Background

Pure Earth has been working in India for over 15 years, addressing public health issues stemming from chemical and heavy metal pollutants, especially lead. Of the 500 toxic sites we have assessed, more than 80% were contaminated with heavy metals, and the majority were locations of substandard lead acid battery recycling operations.¹

Pure Earth has a multi-faceted program addressing childhood lead poisoning, which entails the following components:

1. **Two state-wide programs: Bihar and Tamil Nadu.** Bihar is India’s poorest state and has a significant presence of unsafe battery recycling and adulterated spices, making it an important state in which to invest in solutions. Tamil Nadu ranks in the top three states with lead poisoned children. Pure Earth is working with these states to establish a framework of policies and state-wide programs endorsed by the national and state pollution control boards to reduce lead poisoning from a variety of sources and build demand for replication. To that end, Pure Earth will work with state and local officials to:
   a. assess the extent and sources of lead exposures;
   b. upgrade battery recycling practices and phase out informal/illega"ULAB recycling;
   c. assess supply chains of spices and other food products and cookware;
   d. build capacity to remediate high-risk sites that are contaminated with lead; and
   e. implement policies and monitoring systems to ensure lead-free practices.

2. Development of **policy recommendations** with the national government including the revision of India’s Battery Management/Handling Rules and facilitating their enforcement;

3. A **public education campaign** to help families protect young children and to spur additional action on pollution.

This short **ULAB explainer video** produced by USAID, a key funding partner, features Karmalichak where Pure Earth launched its work to address lead poisoning in India.

¹https://www.contaminatedsites.org/
State of Bihar

Pure Earth India began working in the state of Bihar in 2017, by identifying and assessing lead-contaminated sites in Patna. In 2018, Pure Earth selected a site in the community of Karmalichak for a pilot cleanup.

Pilot Cleanup Project in Karmalichak
Karmalichak is a very poor, suburban neighborhood of 2,000 residents, where a single informal battery manufacturer closed his shop in 2016. Approximately 5 meters from the closed battery shop is an elementary school; all 250 school children were at-risk of dangerous lead exposure. In collaboration with local partner, Institute of Environment & Eco Development (IEED), the Mayor, the Bihar State Pollution Control Board, community leaders, and the public at large, the remediation of the lead-contaminated common community spaces and roads, the community education campaign, training of families and the cleanup of home and school interiors were all completed by September 2018.

The project was well-received by local stakeholders, demonstrated by strong participation in trainings and education events. However, the pre- and post-intervention blood-lead tests did not decline as much as we expected -- typically 45-70% within 12 months of remediation. The children with average BLLs > 55 µg/dL who lived right next to the site reduced by 60%, but the children residing further away with average BLLs of 25 µg/dL did not decline, suggesting that there are additional sources of lead exposure in the community.

Lead Exposure and Source Identification Study
To that end, Pure Earth conducted the country’s first source identification study to better understand which sources of lead (e.g., improper battery recycling, spices, cosmetics, drinking water, etc.) are contributing to elevated blood-lead levels and to what extent.

This study was carried out in February 2020 with a consortium of partners including local development and health organizations, the Bihar State Pollution Control Board, and the Indian National Centre for Disease Control.
A total of 136 children under age 6 were selected from random households in an area located near substandard/informal battery recycling operations and two control areas considered not to be impacted by such operations. The main components of the study were:

- an assessment of potential lead sources in each participating child’s household, including soil, spices, paint, toys, and cookware, drinking water and yard soil.
- a questionnaire, including the child’s diet, use of kohl or traditional medicines, and potential take-home exposures from their parents’ work environment; and
- a blood lead sample.

Key Findings

- Approximately 85% of the children had blood lead levels above 5 ug/dL and approximately 65% had levels above 10 ug/dL.
- The prevalence of elevated blood lead levels in both the control and exposed areas indicates the presence of other significant contributing sources of lead aside from ULAB activities.
- Common cooking spices including turmeric had significant levels of lead.
- More research is needed to determine how and to what extent lead is entering into the spice supply chain.

This pilot source study provided critical data that impacts future work in Bihar. Lead exposure resulting from spices requires different interventions and policies than unsafe battery recycling. The study also demonstrated the need for more research in spice supply chains as well as additional source studies, as there could be variation within Bihar state.

Research on Adulterated Turmeric

In response to the findings from the Patna source study, Pure Earth, in partnership with Stanford University and local researchers, conducted a screening for adulterated turmeric in major cities in India. Further investigation of turmeric supply chain dynamics in Bihar will be carried out when feasible given the current COVID restrictions. Pure Earth is currently seeking funds to conduct this work, which can ramp up as the pandemic subsides.

Relocating Informal Recyclers

Pure Earth’s Bihar-based partner, IEED, has significant experience helping groups of micro-scale, informal businesses form “clusters” and apply for state funding to secure land and equipment to formalize their operations as a unified medium-scale business.
IEED has been engaged to assist 65 recyclers in forming and registering as a cluster. The next phase would be to submit a formal 5-year action plan to the local authorities that will include setting up a safe, common battery processing facility and training members in marketing strategies.

**State of Tamil Nadu**

**Pilot Cleanup in Rangapurum**

Pure Earth and the International Lead Association inspected a registered lead smelter near Vellore, in close proximity to 54 homes and a childcare center and school with 50 children under 5 years old. Unsafe practices were exposing the workers and community with soil lead levels documented as 12 times higher than the US EPA standard. Recommendations were given to the owner and local Pollution Control Board.

In 2018, Pure Earth re-tested community lead levels and shared the results with the Tamil Nadu Pollution Control Board that the smelter continued to contaminate the community and that funding from the Trafigura Foundation had been secured to cleanup the school and residences. The TNPCB conducted another inspection, which resulted in the shutting down of the smelter until upgrades were instituted. The smelter owner decided to invest in the re-development of the property, fund the required remediation onsite, improve the drainage system which impacts community areas, and become part of the solution.

A local engineering firm has been selected to carry out the remediation activities, which will be carried out when feasible due to the disruption and restrictions caused by COVID-19.

![One of Rangapurum's lead-contaminated houses, which will be cleaned](image)

**Lead Exposure and Source Identification Study**

Similar to Bihar, a broader assessment of the potential sources of lead in this state needs to be conducted to inform additional intervention strategies as well as regional and national advocacy and awareness campaigns. Furthermore, state officials have requested training in monitoring and best practices.
Policy and Advocacy Work

In November 2017, Pure Earth presented its findings from *The Lancet Commission on Pollution and Health* at the International Conference of the Public Health Foundation of India in New Delhi. It was well-received by the government as well as academia. So much so that Pure Earth India was invited by the National Institution for Transforming India (NITI Aayog) to present, and lead pollution specifically was recognized as a very serious child health issue that needed to be a top priority. The meeting concluded with Niti Aayog tasking the Ministries of Environment and Health to draft a national program around lead poisoning.

Further, India’s draft updated Battery Waste Management Rules, endorsed by Pure Earth and the International Lead Association, constitute an effective and comprehensive regulatory framework for the closed loop management of ULABs and other batteries. However, the informal recycling sector, functions outside of the regulatory control gamut and benefits from lower overhead and no compliance costs, compared with formal sector recyclers.

Over the past two years, groundwork has been laid by NITI Aayog, Central Pollution Control Board, Ministry of Environment, Forest and Climate Change (MoEF&CC), and the India Lead Zinc Development Association (ILDZA) to address this issue. Pure Earth India will convene key national and state stakeholders and international experts to analyze potential market solutions, such as removing or reducing the payment of 18% Goods and Services Tax (GST) when purchasing used lead acid batteries, and develop, test, and implement tailored solutions for India.

Furthermore, the outcomes resulting from the lead source studies (described above) and lead reduction activities underway in the states of Bihar and Tamil Nadu strengthen the case for the government to prioritize and support the appropriate interventions and policies needed to reduce lead exposures impacting children and families.

Future Plans

In July 2020, Pure Earth, UNICEF and Clarios Foundation, the world’s largest car battery manufacturer, joined forces to launch a global lead initiative, Protecting Every Child’s Potential (PECP). PECP addresses the public health crisis of massive lead poisoning with pragmatic steps to reduce lead exposures. This public-private initiative’s goal is to collectively mobilize international action to prevent lead exposure from unsound lead-acid battery manufacturing and recycling, and other sources.
In addition to global advocacy and education activities, the initiative scales up lead prevention and mitigation programs in Bangladesh, Indonesia, Ghana, Georgia and Mexico, and plans to add two more countries in 2021.

With India accounting for 30% of the world’s lead poisoned children, it is a top priority country to include in PECP and expand upon Pure Earth’s efforts already underway in the country.

Funding is being sought to support a suite of policy, capacity-building and pollution reduction activities in the states of Bihar and Tamil Nadu, which will help eliminate the most widespread lead-contaminating practices, improve the supply chains of all industries that use lead acid batteries and serve as a model for national replication. They will also establish in-country expertise to manage the corporate frameworks necessary for toxic exposures broadly. Most importantly, these efforts will protect the health and environment of millions of children now and for generations to come.