EngineeringX

Founded by the Royal Academy of Engineering
and Lloyd's Register Foundation

Building inclusive systems: a learning resource

Practical Action

Royal Academy of Engineering

Foundation

BUILDING INCLUSIVE SYSTEMS

Thematic learning resource

THE CHALLENGE

Open burning of waste, responsible for around 11% of global carbon emissions, accelerates climate change and contributes to serious respiratory, dermatological, and developmental health issues. It is largely a symptom of inadequate waste management systems, leaving many communities with no option but to burn their waste. Other drivers include low awareness of health risks and misconception about the benefits of pest control or resource recovery. The practice deepens existing inequalities and disproportionately harms the most vulnerable, including informal waste workers, women, children, and people living in or near dumpsites. Despite these impacts, waste management is often deprioritised in national, municipal and city budgets and received only an estimated 0.41% of overseas development finance between 2003 and 2021.

In 2022, Engineering X launched the first global grant scheme dedicated to addressing the open burning of waste. The projects successfully raised awareness, collected and shared critical data and information, delivered initiatives that generated tangible community-level impact and brought national and international stakeholders together.

Sam Barker, LR Foundation Impact Review, 2022

THE GRANT PROJECTS

Improving human health and livelihood through reducing open burning waste in Senegal

Project lead: Practical Action Consulting Ltd (West Africa)

Baseline Study- Itogon Municipal Waste Open Burning Practices and Compliance

Project lead: The Adventist Development and Relief Agency Foundation

THE THEME

The open burning of waste disproportionally affects the most vulnerable members of society. Women often bear responsibility for managing household waste and are therefore exposed to higher levels of toxic fumes. Informal waste workers face similar risks, largely because poverty and job scarcity force them into unsafe work where protective equipment is rarely available. People with no other option but to live near unregulated open dumpsites are also routinely exposed to harmful toxins, which can lead to serious long-term health effects. The open burning of waste often results from broken or inaccessible waste management services, so building an inclusive system that involves all members of the community is essential for long-term sustainability. Including marginalised groups in data collection, communication, advocacy, and policy assures they are part of the solution. Under the theme building inclusive systems, projects confronted the challenges and needs of society's most disadvantaged groups.

PROJECT LEARNINGS AND INSIGHTS

Building inclusive systems requires the meaningful participation of all members of society. While this can be challenging, **working closely with the communities being served is essential** because they will ultimately own and implement solutions. For example, a project operating in remote and hard-to-reach areas of the Philippines was committed to full inclusion and invested significant effort in collecting data on open burning in the farthest and most inaccessible barangays, small territorial and administrative districts that represent the most local level of government. After collecting and analysing the data, the team returned to every barangay to present their findings. The community accepted the results because it reflected their

Sam Barker, LR Foundation Impact Review, 2022

BUILDING INCLUSIVE SYSTEMS
Thematic learning resource

reality and were able to co-create the solutions. This inclusive approach proved effective: the data strengthened local efforts, prompted legislators to commit to improving solid waste policies, improved enforcement of open burning regulations, and is now informing metropolitan and congressional efforts to integrate the findings into future environmental policy discussions.

Multi-actor engagement is also central for creating change and building inclusive systems because complex, systemic problems, such as the open burning of waste, require collective solutions that no single entity could deliver on its own. A major learning for a project in Senegal was that **inclusivity drives adoption and solutions only work when they are co-created with communities.** For example, the project team built an inclusive system by engaging a wide range of actors, from national entities to informal reclaimers. Community participation was also key to this approach: reclaimers received training in an early warning system, while women and households were supported in adopting alternative waste practices. Through collaborative workshops, the project team also co-designed practical solutions focused on recycling, biogas alternatives, and improved public awareness.

The solutions were not imposed on the community; they were developed with the community. By listening to residents in even the most remote barangays, we were able to build trust, validate the findings, and identify practical actions that people were willing to support.

- Geraldina Gutierrez, ADRA Philippines

KEY LEARNINGS

- Building inclusive systems requires the meaningful participation of all members of society and working closely with the communities being served is essential
- Multi-actor engagement is central for creating change and building inclusive systems for complex challenges such as the open burning of waste.
- Inclusivity drives adoption and solutions only work when they are co-created with communities.
- Inclusive systems promote local ownership, thereby strengthening the sustainability of interventions, while also mitigating the disproportionate adverse impacts experienced by women and vulnerable waste workers.

SOURCES:

This impact case study was prepared using information from interviews with the project team, documents supplied by the Academy including reports, and additional online resources.

Learn more about the Engineering X Safer End of Engineered Life programme and our work: engineeringx.raeng.org.uk/programmes/safer-end-of-engineered-life


Practical Action

Engineering X is a growing collaboration founded by the Royal Academy of Engineering and Lloyd's Register Foundation.

Royal Academy of Engineering
Prince Philip House, 3 Carlton House Terrace, London SW1Y 5DG
For more information: https://engineeringx.raeng.org.uk/seel