

Engineering X

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

Community-level behaviour
change: a learning resource



Sam Barker, LR Foundation Impact Review, 2022

COMMUNITY-LEVEL BEHAVIOUR CHANGE

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 perceived benefits such as 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.



Dandora Dumpsite, 2023

THE GRANT PROJECTS

Clean School Operation

Project lead: Gbobètô

Mitigating Waste Burning and Dumping in the Indian Himalayan Region

Project lead: Waste Warriors

Establishing data and markets for waste as an alternative to the open burning of waste in Ulaanbaatar

Project lead: JCS International

THE THEME

The open burning of waste is largely a community-level practice, often used as a decentralised, low-cost, and immediate solution when formal waste management systems are inadequate or non-existent. In areas without regular or reliable waste collection, households and neighbourhoods frequently resort to burning to manage accumulating waste. Local authorities sometimes ban the practice, but municipalities often lack the capacity to enforce such regulations. The daily routines of waste disposal are also deeply embedded community behaviour. Therefore, solutions to end the open burning of waste must address community behaviours, needs, and practices. New waste-management systems should work closely with communities to understand how people interact with waste,

as well as their perceptions, routines, and cultural beliefs. Practical solutions, such as enhanced waste-collection services, must be accompanied by behaviour-change campaigns to ensure long-term adoption. Under the theme community-level behaviour change, the projects found practical solutions to influence the learnt behaviour of open burning and strengthen positive practices to reduce waste burning and mitigate its negative impacts.

PROJECT LEARNINGS AND INSIGHTS

Interventions that are simple, practical, accessible, and relevant to daily life proved to be effective to change community-level behavior. A project in Porto-Novo, Benin working in schools, found that a **holistic, co-designed approach was essential. Simple solutions where the community feels valued and appreciated for their participation are often the most effective.**



COMMUNITY-LEVEL BEHAVIOUR CHANGE

Thematic case study

A community-centered model, rather than top-down, was crucial to achieving long-lasting behavioural change.

For example, co-designing a waste-management contest with teaching staff proved highly effective. Regular check-ins and collaboration allowed staff to highlight that a playful or reward-based element was crucial for participation and the project's success. The project team also provided schools with practical tools such as garbage rooms and waste bins as a first step toward intervention. Once these systems were in place, the team was able to successfully embed behavioural change within the community. Catering staff, who generate significant amounts of waste, along with designated ambassadors, were trained in proper waste disposal practices and how to promote and enforce no burn policies. The



local schoolchildren were able to reach the broader community by disseminating this knowledge within their homes and neighbourhoods, extending the impact of the intervention beyond the school grounds. **As a result, 48 tonnes of waste was collected as opposed to the 2.5 tonnes collected in 2024.**

I was really excited to see how some of the ideas we'd discussed with the local community in Mongolia around giving waste a value and a purpose translated into something tangible.

- Ben Withers, WSP

Rural communities come with a different set of challenges. Accessing these communities is difficult due to long distances and harsh terrain. Unlike urban areas with perhaps limited sanitation services, rural communities often lack waste collection altogether, leaving communities to manage waste entirely on their own. For example, a project in the rural Indian Himalayan Region used creative tools, such as thematic wall murals, signboards, and a language-free animated film to influence behaviour across diverse dialects. However, they found that **meaningful behaviour change can take longer than a year.** While raising awareness did help, people still lacked viable alternatives. **Communication without systemic solutions can leave people frustrated.** Communities view burning waste as a practical solution because it quickly and efficiently reduces rubbish and is more convenient than landfills, which produce strong odours, attracts pests, and generates methane emissions. A major challenge for achieving lasting behaviour change was shifting



the community's perception that open burning is a "good" or appropriate way to manage waste. Some projects found it effective to **reframe how waste is understood.** For example, emphasising that waste, particularly organic waste, can be a valuable resource for composting, or linking open burning to broader issues such as forest fires. Another project in Ulaanbaatar, Mongolia repurposed tyres into earth-retaining walls for composting and found alternative ways for the community to safely practice cultural burning rituals. Both interventions provided a practical alternative to burning and shaped how waste is understood at the community level.

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KEY LEARNINGS

- Holistic, co-designed approaches with the communities are essential to achieve long-lasting behavioural change.
- Simple solutions are often the most effective, and communities must feel valued and appreciated for their participation.
- A community-centered model, rather than top-down, is crucial.
- Meaningful behaviour change takes time.
- Communication without viable solutions can leave people frustrated.
- Reframing waste as a valuable resource drives positive change.
- Behavioural change takes time and requires continuous efforts with reflection on what is and is not working.

“This Open Burning Project has reduced waste that people bring to the landfill”

- The Executive of Betel NGO, Ganbaa, lead partner

SOURCES:

These key learnings were 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.

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