Solidaridad

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Change that matters

FOREWORD

Dr. Shatadru Chattopadhayay
Managing Director,
Solidaridad Asia

Leather is one of the most widely traded commodities in the world. The leather sector in India is known for its consistency in high export earnings and is among the top 10 forex earners for the country, accounting for around 12.9% of the world's leather production of hides/skins. In 2020, exports of leather and leather products touched $5 bn. Despite the sector's strong growth drivers, it is plagued with several pollution issues due to the nature of work and the lack of awareness on clean and green technologies. Leather Industry is one paradox. On the one hand, it is blamed for the significant contamination of heavy chemicals in the rivers while on the other hand, it is heralded as one of the focus sectors in the Make in India and the hope of livelihood to about 4.42 million people in India. This sector is facing chill winds from various directions and the answer to the problem is the dire need for sustainable development. The adoption of advanced and clean technologies with clear business cases to comply with the pollution norms has become an essential path to the tanneries' survival.

We, at Solidaridad, have added Pollution and Water as key strategic areas in our Multi Annual Strategic Plan (2021-2025). I commend the Solidaridad Leather team in India for identifying the core sectoral issues and mobilising projects to address the pollution, water and waste management issues in the sector with a public-private partnership approach to foster its replication and scalability. Solidaridad adopted a sector wide transformation as we are already working in two major leather clusters and will be scaling up our initiatives to the third major leather cluster. Due to the huge support received from the partners and the industry, the projects at Kanpur and Kolkata can serve as a blueprint solution to the other industries along the river basin and "Drive Change That Matters"- larger vision of Solidaridad.

Tatheer Raza Zaidi
General Manager,
Pollution Management in MSMEs,
Solidaridad Asia

With great pleasure, I share with you this booklet- an outcome of our 4 years' relentless journey in the Indian leather sector at Solidaridad. Our growing team has dedicatedly worked towards addressing the complex challenges of pollution and environmental sustainability and consistently pushed towards the sustainable upliftment of the leather clusters.

With pollution being a looming challenge, it started to threaten the credibility and competitiveness of the sector. Thus, integrating sustainability with the leather operations was imperative for its survival. It has been realized that the green recovery needs successful pilot demonstrations of best practices and technologies. We are thankful to our donors and consortium of partners and technical experts for collaborating and providing an enabling environment for the diffusion of green innovations in the leather clusters- Kanpur- Unnao and Kolkata, where we are currently working. We are also grateful to senior representatives from Government of India and Government of Netherlands in acknowledging these project initiatives at several platforms and paving a sustainable way forward in the cluster.

This booklet will guide you through Solidaridad and partners' proven and demonstrated interventions at the tanneries. Through a pictorial representation, we present to you the impact and the benefits of the interventions. We hope that you find something of value and importance and that we continue striving for sustainable changes in our respective arenas.

FOREWORD

Imran Ahmed Khan
General Secretary,
CLC Tanners Association

The Indo-Dutch programme by Solidaridad has successfully introduced & implemented effective ways of sustainable development of our leather industry through various eco-friendly solutions and commercially viable technologies. It has been a pleasure to see the upward journey of Solidaridad in the Kolkata Leather Cluster and CLCTA is happy to be a part of this journey.

Process optimisation & its demonstration shown by the project in different tanning practises have been very helpful to the industry owners in addressing common challenges of integrated water management solutions, effective waste management, better workplace safety and health of the workers.

The industry commits to improve the sustainability of the cluster with other project partners and welcomes this initiative to enhance competitiveness of Kolkata Leather Complex through pollution abatement measures.

We acknowledge the holistic approach adopted by Solidaridad in providing sustainable solutions and circular economy leading towards the path of success with our ultimate goal of 'Think Leather, Think Bengal'.

Ramesh Kumar Juneja
Regional Chairman - East,
Council for Leather Export

The project "Effective Waste Management & Sustainable Development of the MSME tanning companies in Kolkata Leather Cluster (Bantala)" is an outcome of the Memorandum of Understanding between Solidaridad with Government entities of West Bengal and CLC Tanners Association.

Our first step towards this public-private stakeholder ship was laid in Bengal Business Summit in 2019 emphasizing common goals of helping Bantala leather cluster in adopting better tanning practices in terms of green technology, water management, solid waste management and viable approach to better production management through mobilizing local resources helping tanners to adopt these technologies with cost effective measures.

This pictorial booklet is a great example of the case studies that Solidaridad has demonstrated in different tanneries in our Bantala cluster for best practices and eco-friendly technologies. This booklet will be a reference guide for the industry owners who intend to work on globally recognized green solutions for better water usage and waste management.

We as a partner are working together in leather supply chain on different aspects on circular economy, waste to wealth, demonstration of techno-commercially viable process and implementation of cleaner technologies which itself proves that we are walking towards the path of sustainability.

Mr. Pradipta Konar
Senior Programme Manager,
Solidaridad Regional Expertise Centre

The leather industry in India holds a significant place in the Indian economy. The tanning industry is spread across four major states in India – Punjab, Uttar Pradesh, West Bengal & Tamil Nadu.

Solidaridad successfully covered 3 major leather sectors Kanpur, Kolkata and Chennai through its different projects that are running in these sectors.

On behalf of Solidaridad with great pleasure I thank European Union, under their Switch Asia program Kolkata project 'Effective Waste Management and Sustainable Development of the MSME Tanning Companies in the Kolkata Leather Cluster (Bantala)', seeks to introduce and promote sustainable production practices in the highly polluting tanning sector through technology transfer, capacity building of the tannery management and workers on solid waste management, better tanning practices, trainings and health camps for improved workplace conditions.

Project was launched virtually by **Hon'ble Chief Minister of West Bengal, Mamata Banerjee** delegates from India and Europe, institutions such as Central Leather Research Institute and Council for Leather Exports, representatives from the Indian leather industry associations, participants from the global leather fraternity and the development partners community. Through this project we believe, we can create a substantial change in the integrated Kolkata leather sector.

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Solidaridad

Significance of Leather Cluster

USD 12 Bn
size of the domestic Market in India

Accounts for 13%
of global production of hides/skins

3 Bn sq ft
of leather produced in India every year

2nd largest exporter
of leather garments

USD 5.74 Bn exports
of footwear and leather products in 2017-18

Ready availability of Raw Materials - Home to
20% of world's cattle population;
11% of world's goat and sheep population

3rd largest exporter
of Saddlery and Harness

Major markets:
US, UK, Germany, Italy, France

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About Solidaridad Leather Projects in India

Solidaridad embarked on its leather journey in India from its flagship project in Kanpur-Unnao Leather Cluster in 2016. Under the project ***'Pollution Prevention and Efficient Waster Use in Kanpur-Unnao Leather Cluster',*** Solidaridad worked towards water stewardship in 100 tanneries. The project not only aims to reduce the pollution load discharged from the tanneries but also reduce its water consumption in its operations. For this purpose, global and national techno-commercially viable eco-friendly best practices and technologies have been demonstrated in the select tanneries. This public-private partnership model was acknowledged at several platforms, including the centre and state governments and regulatory authorities.

Having identified a scope and need, this public-private partnership model has now been scaled to Kolkata leather geography under the European Union project ***'Effective Waste Management and Sustainable Development of the MSME tanning companies in Kolkata Leather Cluster (Bantala)'*** from 2020. Apart from the water component, the project focusses on introducing Circular Economy through utilisation of the solid waste generated from the tanneries into value added products. This holds a potential to revolutionize the sustainability of the leather industry and demonstrate the true meaning of 'Waste to Wealth'.

With close to 600 tanneries, Tamil Nadu is the key centre for the leather industry in India. On June 22, 2022, Solidaridad Regional Expertise Centre and its partners launched an EU-India sustainability project for the leather clusters in Tamil Nadu which promotes sustainable consumption and production across the Asia-Pacific region. The 42-month initiative, called ***'Promoting Circularity in the Tamil Nadu Leather Clusters for Solid Waste Management,'*** focuses on circularity through solid waste management and water efficiency practices in the leather sector along with improvement in behavioral practices through Occupational Health and Safety.

VALUE CHAIN MATRIX

A process wise mapping of the needs and types of interventions in the tanning process

Leather Process	Challenges	Demonstrated Interventions by Solidaridad and partners	Benefits
Curing / Preservation of hides and skins	High amount of TDS	Mechanical De-salting	i) TDS is reduced by at least 30% at soaking stage, ii) Reduce washings, iii) Reduced GHG emissions.
Salt	Disposal	Reutilization of salt at the time of curing of hides/skins	i) Circular economy, ii) Reduced GHG emissions, iii) Avoid soil pollution.
Soaking	(i) Considerable amount of water usage, (ii) High amounts of inorganic chemicals	(i)Water flow meter, (ii)Enzyme assisted soaking.	i) Quantity of water used is optimized by reducing water usage by around 25-30%, ii) Reduced soaking time, iii) Reduced amount of Inorganic chemicals used, iv) Reduced GHG emissions.
Liming	Leads to high levels of BOD, COD, TSS, Sodium Sulphide in the effluents and generation of H2S gas,	Enzyme Assisted dehairing	i) Reduced BOD, COD, TSS and TDS, ii) Negligible emission of toxic H2S gas.
Fleshing	Continuous flow of water on the rollers, leads to water Wastage	Retrofitting of fleshing machine by installation of Solenoid valve	i) Reduced raw water consumption by around 50%, ii) Reduced GHG emissions.
Post-Liming	High levels of mineral acid and salt in the effluents,	Low Salt Tanning	i) Reduction of pollution load (TDS, COD) in the waste water discharge from the tanneries ii) better chrome uptake. iii) Reduce running time of the drum during process, iv) Reduced GHG emissions.
Tanning	To rationalize the water usage of the tanneries	Water Flow Meters	i) Reduced water consumption by around 25-30%, ii) Reduced GHG emissions.
Solid Waste Management	Reduce the disposal of fleshing to water bodies, Reduce the disposal of Lime Sludge/ CETP / PTP sludge to landfills, Reduce the disposal of chrome shavings, buffing dust, finished leather cuttings and trimmings.	Extraction of tallow from Fleshing, Protein rich remaining's can be utilized for fish / animal feed Utilisation of lime sludge to paver blocks manufacturing *Making of bonded leather and value added products, *Buffing dust can be utilized to upgrade a low selection leather / can be used for covering up the defects.	i) Sustainable approach to utilizing the solid Waste generated from the tanneries and converting waste into value added product, ii) Reducing the load of waste in the disposal sites, iii) Reduces the risk of contamination of water bodies, around the disposal sites, iv) Introduces circular economy model in the leather production. v) Reduced GHG emissions.

All project commodities of Solidaridad

Solidaridad's "Pollution Abatement and Water Efficiency" Intervention Programme aims to reduce the overall effluent load discharged from the tanneries and enhance the water resource efficiency. National and Globally recognized eco-friendly solutions have been pilot tested and technologies with proven business cases have been scaled up in collaboration with public and private entities.

EFFECTIVE WASTE MANAGEMENT
AND SUSTAINABLE DEVELOPMENT
KOLKATA LEATHER CLUSTER

PROMOTING CIRCULARITY
IN THE TAMIL NADU LEATHER CLUSTERS
FOR SOLID WASTE MANAGEMENT

INTERVENTIONS

Green Tanning Technologies


F2

Conventional dedusting of cured salt by hand shaking process

Pre-Intervention

Salt used in the preservation process is dissolved in water and discharged as wastewater, this high TDS in the effluent. Alternative curing methods are not so prevalent.

MACHINE

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Dedusting of cured salt of hides/skins by brush type desalting machine

Post-Intervention

Desalting machine removes the major portion of the salt applied on the surface of hide. It helps to reduce the Total Dissolved Solids. The recovered salt can be reused by the slaughterhouses.

- ***Reduces TDS by around 30% at the soak liquor stage, Department of Micro,***
- ***Small and Medium Enterprise, Government of West Bengal acknowledged the use of desalting machine as an effective to reduce TDS & mandated its use for the tanneries located in Calcutta Leather Complex, Bantala.***

Conventional dehairing & liming operation with lime and Sodium Sulphide

Sodium sulphide used for unhairing the hides leads to emission of hydrogen sulphide gas and increased BOD, COD, TDS & TSS levels.

DEHAIRING

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Enzyme Assisted Dehairing to partially/fully remove sodium sulfide usage

Post-Intervention

Sodium sulphide is replaced with enzymes that have significantly lowered the COD, BOD and hydrogen sulphide gas emission.

- ***Significant reduction of BOD, COD and sulphide.***
- ***Minimum/negligible formation of toxic Hydrogen Sulphide gas,***
- ***99% reduction of sodium sulphide observed in the liming float after implementing EAD intervention.***

Conventional Fleshing machines without any water savings system

During fleshing operation, water continuously flows over the rollers to clean the blades and maintain constant temperature on the hides, thus causing wastage of water.

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Retrofitting of fleshing machines by solenoid valve and limit switch

With installation of solenoid valve, water flow stops when the hides are not placed on the rollers.

- ***Saves around 50% - 55% fresh usable ground water at the fleshing stage,***
- ***Awarded as "EEF Global water award of the year 2021" and "Water sustainability award" for its significant contribution in promoting water use efficiency.***

Extensive amount of water used in post-liming operation (drum)

Pre-Intervention

The volume of water used is not measured but only visually estimated in tanneries, resulting in higher utilization of water than the volume actually required a high chemical wastage.

FLOW METER

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Water measured through digital water flow meter for each operation

Post-Intervention

The digital water flow meters installed at drum is an effective tool for accurate measurement of water in leather industry and minimize waste water in each process.

- ***Saves around 45% - 50% water wastage,***
- ***Reduction in quantity of chemicals, particularly post tanning chemicals batch to batch quality consistency, thus higher quality of products.***

Conventional weighing through estimation the average of few pelts

Pre-Intervention

Orthodox practices of taking average weight of few pieces and determined the whole lot to avoid extra labor and time, leads to wastage of huge amount of water and chemical during the post liming process.

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Post Liming weighing of all the pelts through digital weighing system

Digital weighing system helps the worker to evaluate the weight of whole lot without facing any difficulties and also required less time.

- ***Saves around 45% - 55% water wastage,***
- ***Reduces around 10% - 15% of chemical used in conventional process,***
- ***Great reduction in terms of carbon footprint.***

Extensive amount of water used in post-liming operation (Paddle / Drum)

Pre-Intervention

Orthodox practices of taking average weight of few pieces and determined the whole lot to avoid extra labor and time, leads to wastage of huge amount of water and chemical during the post liming process.

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Automated Water measuring practice through SWaSS

Post-Intervention

SWaSS guarantees optimum use of water, while minimizing waste by monitoring usage at every stage — from soaking and tanning to finishing

- ***Saves around 35% - 45% water wastage,***
- ***Achieved consistent leather processing without any variation in quality or color.***
- ***Great reduction in terms of carbon footprint through water optimization.***

Conventional chrome tanning with inorganic acid and salt

Pre-Intervention

Conventionally, a high amount of salt and Sulphuric acid were used to lower the pH of the pelts so that the chrome can penetrate efficiently.

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Low salt tanning with organic acid and negligible amount of salt

Intervention focuses on reducing the use of salt and mineral acids along with better chrome exhaustion.

- ***Reduction of pollution load (TDS, COD) in the wastewater discharged from tanneries***
- ***Less usage of water during process,***
- ***Better chrome uptake.***

INTERVENTION

Solid Waste Management

REUSE • REDUCE • RECYCLE


SLUDGE BEDS

Solid waste coming out of fleshing operation (Post liming process)

Pre-Intervention

Fleshing waste is disposed off in an unsustainable manner without realizing its economic opportunity.

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Tallow and protein rich extraction from fleshings

Introduced Tallow machine demonstrates the conversion of fleshing waste into value added products: Poultry feed and tallow oil that have market opportunities.

- Reduce the risk of contamination of ground water resources,
- Provides sustainable and environment friendly option to tallow makers and fish / poultry feed manufacturer.

PTP / CETP dried sludge from tannery waste

Pre-Intervention

Currently the solid waste gets dumped in a safe dumping zone. This adds to land and air pollution and also its economic potential is not realized.

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Paver blocks and tiles laid in Kolkata Leather Complex, Bantala

Post-Intervention

Solidaridad has introduced mechanism to convert the dried sludge into paver tiles that has various economic and eco-friendly applications.

- **Sustainable way of utilizing Lime Sludge Waste and converting waste into value added product,**
- **Reducing the load of waste in Waste disposal site,**
- **Reduces the risk of contamination of water bodies around the disposal sites.**
- **This intervention was acknowledged by West Bengal Government, National Mission for Clean Ganga.**

Tannery dry solid wastes - Trimmings, chrome shavings and scraps

Pre-Intervention

Solid waste generated during leather production such as chrome shavings, buffing dust, trimmings etc., are disposed in landfills.

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Utilisation of trimmings/shavings/scraps to Bonded Leather Sheet

Post-Intervention

This solid waste is utilized and converted into **Bonded Leather**. These sheets can be used and re-used to make **several value added products**, such as the pouch and base of the mousepads, bags, wallets, Pen Stands, out of waste.

- **Solidaridad has conducted pilot demonstrations to introduce ways to harness the economic yet eco-friendly potential of solid waste (leather trimmings and cuttings) generated from the tanneries.**

BUFFING DUST

Solid waste coming from buffing machine

Pre-Intervention

Buffing dust is a proteinous solid waste impregnated with chromium, synthetic fat, oil, tanning agents and dye chemicals which is generated after buffing operation during the manufacture of leather. It causes huge air pollution and land pollution.

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Utilisation of buffing dust to upgrade the leather

Post-Intervention

This solid waste sprayed on the leather surface to covering up the defects and give a suede look to it. It can be again passed through finishing operation without any chemical hindrance.

- **Solidaridad, along with another Dutch organization named CooLoo, introduced this intervention in Kolkata leather complex which will support the industry to utilize the solid waste into value added upgradation.**

Conventionally No filtration observed before final discharge

Pre-Intervention

The final discharge from the tannery contains a significantly higher percentage of Total Suspended Solids (TSS), which poses a significant challenge for the CETP operation.

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Implementation of Rotary Drum Screening to reduce the TSS

This mechanism indicating a notable improvement in the quality of treated effluent. Such a reduction in TSS levels not only signifies a more environmentally responsible approach to wastewater management but also contributes positively to the overall efficiency and sustainability of the CETP's operations.

- **Reduce the TSS (Total Suspended Solids) within the tannery yard,**
- **Supports CETP operation by reducing the solid particles before entering into the treatment plant.**

Final Waste from Beamhouse section – PTP Sludge

Pre-Intervention

The management of tannery waste, specifically the disposal of sludge, involves a critical concern as it involves transporting this sludge to designated landfills. This sludge typically consists of 80% water and 20% solid particles, making it particularly problematic. The high moisture content of this sludge contributes to a significant issue: the leaching of hazardous chemicals and heavy metals into the ground, resulting in water and mineral contamination.

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Implementation of Dewatering machine to reduce indirect pollution

Post-Intervention

To address these environmental challenges, a solution in the form of a proposed Dewatering machine has been introduced. This innovative technology leverages screw mechanisms to efficiently extract the optimal moisture content from the sludge. By doing so, it accomplishes several crucial objectives

- **Mitigating the potential environmental harm caused by hazardous substances,**
- **Diminishing the moisture content, it also curbs greenhouse gas emissions, particularly in the form of methane, offering an eco-friendly solution.**

Conventionally Spray Booth

Pre-Intervention

Buffing dust is a proteinous solid waste impregnated with chromium, synthetic fat, oil, tanning agents and dye chemicals which is generated after buffing operation during the manufacture of leather. It causes huge air pollution and land pollution.

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Water Curtained Spray Booth

Post-Intervention

This equipment come standard with a water curtain and a back suction through water so as to trap paint particles before releasing the air into the atmosphere. There are provisions available for supporting leather skins on perforated support meshes or with monorail hangers.

- **Improve the air quality near to spray booth,**
- **Safe working environment.**

Biogas Generation

Pre-Intervention

The bioreactor is ingeniously transforming fleshing waste into valuable biogas through anaerobic digestion, producing a substantial amount of methane. This methane-rich biogas is efficiently utilized to heat water for the tannery's Wet End process, aiding in the dissolution of fat liquor.

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from Fleshing Waste

Post-Intervention

Moreover, the digested slurry discharged from the reactor possesses significant potential for enhancing soil fertility. The biogas quality is exceptional, with an impressive methane content of approximately 85%, while the remaining fraction comprises carbon dioxide and oxygen.


RESEARCH &

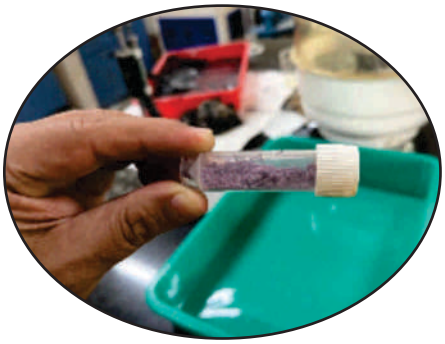
DEVELOPMENT

Chrome Shavings & Leather trimmings to Biochar (Fertilizer)

Chrome Shavings

Dechromed Protein

Extracted Chrome



Leather Crust Trimmings

Biochar

- Recovering chromium from chrome shavings for fertilizer production and utilizing the extracted chromium complex for creating B.C.S.
- Converting leather trimmings into biochar, which has a high NPK value, is a great illustration of a circular economy.

Leather Trimming to Activated Carbon

- Transforming leather trimmings to Activated Carbon is not only utilizing the waste, as well as this Activated Carbon will be used to treat the waste water.
- Activated carbon is being used in cosmetics, Gold recovery, Gas purification industries.

Keratin Extraction from Hair

Hair of Goat substrate

Enzymatic Hydrolysis

This refined keratin resource holds immense market potential spanning diverse industries, unburdened by constraints, and fostering a multitude of industrial connections. By transforming this previously discarded waste material into a valuable and pristine keratin resource, we not only mitigate the environmental impact associated with leather production but also open up new avenues for sustainable resource utilization.

ADDED PRODUCT

of Cow/Goat through EAD process

Chamber

Pure form of Keratin (Pre-powder form)

This endeavor signifies a progressive step towards achieving sustainability goals while simultaneously establishing robust connections across various sectors, thereby contributing to a more sustainable and interconnected industrial landscape.


CAPAC
BUILDI


ITY
ING

Occupational Health and

Solidaridad initiative has had a far-reaching impact, conducting numerous Occupational Health & Safety camps workshops. Our efforts have benefited a substantial number of people, while the distribution of essential PPE kits and OH&S kits have further contributed to the well-being of tannery workers

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Safety Workshop

We continue to actively identify and address areas in need of improvement, ensuring safer and healthier workplaces through ergonomics and safety practices within the Kolkata Leather complex.

General Awareness on Fire Safety Workshop

our safety camps have pinpointed tanneries where fire safety measures were sorely lacking. Implementing a fire safety workshop helps in preparing the employees and staff to have the knowledge to prevent a fire from occurring and also to promptly respond during a fire to ensure the safety of individuals and prevent damages to property. We also provide them Fire Safety kits.

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Eye Screening Campaign

Our unwavering dedication to this cause has led us to consistently organize these Eye screening camps, resulting in the identification of individuals requiring specialized eye care. It helps the workers to have their vision corrected and can improve the quality day by day and focus on their work. Through this workshop, we have distributed spectacles, Eye Care Kit and essential medicine (if needed).

Gender Sensitization

The ultimate objective of this initiative is to lay the foundation for a robust gender framework within the leather clusters, which will guide future endeavors and actions towards achieving gender parity. By actively involving both male and female participants, we aim to challenge preconceived notions, dispel biases, and foster mutual understanding between genders.

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Workshop

These gender sensitization workshops represent a vital step forward in our ongoing commitment to fostering gender equality within the Kolkata leather cluster's tanneries and goods unit. By challenging ingrained gender norms, fostering dialogue, and empowering emerging leaders, we are paving the way for a more inclusive, diverse, and equitable future in the leather industry.

Training of Trainers

Training programs have been successfully executed for tannery managers, supervisors, and workers, showcasing innovative process optimization interventions and solid waste recycling solutions demonstrated in Kolkata's tanneries. A workshop specifically tailored for tannery supervisors and managers highlighted these interventions, ensuring their effective implementation.

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(ToT) Workshop

These trained managers and supervisors have further disseminated their knowledge to numerous on-site tannery workers, ensuring the sustainability of capacity building activities. Moreover, representatives from the CLC Tanners Association actively participate in Training of Trainers (ToT) activities, sharing their insights and magnifying the positive impact of such initiatives across the cluster.


Achiev


ement

GHG Avoidance Certificate by

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

TÜV SÜD South Asia

VERIFICATION STATEMENT OF GREENHOUSE GAS

The Certification Body of

TÜV SÜD South Asia Pvt. Ltd.

certifies that the GHG Assertion reported by

Solidaridad Regional Expertise Centre

Solidaridad

For its

Project Interventions in

Trident Leather, Bantala Leather Complex, Zone 03, Plot 219 to 221, Karaidanga, Kolkata, India.
N J Exports, Bantala Leather Complex, Zone 01, Plot 54, Karaidanga, Kolkata, India.
Aslam Tanning Industries, Bantala Leather Complex, Zone 03, Plot 217-218, Karaidanga, Kolkata, India.
Dugros Leather India Pvt. Ltd., Bantala Leather Complex, Zone 08, Plot 622, Karaidanga, Kolkata, India.

In line with

ISO 14064-2:2019

Base Year: 2021 **Application Year: 2022**

Reporting Period: January 2022-December 2022

Total GHG emissions reduction reported for Desalting Mechanism: 5.76 $tCO_2eq/year$;

Total GHG emissions reduction reported for Water Optimization Mechanism: 0.3 $tCO_2eq/year$;

Total GHG emissions reduction reported for Accurate Weighing Mechanism: 143 $tCO_2eq/year$;

Assurance Category: Limited Level

GHG Accounting Standard: ISO 14064-2:2019

GHG Sources: ☒ CO_2 ☐ CH_4 ☐ N_2O ☐ HFCs ☐ PFCs ☐ SF_6

Verification Statement No.: VVB-06/
Vide Report No.: ET-006263

Shruti Kudtarkar,
Manager, Certification Body
TUV SUD South Asia Pvt Ltd
Date: 30/05/2023

TÜV

FILE: IS-GHG-VVB-06 Version:04 Effective: 15-01-2022 1

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TUV-SUD in Process Optimization

Desalting Machine

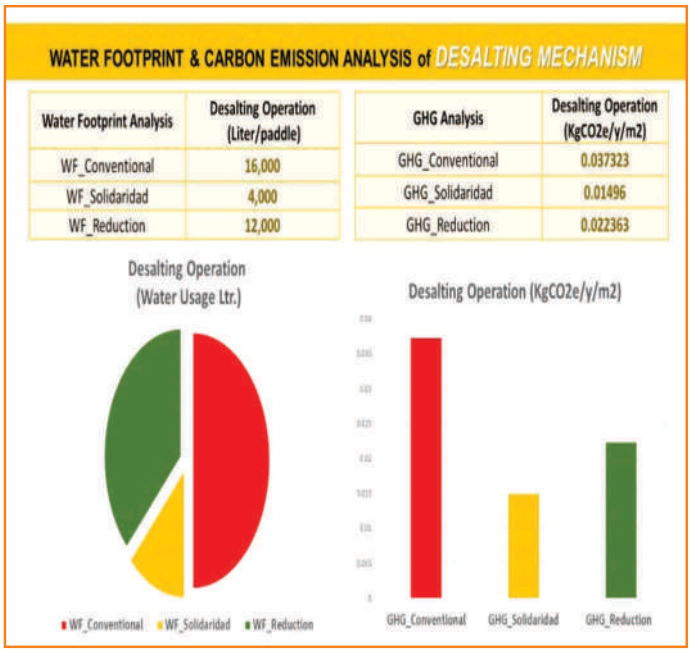
5.76 $tCO_2eq/year$

water Optimization

0.3 $tCO_2eq/year$

weighing Mechanism

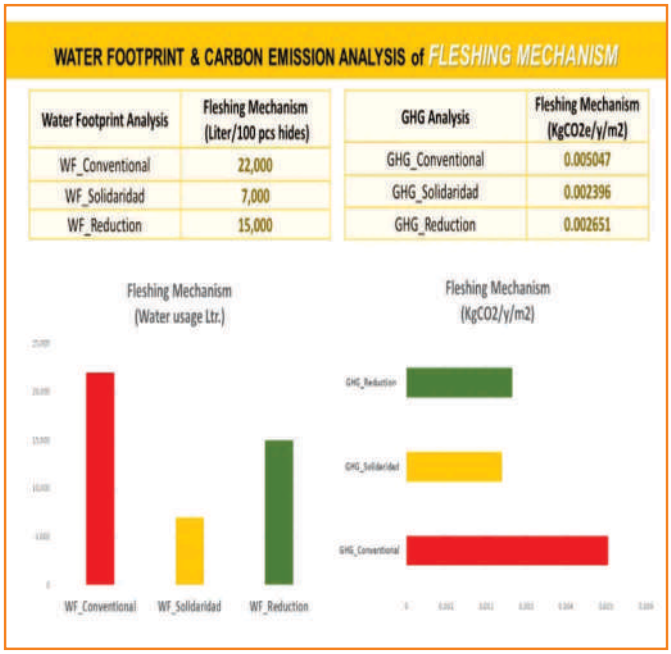
143 $tCO_2eq/year$



WATER FOOTPRINT & CARBON EMISSION ANALYSIS of DESALTING MECHANISM

Water Footprint Analysis	Desalting Operation (Liter/paddle)
WF_Conventional	16,000
WF_Solidaridad	4,000
WF_Reduction	12,000

GHG Analysis	Desalting Operation (KgCO2e/y/m2)
GHG_Conventional	0.037323
GHG_Solidaridad	0.01496
GHG_Reduction	0.022363



WATER FOOTPRINT & CARBON EMISSION ANALYSIS of FLESHING MECHANISM

Water Footprint Analysis	Fleshing Mechanism (Liter/100 pcs hides)
WF_Conventional	22,000
WF_Solidaridad	7,000
WF_Reduction	15,000

GHG Analysis	Fleshing Mechanism (KgCO2e/y/m2)
GHG_Conventional	0.005047
GHG_Solidaridad	0.002396
GHG_Reduction	0.002651

TERI – WATER SUSTAINABILITY AWARD 2023

Water Sustainability Awards 2022-23

Certificate of Best Initiative

Category : Innovation in Water Technology

Presented to

Solidaridad Regional Expertise Centre

for facilitating the

Development and usage of innovative water technologies

towards the achievement of

Sustainable Development Goal on Clean Water and Sanitation

Dr Shresth Tayal
Organizing Secretary, WSA
The Energy and Resources Institute
New Delhi

Dr Vibha Dhawan
Director General
The Energy and Resources Institute
New Delhi

Mr Sanjay Seth
Senior Director
Sustainable Infrastructure Programme
The Energy and Resources Institute
New Delhi

Dr S K Sarkar
Distinguished Fellow
The Energy and Resources Institute
New Delhi

CERTIFICATION ON WATER FOOTPRINT REDUCTION

Government of West Bengal

Government College of Engineering and Leather Technology

Block – LB, Sector – III, Salt Lake, Kolkata – 700098

Phone : +91-33-2335 6977; Fax : +91-33-2335 8353; E-Mail: principal@gcelt.gov.in; URL http://www.gcelt.gov.in

Water Footprint Verification Statement

Statement: WF/SOL/VERF_GCELT

Verification Report No.: GCELT/SOL/2/WF/1/2023

Government College of Engineering of Leather Technology
Certifies that the water footprint assertion reported
by

Solidaridad switchasia GRANTS PROGRAMME

Solidaridad Regional Expertise Centre
158/5, Prince Anwar Shah Road, 1st Floor, Kolkata – 700 045

(a) **The inventory of intervention Water Footprint of Desalting Machine,**
(b) **The inventory of intervention Water Footprint of Solenoid valve & Limit Switch,**
(c) **The inventory of intervention Water Footprint of Enzyme Assisted Dehairing,**
(d) **The inventory of intervention Water Footprint of Accurate Weighing System,**
(e) **The inventory of intervention Water Footprint of Digital Water Flow Meter,**

Has been verified in accordance with The Water Footprint Assessment Manual requirements.

Following activities were conducted during verification;
- Document review
- Interview the beneficiary
- Site Visit
- Recalculation

Based on the information we have received and evaluated, it was verified by Government College of Engineering and Leather Technology that;

- **System boundary:** Base Year: **2021** Application Year: **2022**
- **Inventory period: January'22 – December'22**
- **Total Water Footprint reduction recorded for Desalting Machine: 9.22 ML / Year**
- **Total Water Footprint reduction recorded for Solenoid Valve & Limit Switch: 3.64 ML / Year**
- **Total Water Footprint reduction recorded for Enzyme Assisted Dehairing: 2.31 ML / Year**
- **Total Water Footprint reduction recorded for Accurate Weighing System: 6.72 ML / Year**
- **Total Water Footprint reduction recorded for Digital Water Flow Meter: 9.44 ML / Year**

Govt. College of Engg. & Leather Technology • Dept. of Higher Education •

Mr. Arijit Chakraborty
Validation & Verification Officer
Superintendent
Boot & Shoe Department
Govt. College of Engg. & Leather Technology,
Salt Lake, Kolkata-700106

Dr. Sanjay Chakraborty
Officer – In - Charge GCELT
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Govt. College of Engg. & Leather Technology,
Salt Lake, Kolkata-700106

GHG Avoidance certified by Government

Government of West Bengal

Government College of Engineering and Leather Technology

Block – LB, Sector – III, Salt Lake, Kolkata – 700098

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Verification Statement of Pollutional Parameter

Statement: PP/SOL/VERF_GCELT

Verification Report No.: GCELT/SOL/2/PP/3/2023

Government College of Engineering of Leather Technology
Certifies that the water footprint assertion reported
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Solidaridad switchasia GRANTS PROGRAMME

Solidaridad Regional Expertise Centre
158/5, Prince Anwar Shah Road, 1st Floor, Kolkata – 700 045

(k) **Reduction of Total Dissolved Solids in the soaking float through Desalting machine,**
(l) **Reduction of pollutional load in liming float by Enzyme Assisted Dehairing.**

Has been verified in accordance with The Water Footprint Assessment Manual requirements.
Following activities were conducted during verification;

- Document review
- Interview the beneficiary
- Site Visit
- Recalculation

Based on the information we have received and evaluated, it was verified by Government College of Engineering and Leather Technology that;

Sr. No.	Intervention	Details of Activities	Claims	Statement	Period
1	Desalting Machine	Reduction of Total Dissolved Solid (TDS) in soaking float	TDS reduction 30%-35% in the soaking float	Validated & Verified	2021-2022
		Recovering of Cured Salt	20 gms – 30 gms / sq. ft. of hides/skins recovered	Validated & Verified	2021-2022
2	Enzyme Assisted Dehairing	Reduction of pollutional load in liming float.	✓ TDS = 15% ✓ TSS = 20% ✓ COD = 15% ✓ BOD = 15% ✓ CaO = 25% ✓ Sulphide (S^{-2}) = 98%	Validated & Verified	2021-2022

Govt. College of Engg & Le... Dept. of Higher Edu...

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Academic & Research Institute

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Green House Gas Verification Statement

Statement: GHG/SOL/VERF_GCELT

Verification Report No.: GCELT/SOL/2/GHG/2/2023

Government College of Engineering of Leather Technology
Certifies that the water footprint assertion reported
by

Solidaridad switchasia GRANTS PROGRAMME

Solidaridad Regional Expertise Centre
158/5, Prince Anwar Shah Road, 1st Floor, Kolkata – 700 045

(f) The inventory of intervention Carbon Footprint of Desalting Machine,
(g) The inventory of intervention Carbon Footprint of Solenoid valve & Limit Switch,
(h) The inventory of intervention Carbon Footprint of Enzyme Assisted Dehairing,
(i) The inventory of intervention Carbon Footprint of Accurate Weighing System,
(j) The inventory of intervention Carbon Footprint of Digital Water Flow Meter,

Has been verified in accordance with The Water Footprint Assessment Manual requirements.

Following activities were conducted during verification;
- Document review
- Interview the beneficiary
- Site Visit
- Recalculation

Based on the information we have received and evaluated, it was verified by Government College of Engineering and Leather Technology that;

- **System boundary:** Base Year: **2021** Application Year: **2022**
- **Inventory period:** **January'22 – December'22**
- **Total Carbon Footprint reduction recorded for Desalting Machine:** **5.76 tCO_2eq / Year**
- **Total Carbon Footprint reduction recorded for Solenoid Valve & Limit Switch:** **0.3 tCO_2eq / Year**
- **Total Carbon Footprint reduction recorded for Enzyme Assisted Dehairing:** **17.3 tCO_2eq / Year**
- **Total Carbon Footprint reduction recorded for Accurate Weighing System:** **143 tCO_2eq / Year**
- **Total Carbon Footprint reduction recorded for Digital Water Flow Meter:** **2.66 tCO_2eq / Year**

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Salt Lake, Kolkata-700106

Centre of

A noteworthy achievement in this venture is the inception of the "Center of Sustainability," envisioned by our Managing Director, Mr. Shatadru Chattopadhyay. Backed by the Calcutta Leather Complex Tanners' Association, this 2000 sq. ft. facility functions as an exemplary Sustainable Exhibition Room and a training center aimed at enhancing the skills of technical personnel.

Sustainability (CoS)

It is equipped with environmentally friendly appliances that have demonstrated both efficacy and positive impact on the environment. This establishment stands as a testament to the synergistic collaboration among the Industry Association, Government, and Solidaridad, working towards cultivating a sustainable and responsible leather industry well beyond the project duration.

Tanner's Voice

Solidaridad has shown promising commitment towards Kolkata leather cluster. They have demonstrated water optimizing mechanisms like Solenoid valve, water meter etc. in our tannery and results are very encouraging.

- Prabhas Sadhukhan, Technical Head, Ah Tiam Tannery

Solidaridad has successfully utilized PTP sludge into a very useful product, paver block, which was laid Infront of tannery raw entrance as well as in the parking area. I appreciate Solidaridad's green effort.

- Kamal Ahmad Khan, Managing Director, Dugros Leather (India) Pvt. Ltd

I really appreciate the work, Solidaridad has done in my tannery and the outcome was truly inspiring. We have tested the lime float for better understand and reduction of TDS, TSS and Sulphide was prominent. I am happy with the quality of leather that coming through the Enzyme Assisted Dehairing.

- Azhar Nadeem, Managing Director, M. K. Products

Solidaridad has implemented few water saving interventions like solenoid, weighing system and desalting machine in my tannery. Their efforts and supports to escalate these commercially viable technical interventions helped me to showcase my tannery in global level.

-Asad Ahmad, Chief Executive Officer, N. J. Export

Tanner's Voice

I am very close to Solidaridad people because they have always shown professionalism and informed me about every new technology. Recently, they have demonstrated solid waste utilisation technology where buffing was used to upgrade low selection leather. Thank you so much Solidaridad for introducing us with the globally recognized green technology.

Md. Taher Khurshid, Managing Director, Trident Leather

They have demonstrated the enzyme assisted dehairing in my factory and result was very good. I have sent my leather to buyers and they appreciated the quality and my approach to green practice.

- Shahid Parwez, Managing Director, Aslam Tanning Industries Pvt. Ltd.
Joint Secretory, CLCTA

We appreciate their work specifically the desalting machine, paver blocks and solenoid valve mechanism should be adopted by everyone in the complex of Bantala.

- Imran Ahmad Khan,
General Secretory, Calcutta Leather Complex Tanner's Association

Most of their interventions are cost effective and demonstrated in my tannery on previous year. Through out the year they have supported for understanding the benefits of it. I would like it recommend everyone to try one of their intervention and experience the future of leather industry.

- Haider Ali, Owner, Crescent Tannery

PISIE

CLC TANNERS ASSOCIATION
(We Care for the Environment)

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PARTNERS

switchasia
Funded by the European Union

Council for Leather Exports
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IFLMEA

TATA INTERNATIONAL

Solidaridad

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