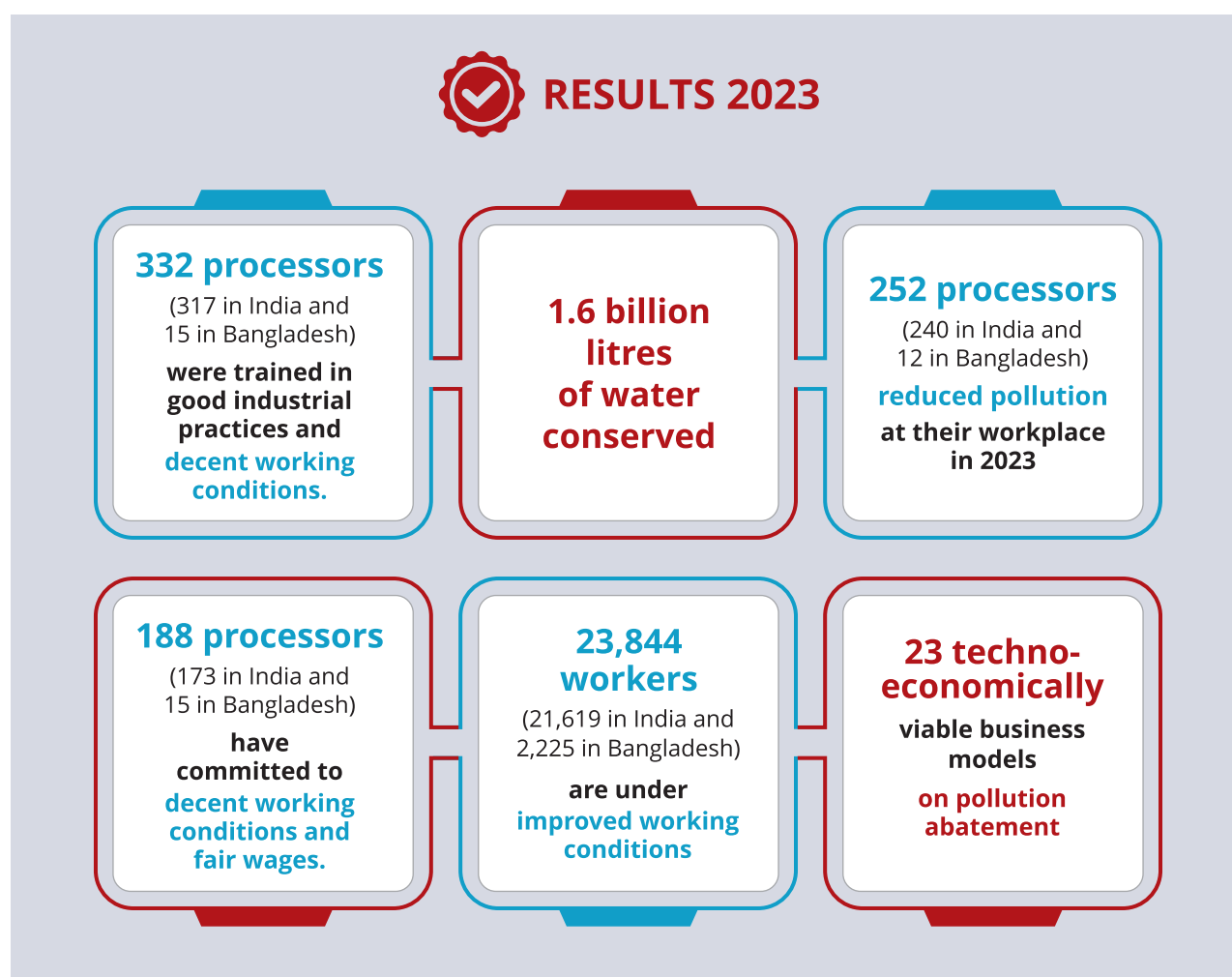


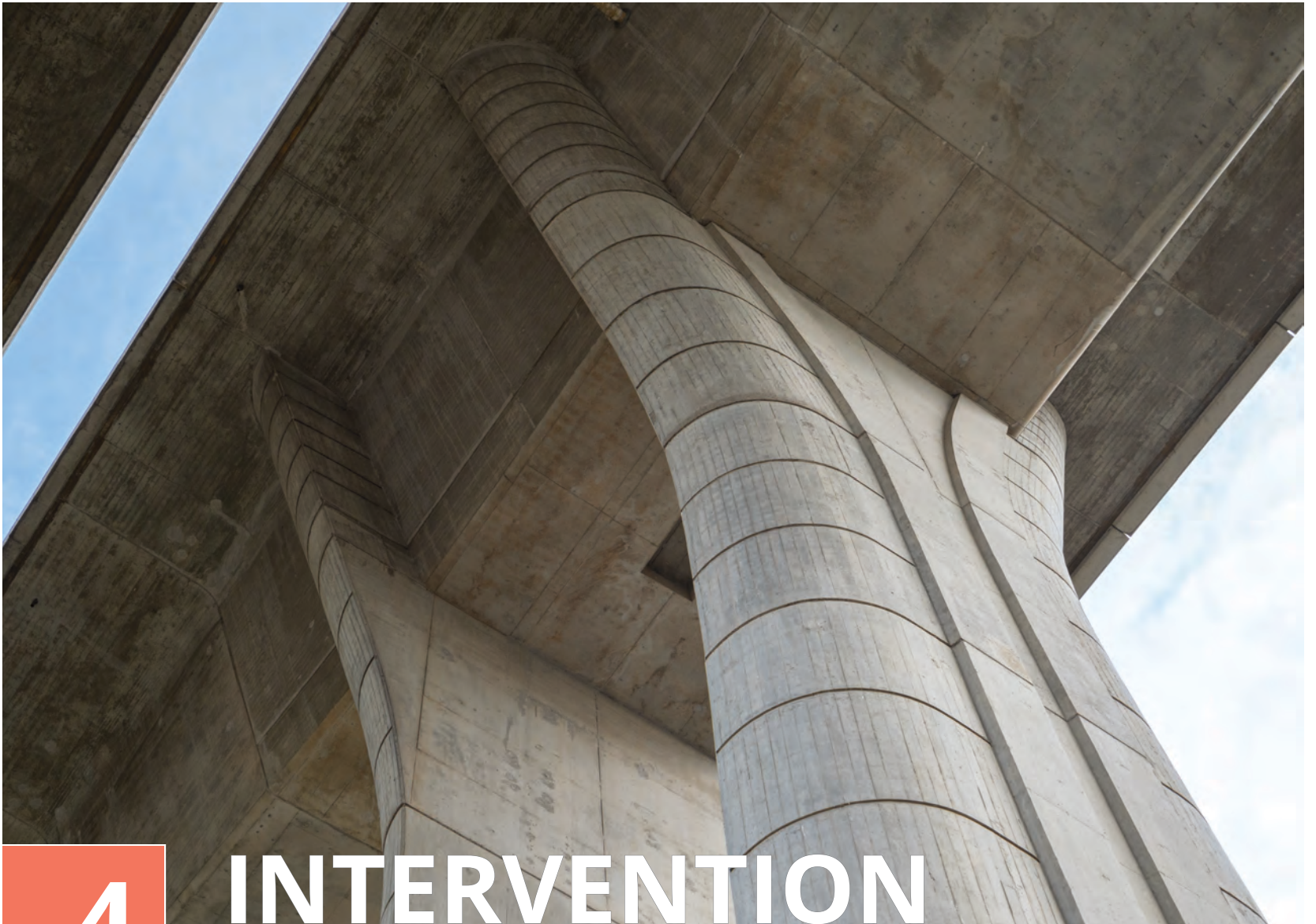
Market Uptake

Solidaridad's green interventions and technologies are gaining acceptance in markets, domestic and abroad. For instance, paver blocks made from sludge generated by the Kolkata leather cluster are being used to make pavements in tannery premises. These blocks boast of a high compressive strength and meet the necessary environmental standards. Due to their applicability and their usefulness in curbing the disposal of lime sludge at landfills, this measure has also been introduced in the premises of leather industries and shoe companies in the Tamil Nadu leather cluster.

Our efforts to link enterprises (MSMEs) producing sustainable goods in leather and textiles and more importantly building markets for players engaged in waste-to-value products has yielded impressive outcomes. In the Kanpur cluster, the tallow oil generated from fleshings has found application in multiple industries and enterprises – paint, lubricants, adhesive, soaps and candles, to name a few.

Reaching consumers is another dimension of our strategy. Through the Leather Trade Intelligence Portal, not only are we supporting tanneries to self-assess their sustainability performance but the QR code on the product when scanned can also inform the consumer about the sustainable practices the supplier has adopted while making it.





4

**INTERVENTION
Pillars**

Intervention Pillars

Lack of waste management, inefficient use of water, untreated effluent discharge into river systems and inadequate training and capacity building of workers at the units to mitigate occupational health and safety risks are the key challenges faced by the leather and textiles sector in Asia. Our interventions are designed and deployed to address them.



Key interventions

Extracting tallow from solid waste: Tallow is a rendered form of animal fat and is derived from the fleshing waste. Currently, this fleshing waste from the tanneries is sent to the nearby landfill areas at a cost, both environmental and economic. Tallow is processed by boiling the fleshing waste with an acid for esterification which results in the end product – tallow, which is then separated and collected in drums. The tallow is used in various industries such as paint, lubrication and bio-diesel. A new type of boiler (5,000 kg capacity) has been successfully tried and tested by Solidaridad.



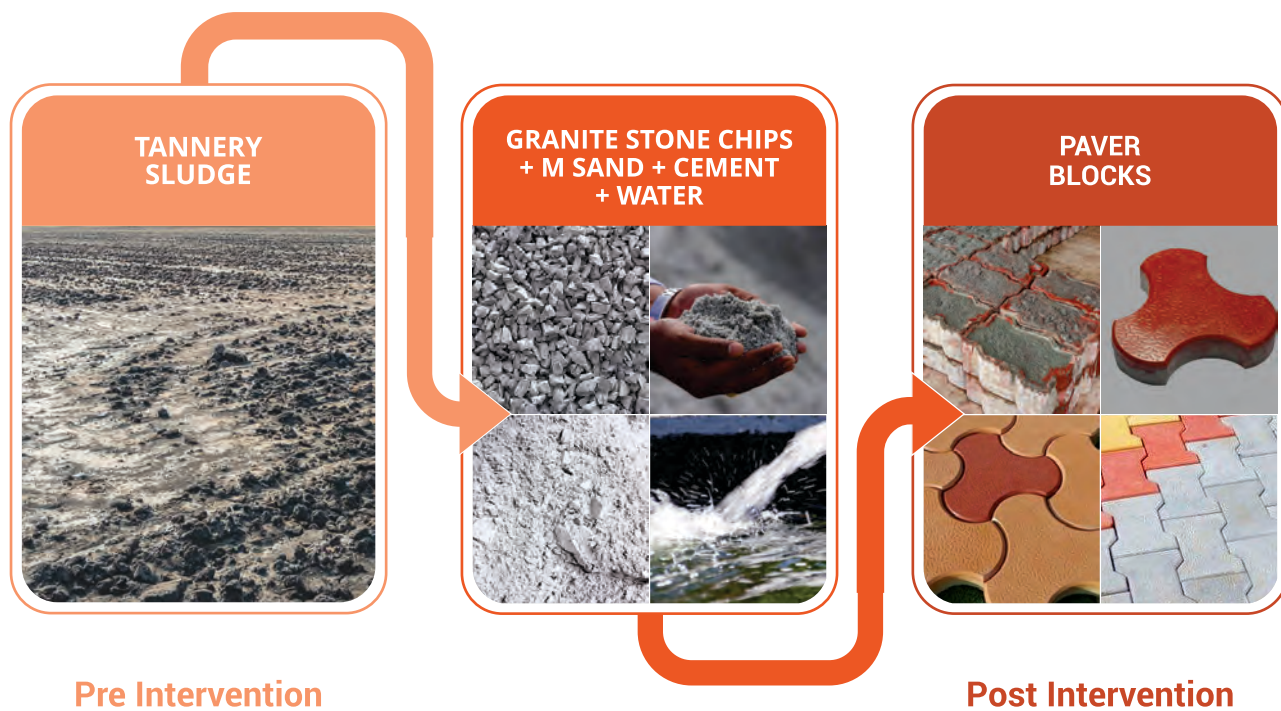
Making bonded leather sheets from waste: Solid tannery waste, generated during the leather production, such as chrome shavings, leather buffing dust, cuttings, leather scrap and finished leather

trimmings are disposed of at landfills or dumped in vacant land and riverbanks, contributing to land and water pollution. When burnt, they also contribute to air pollution. Through our low-cost interventions, the waste is turned into leather sheets which after processing are used in the leather goods industry to produce insoles for slippers or shoes, lining and dividers in bags. The base material is also used to make bags, belts and wallets. Besides reducing the environmental footprint of the tanneries, these marketable by-products are a source of additional income.



Creating paver blocks from sludge: One of the biggest challenges faced by tanneries is the generation of solid waste sludge. The processing of one tonne of raw hide produces more than 125 kg of solid waste sludge. Currently, this sludge is dumped in secure landfills. We are working with tanneries to recycle this solid waste into paver blocks which are now used in tannery floors, roads, park benches, and pavements.

Waste to value



2.

Reducing Effluents at Source



Key interventions

Desalting machines and re-use of salts: Large quantities of salt are used for the preservation of raw hides prior to tanning. This intervention reduces the level of Total Dissolved Solids (TDS) in the wastewater discharged from the tanneries. The desalting machine has a cylindrical roller with nylon bristles that is used to brush out the salt which can be collected and reused. The pro-environment outcome: reduction of TDS by around 33% at the soak liquor stage.



Enzyme-based dehairing: Sodium sulphide is generally used for dehairing in tanneries. Sodium sulphide is a hazardous chemical and is responsible for the generation of H_2S gas. The unutilised sulphide contributes to a higher amount of chemical oxygen demand (COD) in the effluents. By using enzymes instead of sodium sulphide, the animal hair does not dissolve but is loosened to such an extent that it can be removed by a machine. The use of enzyme-assisted dehairing leads to 50-75% sodium sulphide avoidance during the process.



Bar Screen: Bar screen is a mechanical device placed in the effluent channels inside the tannery prior to the effluent treatment plant. Its purpose is to remove the floating unwanted material (trimmings, shavings, hair, plastic, among other things) from the effluent. If not removed, this floating matter contributes to suspended solids, choking the downstream pipeline and clogging the pumps.



Drum Screen: The cost of treating tannery wastewater in a pre/primary effluent treatment plant (PETP) is fairly high due to the presence of a significant amount of sludge in it. To address this, a drum screen is installed at the inlet of the PETPs. The rotating drum allows the waste water to pass through while filtering out the sludge, reducing the total suspended solids (TSS) before the wastewater undergoes further treatment in the PETP. This measure reduces the costs for treating tannery wastewater. The pre- and post-analysis of the effluent has revealed that the drum screen is not only capable of reducing the levels of TSS but also the levels of COD and BOD (Biological Oxygen Demand) significantly.



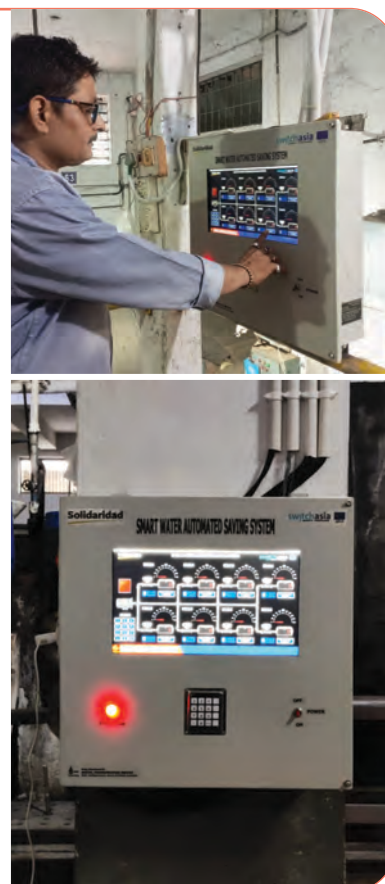
3. Optimising Water and Energy Use



Key interventions

Smart water saving system (SWaSS): In large tanneries, water feeding systems are manually managed and controlled, resulting in wastage of fresh water and increasing risk of human error in tannery operations. Solidaridad's team innovated and introduced SWaSS, a water optimisation technology for tanneries. It is a programmable logic control (PLC)-based, tannery-specific integrated water management system developed to optimise fresh water usage in tanneries. Using this system, a specific amount of water is fed into the drums to optimise freshwater usage, resulting in a 25-30% saving in freshwater.

Similar technology is deployed in textile units. Auto-controllers with PLC systems are installed with the jet machines, controlling the water flow input into the system as well as the temperature and water discharge from the jet dyeing machine. This intervention reduces water consumption by 15% and manual errors by 95% at in textile units.



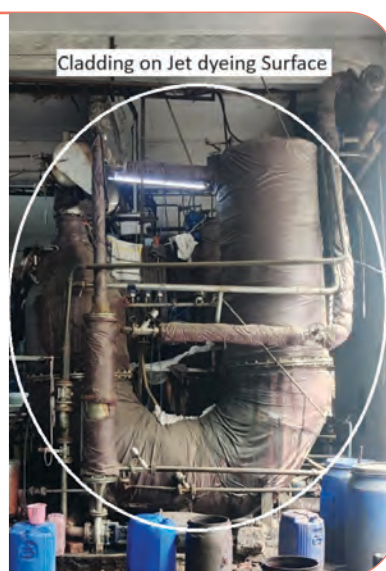
Digital water flow metres: Leather processing, from soaking to post-tanning stage, is water-intensive. However, in many small- and medium-sized tanneries, the volume of water used during the process is not measured but only roughly estimated. This estimation results in higher utilisation of water than the volume actually required, leading to water wastage. To reduce water consumption at the source, water flow metres have been installed at the tannery units, leading to 35-40% reduction in water use during the processing stages.



Solenoid valve: During the fleshing operation in tanneries, water continuously flows over the rollers to clean the blades and maintain constant temperature on the hides, thus causing wastage. With the installation of solenoid valves, water flow stops when the hides are not placed on the rollers. This can save around 50% of the freshwater used in such operations, leading to significant cost-reduction for tanneries.



Cladding: During the jet dyeing process in textile processing, the temperature within the machine is maintained at 130 degrees, whereas the temperature on the machine surface is 120 degrees. This results in a loss of thermal energy due to the difference in temperature of the two surfaces. Our intervention in insulating the jet dyeing machine with a mineral wool layer with aluminium has led to consistency within the batch of processed fabric while maintaining the temperature within the machinery. A key outcome: reducing energy consumption by 223 kg/day for a 1000 kg machine.



Water spray gun: Pipes are used in various industrial processes such as dyeing, printing, washing, and cleaning of equipment, storage drums, and nearby processing areas. These pipes have a larger diameter and have low water pressure resulting in loss of water. We have switched these pipes with water spray guns. An economical intervention, they reduce the diameter of the pipes, improving the water pressure from the outlet and reducing water consumption by up to 50%.



Vacuum suction slit on stenter machine: The wet fabric passing through the stenter machine causes the water vapour and chemical fumes to dissipate in the industrial spaces, leading to higher energy consumption. The vacuum suction slit which is mounted after a mangle extracts the moisture from the fabric. This reduces the moisture percentage by 9-10% in the fabric, thereby improving the drying efficiency. It also saves water used in this process by 43%.



4. Ensuring Safe & Decent Work Conditions



Improving occupational health and safety of those working at the tannery and textile units has been a key area of our work over the last seven years. Our training sessions focus on aspects of risk assessment, workplace safety, fire safety, hydrogen sulphide gas safety, volatile organic compounds (VOCs) gas safety, proper handling/storing of chemicals, safety in machinery operations and electrical installations, first aid, etc.

Through safety demonstrations, workers are also trained on appropriate use of personal protective equipment (PPE). In Panipat, a framework for chemical management and occupational health and safety (OHS) is being developed for the textile units, in consultation with industry experts.

The Decent Work Toolkit: The Corporate Sustainability Due Diligence Directive (CSDDD) introduced by the European Union represents a significant shift towards mandatory compliance with rigorous environmental and social standards for companies operating within the EU or engaging in trade with EU-based firms. As the directive mandates comprehensive due diligence across supply chains, it poses both a challenge and an opportunity for the MSMEs globally. In response to this evolving regulatory landscape, we have developed a Compliance Toolkit specifically tailored for MSMEs in the leather and textile sectors. These industries often face significant scrutiny due to their environmental impact and labour practices. MSMEs, in particular, may lack the resources, knowledge, or expertise to navigate complex regulatory requirements. This toolkit aims to bridge that gap by offering a structured approach to compliance. Leather and textile MSMEs will benefit from a clear framework for assessing their compliance with the CSDDD, covering both environmental and social metrics.





5

MULTI-STAKEHOLDER Approach



Our Multi-stakeholder Approach

OUR PARTNERS

A Collaborative Enterprise



Leather and Textiles Industry Associations

Indian and International Partnerships



Government Agencies

OUR GOALS

Pollution Abatement



Sustainable Supply Chain

Sectoral transformation requires different stakeholders to commit to shared goals and vision. In leather and textiles, our success in pollution abatement at source is driven by our multi-stakeholder approach, foregrounded in public-private partnerships with both Indian and international (especially European) participants. We bring together government agencies, regulatory authorities, industry associations, common effluent treatment plants (CETPs), technical institutes and private associations to design and implement strategies that are a win-win for all actors in the supply chain.

In the Kanpur cluster, Solidaridad is working with PUM Netherlands, Stahl, Uttar Pradesh Leather Industries Association (UPLIA), Council for Leather Exports (CLE), Council Of Scientific And Industrial Research–Central Leather Research Institute (CSIR–CLRI), Uttar Pradesh Pollution Control Board and Small Tanners Association to introduce techno-commercially viable solutions that have been endorsed by the National Mission for Clean Ganga (NMCG). In 2018, National Mission for Clean Ganga recognised Solidaridad as its Sustainability Partner for projects that address pollution in the Ganga and its tributaries, particularly recommending its 'waste-to-value' interventions.

A similar public-private partnership (PPP) model has been employed in the Kolkata cluster. Here, Solidaridad is collaborating with different entities – the European Union (under the SWITCH-Asia programme), Calcutta Leather Complex Tanners Association (CLCTA), Dugros, Stahl, International Polytechnic for Industrial and Economic Development (PISIE), and nearly 100 tanneries – to reduce the environmental footprint of the cluster and improve workers' practices.

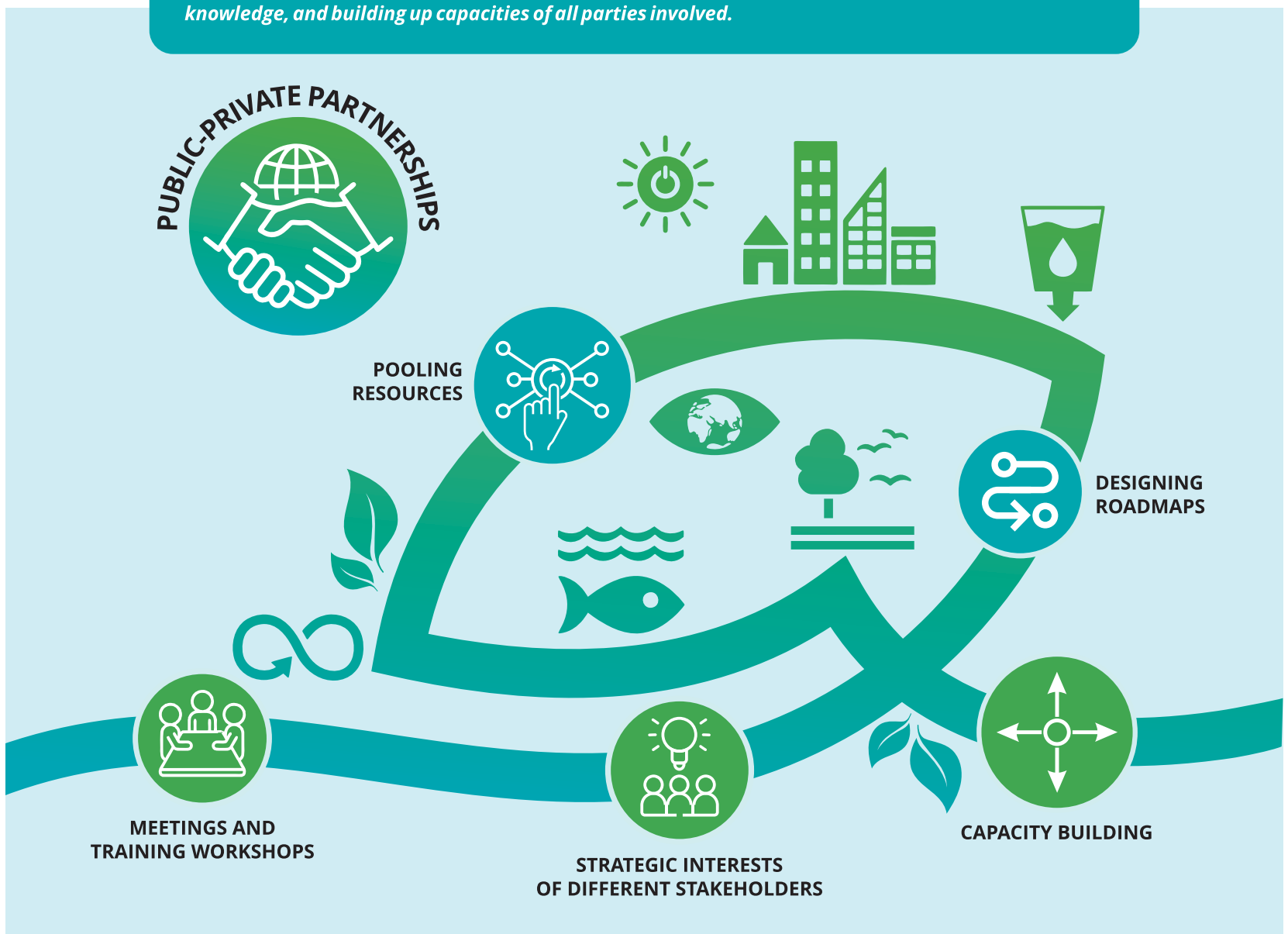
In Tamil Nadu, significant efforts in the leather sector are being undertaken with the support of EU SWITCH-



Asia, Indian Finished Leather Manufacturers and Exporters Association (IFLMEA), PISIE, CLE, TATA International Limited and 8 CETPs in the state's four clusters.

In Panipat, we are leveraging the scale and scope of work provided by the Government of India through the National Mission of Clean Ganga and the technical knowledge of premier textile research institute NITRA and the industry expertise of TANATEX Chemicals (Dutch) and Panipat Dyers Association to reduce the environmental footprint of the cluster through green technology, chemical management system and best management practices.

The operations of these multi-stakeholder PPP platforms guarantee long-term sustainability, implementation of good practices, besides also ensuring alignment with national policies and plans. Through meetings and training workshops, we also play a key role in aligning strategic interests of different stakeholders, designing roadmaps, disseminating information, pooling in resources, knowledge, and building up capacities of all parties involved.





6

OUR USP

Sustainability Solutions



Our USP:

Sustainability Solutions

To ensure a more sustainable future for the leather and textiles industry, it is vital to research and develop cleaner and greener technologies, while simultaneously training workers, supervisors, managers and tannery owners on efficient practices. Our efforts in reducing carbon footprint in tanneries we work with are proving to be a gamechanger for the industry. Dedicated knowledge-and-training centres have helped us contribute to establish industry best practices and share knowledge with the community even after a project is complete.

1 Reducing carbon footprint in tanneries: The carbon footprint of bovine leather amounts to approximately 65 kg CO₂ / sq. mtr. With over 2 billion square metres of leather produced globally each year, this creates a substantial environmental impact. To address this, greener technologies are crucial. In the Kolkata leather cluster, Solidaridad has been working with 100 tanneries to effectively minimise these footprints. The latest audit and life cycle assessment of Solidaridad's interventions in five selected tanneries, conducted by TÜV SÜD South Asia, revealed significant achievements, with each tannery surveyed averting an estimated 150 tonnes of CO₂eq per year in greenhouse gas emissions (Scope 2 and Scope 3) through just three technical innovations (desalting, water optimisation and accurate weighing) at the process level. The greenhouse gas-avoidance potential of these measures can, in fact, rise to around 500 tonnes of CO₂eq per tannery per year. The goal is to make at least one tannery carbon neutral in the next year, under the PAS 2060 certification.

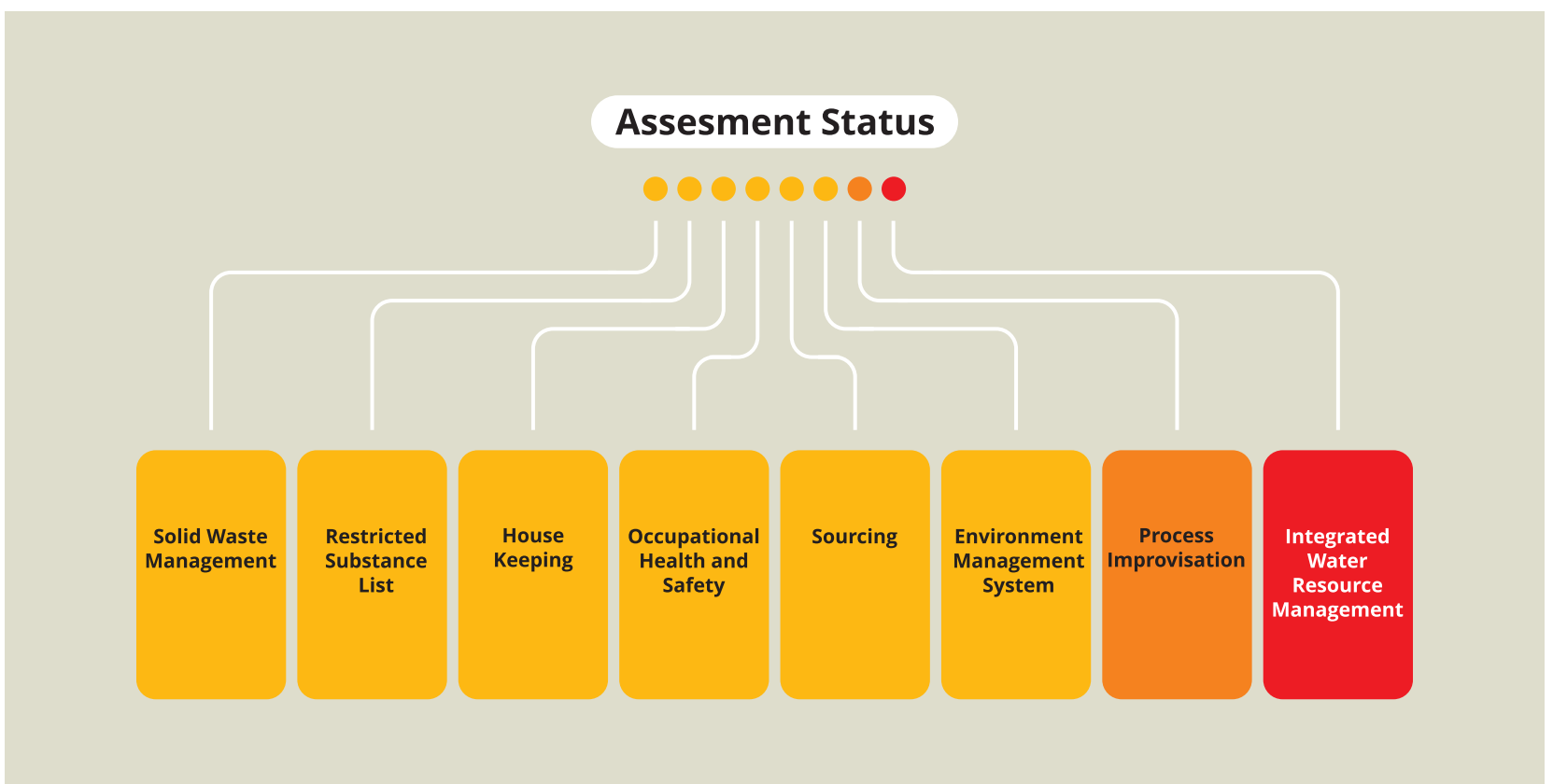
In India, we are directly engaged with approximately 300 leather enterprises. For the future, Solidaridad is researching the potential of greenhouse gas avoidance through solid waste recycling solutions. It is also exploring the potential of generating renewable sources of energy (wind, solar and biogas) from tannery waste. These learnings will be shared with other commodities and projects within and outside India.

Potential GHG reduction for a tannery with production capacity of 150,000 sq.ft. per month cattle hide

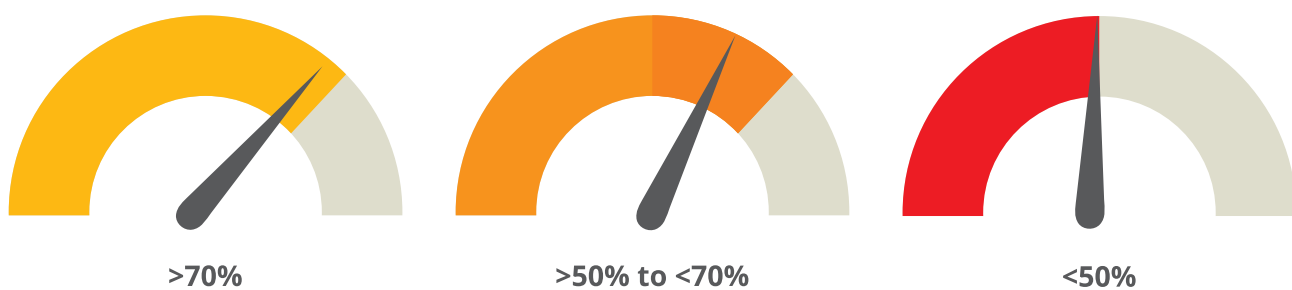
Value chain Area	What is the nature of the potential reduction?	Where do these emissions arise geographically?	Amount (tCO ₂ e/year)
1 Raw Section	Water and power consumption	Reduction of water consumption in washing and reducing the paddle running time	7.03
2 Fleshing operation	Water and power consumption	Checking water wastage and reducing power consumption	0.3
3 Accurate weighing system	Water and chemicals consumption at beamhouse (raw hides to wet blue section)	Reduction of water and chemical use	151.9

2 Leather Trade Intelligence Portal (LTIP): A digital tool, LTIP helps tanneries self-assess and declare their environmental and social performances (measured against multiple parameters), thus enhancing their business prospects, viability and access to market. Envisioned as a holistic database to provide insights into the operational efficiencies and sustainability performances of tanneries and other leather units, the key components of this portal are: self-assessment, industry info repository (providing information about the industry's sustainability performance), and knowledge and solution (a resource for industry knowledge and expert solutions on responsible social and environmental practices).

An example of self-assessment is presented below:



Performance Indicators



- 3 Textile Pollution Portal:** The Textile Pollution Portal developed by Solidaridad is aligned with the guidelines of the Central Pollution Control Board, Ministry of Environment, Forest and Climate Change, India, with the Board also endorsing it. It is designed to support the textile industry to self-assess and improve its performance on environment parameters as mentioned in the 'Charter for Water Recycling and Pollution Prevention in Textile Industries in Ganga River Basin'. The portal, inaugurated by the Minister of Water Resources, Government of India in 2023, supports assessment on various aspects of pollution reduction by waste treatment at the end of the processing pipeline as well as reduced consumption of natural resources, right selection of chemicals and development of green technology.
- 4 Centre of Excellence, Kanpur Leather Cluster:** Inaugurated in 2020, the Centre of Excellence in the Kanpur Leather Cluster aims to equip tannery workers with knowledge of water-efficient, environment-friendly technologies and processes in leather manufacturing. A state-of-the-art facility, its goal is to address the issue of water pollution in the Ganga while ensuring the sustainable economic development of the industry by providing training programs to tannery owners, workers, and supervisors. Developed with support from Stahl, the centre builds the capacities of tannery workers, supervisors, and other relevant stakeholders on novel technologies, globally recognized eco-friendly practices, safety practices for chemical use and management, shop-floor management, and other related areas of expertise as per the standards of the global leather industry.
- 5 Centre of Sustainability, Kolkata Leather Cluster:** Established in 2023, the Centre of Sustainability in Bantala, Kolkata, serves as a one-stop resource centre displaying miniatures of the critical interventions and technologies developed for the Kolkata cluster: Smart Water-automated Saving System (SWaSS), digital water-flow metre, desalting machine, enzyme-assisted dehairing, low-salt tanning technology, safety protocol display with PPE kits, among others. Together with a video-display area where the interventions are explained in detail, the purpose is to inform and educate tannery owners, managers and workers about the importance and functioning of the technological intervention and equipment. The centre also hosts capacity-building and training sessions on good, safe practices, occupational health and safety, and other aspects that contribute to the emergence of a green and clean leather industry.





7

AWARDS AND Recognition

Awards and Recognition

EEF Global Industrial Water Project Award, 2021

Our project in Kanpur-Unnao leather cluster won the EEF Global Industrial Water Project Award of the Year 2021. The National Mission for Clean Ganga (NMCG) acknowledged Solidaridad as its 'sustainability partner', encouraging us to scale up the successful project template to other polluting sectors such as dyeing and bleaching (Textiles) and to the SAARC countries.

Global Good Award, 2022

Solidaridad received the prestigious Global Good Award in the category of Community Partnerships for its work in the FDW Kanpur-Unnao Leather Project which focused on pollution prevention and efficient water use. The UK-based Global Good Awards, formerly known as the National CSR Awards, has been recognising responsible and sustainable practices since 2015. The 39-member jury chose the leather project for the top honour because they felt it was strongly rooted in the community and demonstrated great potential for replication.

Water Sustainability Award, 2022 and 2023

On the eve of World Water Day, we won the 'Water Sustainability Award' (2022-2023) for "innovation in water technology" in the Leather portfolio. The award, which Solidaridad won for a second time in a row (we were runners-up in 2022), is given by TERI - The Energy and Resources Institute, in collaboration with the Ministry of Jal Shakti, Government of India, International Water Association and United Nations Development Programme.





8

FUTURE

Roadmap

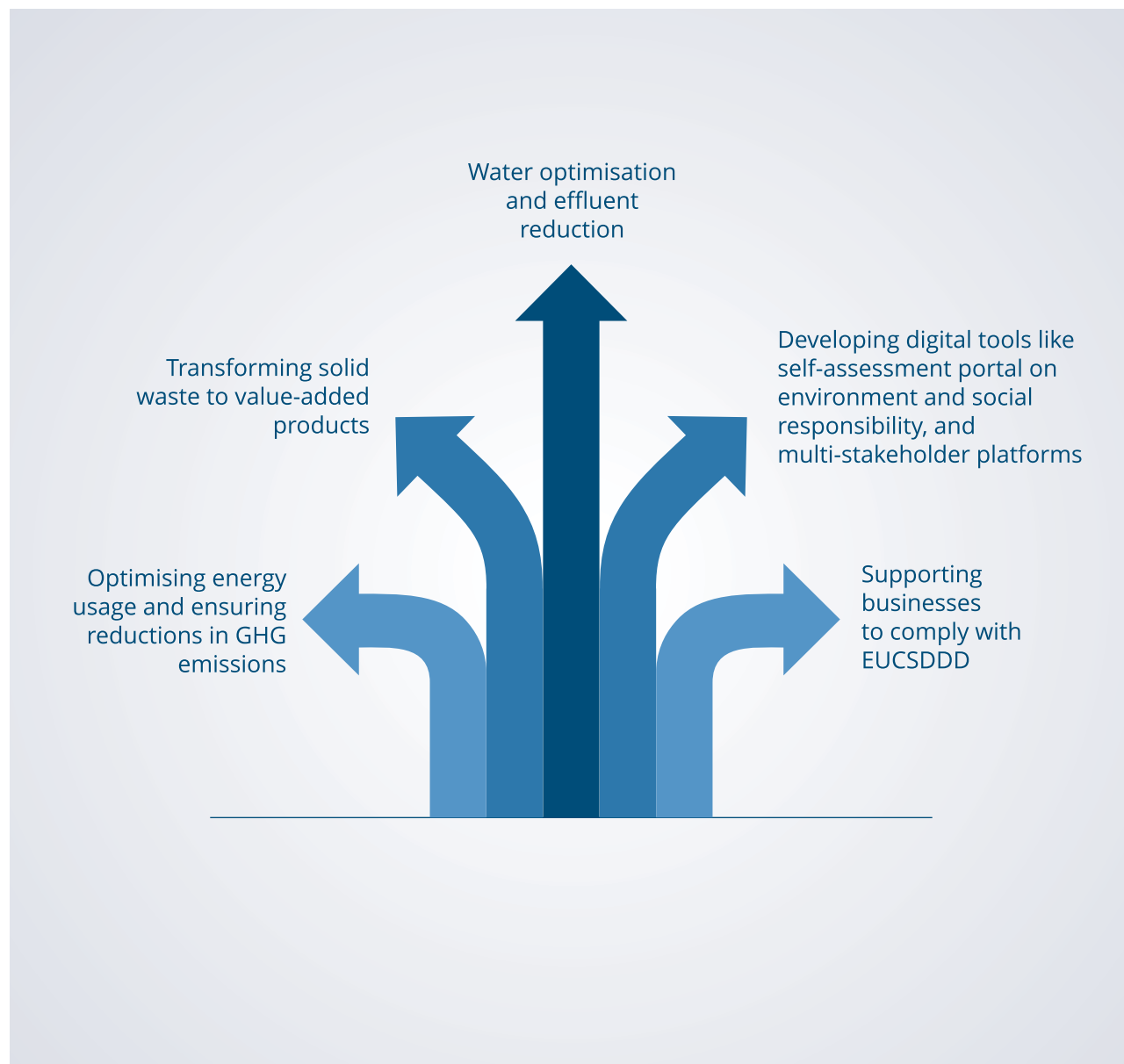
Future Roadmap

In Asia, Solidaridad will continue to work on **a)** pollution mitigation by introducing viable innovations at the source, **b)** while expanding focus on pollution adaptation by the impacted communities. The health consequences of pollution impose a significant economic burden on affected communities, including healthcare costs, loss of productivity due to illnesses or disabilities, reduced property values, and diminished quality of life. Therefore, there is an urgent need for:



With our sustainability interventions firmly established in tanneries, especially in India, we are now working on collaborating with leather manufacturing units – a direction that represents a strategic evolution in Solidaridad's efforts within the leather sector. This will help open doors and create more opportunities for promoting sustainable products, enhancing value addition, ensuring market expansion, while addressing social aspects as well (empowerment of women workers, for instance). Such a shift will foster inclusive economic growth and inspire social equality.

Solidaridad aspires to expand its efforts in a few other sectors, such as pharmaceuticals, pulp and paper. Furthermore, making use of the lessons learned from working in India's leather and textiles sector, we are scaling up our efforts in other geographies – Bangladesh, Indonesia, Nepal, Sri Lanka, and Thailand. Our strategic interventions are centred around:



In particular, Solidaridad is looking to tap into the unexplored potential of new geographies in Thailand, Japan and Nepal



In Nepal, Solidaridad is exploring the potential of developing leather as one of the focus commodities in the country.

In Thailand, a scoping study for the leather sector is in the works, the results of which will pave the way for designing interventions addressing the sector's unique challenges in the country. Partnership opportunities are being explored with two global brands.

In Japan, synergies with the automobile industry (which has supply-chain connections with Bangladesh, India and Thailand) are being identified. Plans are afoot to engage sustainability-conscious textile and fashion brands to source from green tanneries and manufacturing units.



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