

# SRI's Contribution in Swachh Bharat Mission (2014-2024)



**Shriram Institute for Industrial Research (SRI)**

**(A Unit of Shriram Scientific & Industrial Research Foundation)**

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DIRECTOR  
SHRIRAM INSTITUTE FOR INDUSTRIAL RESEARCH**



## **FOREWORD**


The Swachh Bharat Mission (SBM) in India was launched in the year 2014 by the Hon'ble Prime Minister to make the country open defecation free (ODF) by ensuring use of household toilets, especially in rural areas. By 2019, the mission celebrated the construction of over 100 million individual household toilets, declaring more than 6 lakh villages ODF aligning with Target 6.2 of sustainable development goals (SDG). The Swachh Bharat Mission-Urban 2.0 (SBM-U 2.0) has been launched on 1<sup>st</sup> October, 2021, with the overall objective of creating 'Garbage-Free Cities'. This implies that all municipal solid waste (including construction and demolition waste and plastic waste), and liquid waste (including grey and black water) in cities is safely collected, processed and scientifically treated so that no untreated wastewater is discharged into water bodies, and no untreated municipal solid waste is sent to landfills. The Mission also emphasises on imbibing the spirit of a circular economy with a focus on waste to wealth initiatives.

The Shriram Institute for Industrial Research (SRI), Delhi having thrust areas such as Material Sciences, Environmental Sciences, Biological Sciences, Analytical Sciences, Calibration and Radiation, always endeavour to support Government of India to achieve missions of National importance through imparting services in verticals like research, innovation, training & capacity building, quality assurance and certifications. The SRI is also collaborating with various international and national agencies to contribute towards achieving various important goals of national missions through imparting scientific services. In this direction, the SRI has implemented various projects standalone or in cooperation with collaborating partners during 2014 to 2024 to support Government of India for achieving various milestones of Swachh Bharat Mission.

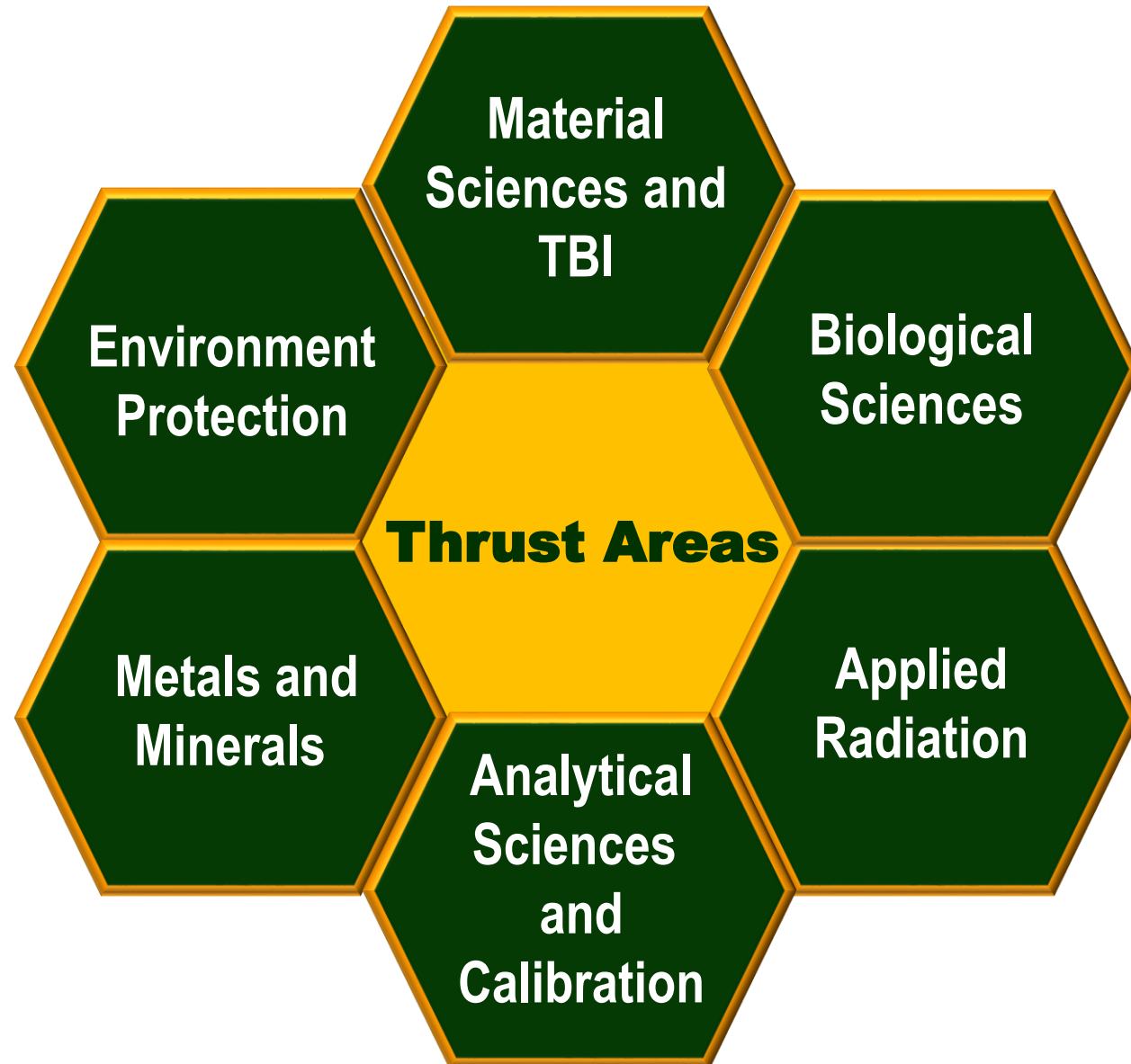
During 2014-18, SRI in collaboration with IVL Swedish Environmental Research Institute, Sweden and Danish Technological Institute (DTI), Denmark to implement EU-India Technical Cooperation on Environment. The major objective of this project was creation of enabling environment to implement cleaner, greener and climate friendly technologies for solid waste management and sewage treatment. During implementation of this project, the capacity building programmes were conducted in the areas of Waste to Energy (Incineration, Gasification & Biogas/ Biomethane); Landfill Mining and Reclamation (LFMR); Sewage Treatment and Sludge Management. These areas have greater synergies with the Swachh Bharat Mission. In partnership with UNICEF India Country Office, the SRI has successfully conducted Assessment of the effectiveness of open defecation free (ODF) system on the incidence of faecal contamination on environment through microbial source tracking. The overall objective of this project was to study the impacts of Swachh Bharat Mission (Grameen).

During last one decade, SRI has conducted training programmes on PAN-India basis to build the capacity of Public Health Engineering Department under the *Jal Jeewan Mission*. SRI team has put-up remarkable research and innovation efforts to develop waste to wealth technologies. Hence, SRI has put-forth extraordinary efforts to impart scientific contribution to achieve various goals of Swachh Bharat Mission. I am confident that SRI's scientists shall leave no stone unturned to pursue many more scientific attributes to support Government of India to achieve various missions of National importance. I take this opportunity to thank various departments of Government of India and all stakeholders for providing opportunities to SRI to impart scientific contributions in achieving various missions.

**09 September 2024**

  
**DR MUKUL DAS**

# SRI's Institutional Capacity



- ❖ SRI Established in 1940 under Society Act; started operations in 1950
- ❖ Objectives : Research, Scientific, Training, Consultancy and Testing Support to Stakeholders

# Strength and Credentials of SRI

## Accreditations

- ◆ NABL as per ISO/IEC: 17025
- ◆ QCI/ NABET EIA consultant

## Certifications

- ◆ QMS as per ISO 9001:2015.
- ◆ EMS as per ISO 14001:2015
- ◆ OHSMS as per ISO 45001:2018
- ◆ Medical Devices - QMS as per ISO: 13485 & ISO: 11137.

## Empanelment

- ◆ Key Resource Centre (KRC) by Ministry of Jal Shakti (2021-24)
- ◆ Swachhta Knowledge Partner (SKP) by Ministry of Housing and Urban Affairs.

## Atomic Energy Regulatory Board (AERB) Compliances/ Authorization

- ◆ Operation of Gamma Radiation processing facility (Category IV)
- ◆ Analysis of Radionuclide (Alpha, Beta and Gamma Particles) content

## Good Laboratory Practices (GLP) Compliance Laboratory





# 2014-18: Implementation of EU-India Technical Cooperation on Environment

**Project Theme:** Sewage Treatment and Solid Waste Management

**Cities:** Delhi and Greater Mumbai

**Objectives:** Creation of enabling environment for implementation of cleaner, greener & climate friendly technologies

**Project Sub-themes**

- ❖ Waste to Energy (Incineration, Gasification & Biogas/ Biomethane)
- ❖ Landfill Mining and Reclamation (LFMR)
- ❖ Sewage Treatment and Sludge Management



**Stakeholders:** MCD; MCGM; MPCB; DPCC; DOE-Delhi; CPCB; MoHUA; MNRE; MoEF&CC; DJB; Public & Private Sectors & NGOs

**Implemented By:** IVL, Sweden, DTI, Denmark & SRI, Delhi

**Deliverables:**

- ❖ Knowledge Products (Technical Reports & E-learning tools)
- ❖ Three Study Tours to Europe
- ❖ Four Technical Training & Three Conferences (Total Audience: 600)



# 2014-18: Knowledge Products of EU-India Technical Cooperation on Environment

- 1) Waste Management Practices in EU and India – Learnings from Study Tours to Europe, June 2016
- 2) Manual on Precautions for Landfill Mining, August, 2016
- 3) Manual for Processing of Recyclable Plastics recovered from Landfill Mining and Reclamation, November-2016
- 4) Landfill Tax, April-2017
- 5) Solid Waste Transfer Stations Fact Sheet, August-2017
- 6) Pay As You Throw, May-2017
- 7) Solid Waste Management in Greater Mumbai, July-2017
- 8) Sewage Treatment in Greater Mumbai, March-2018
- 9) Wastewater Treatment in NCT of Delhi, May-2018
- 10) Solid Waste Management in Delhi, August-2018
- 11) Project Compendium: EU-India Technical Cooperation on Environment Project Compendium (SWM & Sewage Treatment, September-2018)
- 12) EU India Project Newsletters, Volume 1, April-2016; Volume 2, November-2016; Volume 3, August-2017
- 13) India Needs Climate Resilient Urban Development; Urban Updates, 24 January 2017 | [www.urbanupdate.in](http://www.urbanupdate.in)



# 2018-19: SRI - UNICEF Project: Impact of Swachh Bharat Mission

## Assessment of the effectiveness of open defecation free (ODF) system on the incidence of faecal contamination on environment through microbial source tracking

Overall, in terms of faecal contamination from human origin, non-ODF villages were, on average:



**12.7** times  
more likely to have their  
groundwater sources contaminated  
(12.7 times more from contaminants  
traceable to humans alone)



**1.1** times  
more likely to have their  
soil contaminated



**2.16** times  
more likely to have food  
contaminated and 2.48 times  
more likely to have household  
drinking water contaminated

The study findings indicate that these substantial reductions may potentially be attributed to the improvement in sanitation and hygiene practices, as well as supportive systems such as regular monitoring and behaviour change messaging.

Project No. PJ1819/1/443

## Assessment and Characterization of Plastic Waste in NCT of Delhi (July-2020)



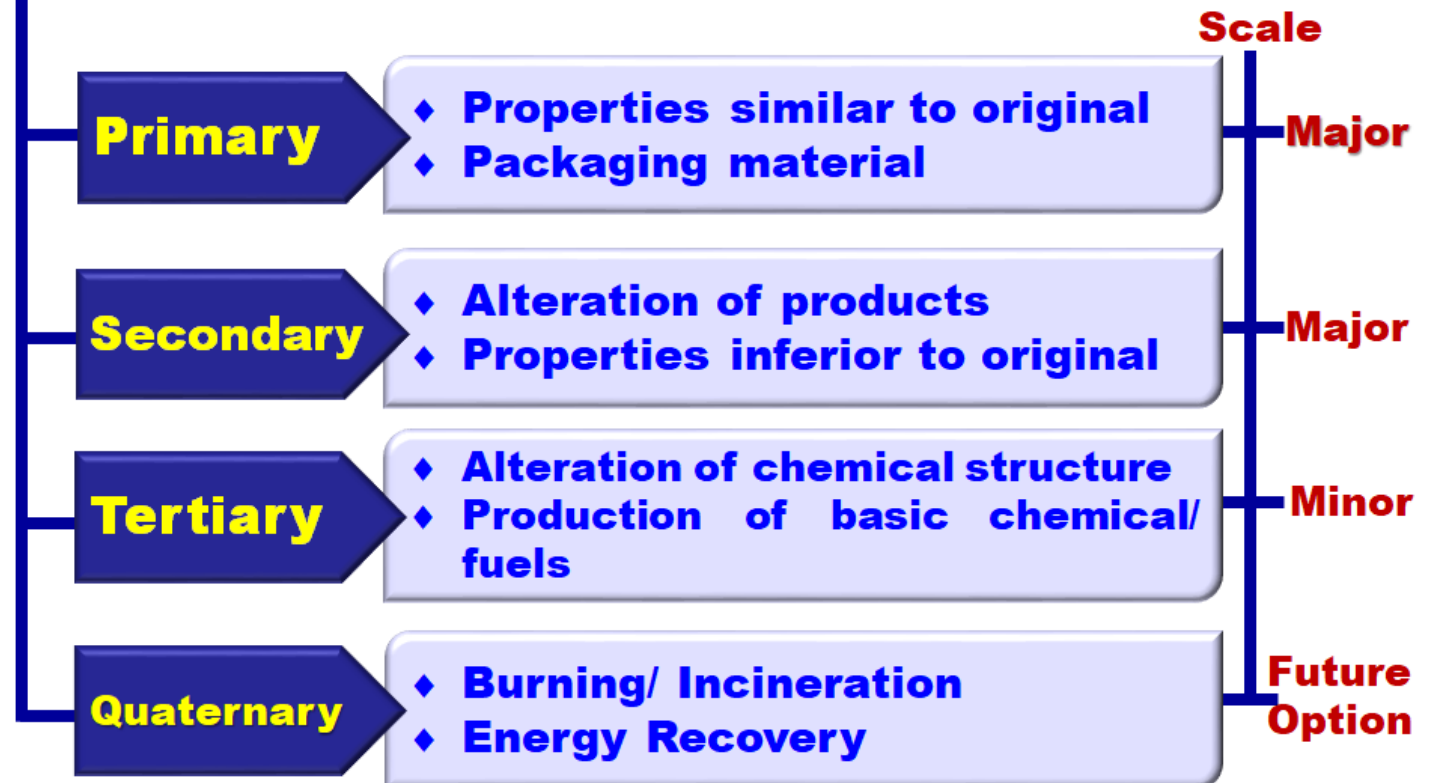
Submitted To

Department of Environment,  
Govt. of NCT of Delhi  
Level 6<sup>th</sup> C-Wing, Delhi Secretariat  
I.P.Estate, New Delhi-110 002



**Shriram Institute for Industrial Research**  
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## Recycling Options for Plastic



**OH&S and Environmental Management Aspects to  
be monitored and improved on continual basis**



# 2022: An Interactive talk conducted at Hindu College on 08 July 2022 on the “Paradigm shift from Single-use plastic”



The session was attended by over 500 students; Students also performed *Nukkad Natak* to sensitize and create awareness to stop the use of Single-use Plastics



# 2022-23: SRI implemented PTB, Germany & National Mission for Clean Ganga project for Training of Pollution Control Board of Uttarakhand & Uttar Pradesh to Strengthen Ganga River Water Quality Monitoring Network



**Contextualization of Training Modules; Training Delivery : Classroom & Field**



# 2021-23: SRI's Delivered 35 training programmes : 10 online and 25 physical (classroom & handholding) to build the capacity of 1200 Public Health Engineers



**Training Themes:** (i) Strengthening Water Quality Monitoring & Surveillance; (ii) Strengthening Water Treatment; (iii) Strengthening Water Testing using Advanced Instruments

**States/ UTs covered:** Assam; Andaman & Nicobar Islands; Andhra Pradesh; Bihar; Chhattisgarh; Gujarat; Haryana; Himachal Pradesh; Jammu & Kashmir; Jharkhand; Kerala; Karnataka; Ladakh; Madhya Pradesh; Maharashtra; Manipur; Mizoram; Nagaland; Odisha; Punjab; Rajasthan; Sikkim; Tripura; Uttar Pradesh; Uttarakhand & West Bengal



# 2014 - 2024: Research and Innovation Projects: Conversion of Waste to Wealth

## Plastic- Bitumen Road



Plastic Waste



HOT MIX PLANT



Laying and compaction



# Process Engineered Fuel



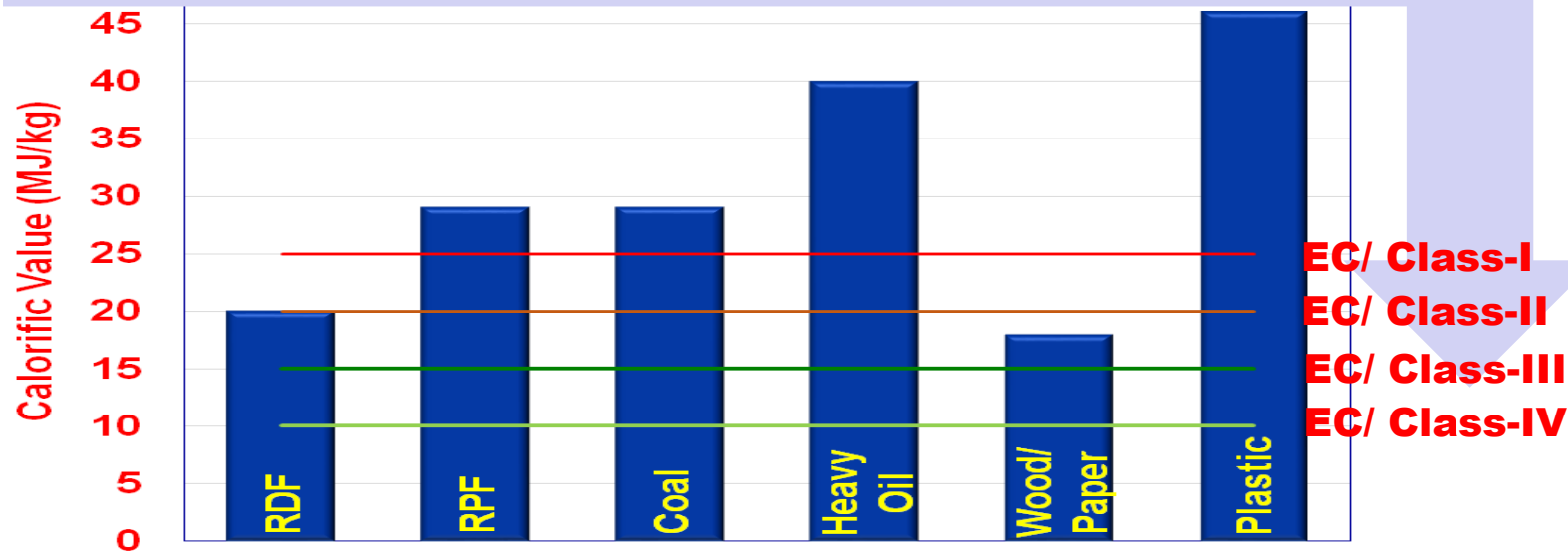
**Plastic Waste**



**Shredding**



**Briquetting**



**Saw Dust + PW**



**Coal + PW**



**Paper + PW**



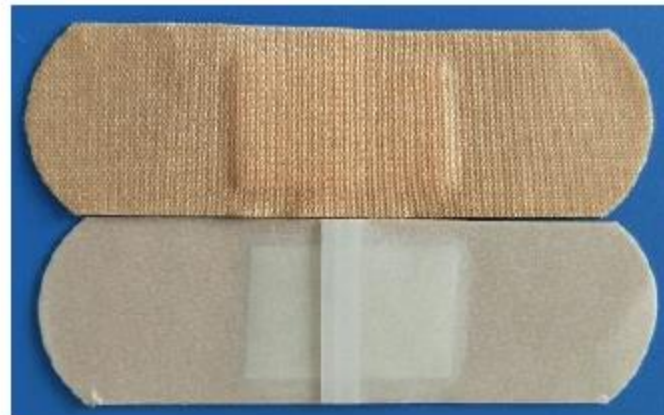
**Biomass + PW**



**Refuse-derived paper & plastic densified fuel (RPF) has much more energy than Refuse Derived Fuel (RDF) or Solid Recovered Fuel (SRF)**



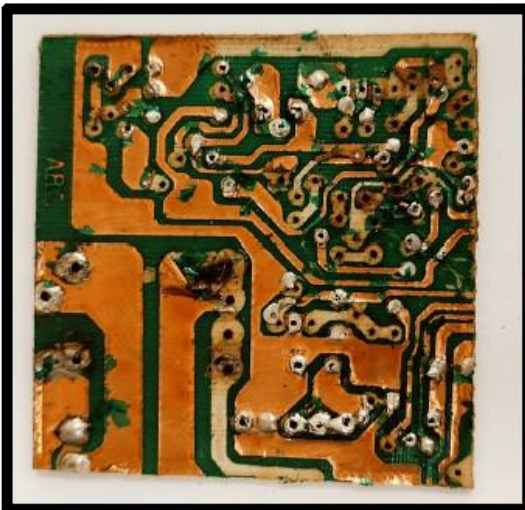
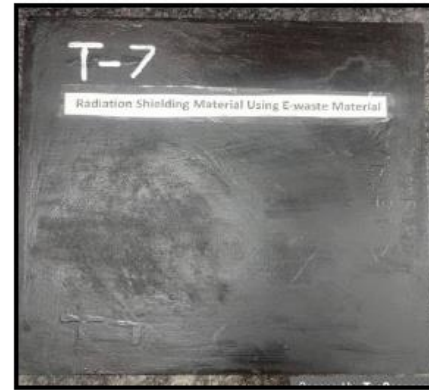
## Bamboo Waste Composite



Hygiene Pads & Wound Dressings using Bamboo Pulp



## Radiation Shielding Material Using Electronic Waste Residue



## Copper Extraction from Waste Printed Circuit

## Wood Polymer Composite from Wood Saw Dust



## Multilayer Sheet from Biscuit Packets Waste





## Agri-residue to Tableware



Metallised multilayer waste packaging to composite



# Recent Outreach Activities (2024)



**Shriram Institute for Indust...** · 20 Jul  
 Dr. Mukul Das, Director SRI, Delhi had chaired the technical session on Science and Technology Education in National Academy of Sciences, India (NASI) programme at Ayodhya, Uttar Pradesh on July 19, 2024



Dr. Runumi Gogoi, Scientist from Shriram Insitute for Industrial Research, Delhi awarded iPhone by AIPMA & CPMA jointly organized a Global Conclave on Plastic Recycling and Sustainability held on 4th -7th July, 2024 at Pragati Maidan, New Delhi



Dr Vivek Narayan Singh, HoD Environment Division had delivered a lecture in a seminar organised at Amity University, Noida on World Water Day 2024.



**Shriram Institute for Indus...** · 22 Mar  
 Shriram Institute for Industrial Research, Delhi organized a lecture on the occasion of World Water Day by Dr. Anil Kumar, Former Director, Department of Environment, NCT of Delhi.



**prs ASIA** Plastics Recycling Show Asia  
 454 followers  
 1w · Edited ·

We are delighted to announce **Dr Jagdish Kumar** of **Shriram Institute For Industrial Research** as Featured Speaker at Plastics Recycling Show Asia, Singapore, 13-14 November. To view programme and register for free attendance: <https://loom.ly/BGktffs> #PRASia2024

Topic: **Challenges and opportunities of plastic waste management with special reference to study conducted in the National Capital Territory of Delhi.**



Shriram Institute for Industrial Research, Delhi had organized two days workshop on the theme of water and soil quality in Moradabad District on 22-23 August 2024 at DMR Hospital Hall, Civil Lines, Moradabad, Uttar Pradesh.



# SRI's Global Outreach



- ❖ India-European Union Technical Cooperation for Environment
- ❖ Indo-German Cooperation on Ganga Water
- ❖ Cooperation with European Shellac Association
- ❖ Participated in 5 Indian Scientific Expedition to Antarctica
- ❖ EIA/EMP Studies in Qatar, Bhutan and Nepal
- ❖ Cooperation with Sri Lanka on Quality Control of Tea
- ❖ Research, Training and Capacity Building Programmes
  - Trinidad and Tobago
  - ASEAN Countries
  - African Countries
  - European Countries (Sweden, Denmark, Germany, England & Spain)
  - Vietnam
  - Afghanistan
  - Iraq
  - Gulf Countries (Kuwait, Qatar, UAE)

**SRI is an active member of “World Association of Industrial and Technological Research Organizations (WAITRO)”**



## **SRI is committed to support stakeholders through**

- ❖ **Research & Innovation,**
- ❖ **Training & Capacity Building,**
- ❖ **Consultancy Services**
- ❖ **Quality Assurance and Product Certification**

**Thanks**