Supporting refugees with clean cooking fuel in humanitarian crises

Cooking fuel is rarely provided to refugees in crisis situations. In Cox's Bazar, Bangladesh, 92% of Rohingya refugees and host communities rely on firewood,[1] leading to severe deforestation, increased landslide risks and high levels of indoor air pollution. Although previous studies in other countries have examined the benefits of clean cooking fuels, research specific to refugee populations was lacking. The Safe Access to Fuel and Energy Plus (SAFE+) programme and a separate UNHCR programme distributed liquified petroleum gas (LPG) to refugees. They faced funding challenges, highlighting the need for evidence to support policies that ensure refugees have access to cooking fuel, preferably clean cooking fuel, in Cox's Bazar and other settings.

This study, conducted between 2019 and 2022 by Stanford University, the University of Berkeley, California, the International Centre for Diarrhoeal Disease Research, Bangladesh, International Organization for Migration (IOM) and United Nations High Commission for Refugees (UNHCR), evaluated the impact of LPG provision to Rohingya refugees on health, safety and the environment. Tracking 1,200 households, researchers assessed stove use, air quality and fuel-related violence. Findings improved programme design and positioned LPG distribution for potential carbon credit financing. The research has attracted global interest, shaping future humanitarian energy policies.

Title: Human and environmental health costs and benefits of firewood versus clean fossil fuel used by forcibly displaced Myanmar nationals and host communities in Bangladesh

Location: Bangladesh

Study type: Mixed-methods observational study

IMPACTS

- Findings improved programme design in Cox's Bazar
- Informed policy conversations on carbon credit financing
- Attracted global interest, potentially shaping future humanitarian energy policies

LESSONS LEARNT

- Consistent personal engagement with key stakeholders
- Concise, engaging multimedia communications materials suited target audiences

[1] UNDP, 2018. Impacts of the Rohingya Refugee Influx on Host Communities. https://reliefweb.int/report/bangladesh/impacts-rohingya-refugee-influx-host-communities

BACKGROUND

Cooking fuel, unlike shelter and food, is not typically provided to refugees by humanitarian organisations during a crisis. In Bangladesh, 92% of both Rohingya refugees and host communities in Cox's Bazar, which is home to the world's largest refugee camp, rely on firewood for cooking. This has serious environmental and health consequences, including severe deforestation and increased risk of landslides, and respiratory diseases from indoor air pollution. Refugees also allocate a significant portion of their income on fuel.

Previous studies in Guatemala, Peru, India and Rwanda have examined the impact of providing cooking fuel to communities, but none specifically focused on refugee populations or linked outcomes to social, health and environmental benefits. Some evidence suggested that providing LPG could improve health and environmental conditions, but existing research was outdated and limited.

The SAFE+ programme, implemented by IOM, the Food and Agriculture Organization and World Food Programme, is an intervention providing LPG to refugees in Bangladesh, but it was struggling to maintain attention and funding.

THE STUDY

This mixed-methods observational study assessed the impact of providing LPG for cooking to Rohingya refugees and the resulting reduction in firewood use. It examined effects on health and wellbeing, household economics, security concerns, environmental pressures and disaster risks. The study aimed to generate evidence to support policy change – advocating for LPG funding in both existing and future crises – and to contribute to the scaling-up of clean energy distribution.

Before the study, the Government of Bangladesh, in collaboration with UN agencies and NGOs, had started to provide 195,000 refugee households with one LPG stove, a cylinder, and regular refills (about once a month, depending on family size) via the SAFE+ programme and a separate UNHCR LPG programme. The study surveyed 600 households that had been using LPG for 12 months (comparison group) and 600 households that had not yet started using LPG but were soon to receive it (intervention group). Of these, 437 from the comparison group and 494 from the intervention group responded to all three survey rounds and were therefore included in the study findings. Stove use and air quality were monitored in 202 households. Rohingya community members were also interviewed about their experiences of domestic and inter-group harassment and violence related to cooking fuel collection and use. Data were collected at 0, 12 and 22 months after baseline.

By evaluating the SAFE+ programme and LPG distribution in Cox's Bazar, the study aimed to provide actionable insights for scaling-up clean energy initiatives in humanitarian settings.

FINDINGS

The study found that providing LPG for cooking to Rohingya refugees significantly reduced reliance on firewood, replacing 4.3 kg of firewood with 0.34 kg of LPG per day. Over the three-year period covered by the SAFE+ programme and UNHCR LPG programme, LPG distribution prevented the extraction of an estimated 330,600 tons of firewood and avoided 407,000 tons of CO_2 emissions. It also eliminated the burning of plastic for fuel, which previously occurred in 40% of households. Improved air quality led to an estimated prevention of 2,309 adult and 385 child deaths over five years.

Households using LPG experienced increased spending on food, a lower risk of depression among female caregivers, and reduced domestic and inter-group violence. These findings suggest that long-term LPG provision could be a cost-effective strategy to enhance food security, health and safety for refugees while protecting the environment, easing tensions with host communities, and advancing global sustainable development goals on clean energy.

Prior to liquefied petroleum gas distribution, a Rohingya boy walks home from the forest with firewood. Credit: Laura H Kwong

COMMUNICATIONS AND ENGAGEMENT

The study was designed to fill evidence gaps and drive policy change by highlighting the multisectoral benefits of LPG. Its independence from UN agencies strengthened its credibility, making it a neutral resource that all stakeholders could support. This positioning helped secure buy-in from partners and demonstrated to donors how their funding could have broad socioeconomic impacts on refugee wellbeing.

A proactive dissemination strategy ensured strong research uptake, focusing on policy impact and engagement with humanitarian stakeholders. Early involvement of donors, local authorities and humanitarian actors helped to sustain interest and build trust. Regular updates through cluster meetings, one-on-one engagements and workshops kept stakeholders informed. This approach made donors more receptive to findings and facilitated outreach to embassies and private sector partners, many of whom are now SAFE+2 (the follow-up programme to SAFE+) donors.

At the global level, the research team presented at international virtual events to share findings with a wider audience. Key partners, including IOM and UNHCR, helped amplify the study's reach within their networks. Though the global-level impact is still nascent, active networking and engagement ensured strong buy-in and support. A dissemination opportunity tracker recorded stakeholder interactions, and a strategy is in place to maintain engagement and explore next steps, including further discussions on carbon credit financing.

To maximise impact, the research team created accessible outputs, including a policy brief and a multilingual short documentary. The policy brief provided a concise summary of key findings, making it easier for decision-makers to engage with the research. The documentary, available in five languages, used storytelling to highlight LPG's benefits and amplify local voices. Viewed 300–400 times since October 2023, it earned an honourable mention in a global health documentary competition, helping broaden the study's reach and influence.

> ***"I was very intentional about having this be policy relevant from the start and I wanted to make sure that the findings were going to be useful to somebody who cared."*** **– Dr Kwong, co-principal investigator**

UPTAKE AND IMPACT

The study generated valuable evidence to inform decision-making on the provision of LPG for both humanitarian agencies in Cox's Bazar, Bangladesh, and global actors working on energy and environment issues in crisis settings. Insights went beyond energy consumption, indoor air pollution and deforestation, to understand broader changes to food security and reducing refugee-host conflict and domestic violence. It introduced pioneering data on intimate partner violence, social cohesion and mental health, leading to improved safety measures such as gender-specific distribution lines and doorstep deliveries for people with disabilities. The study also helped establish baseline indicators and targets for future programmes, which were integrated into SAFE2+ reporting and donor engagement initiatives.

Findings demonstrated to donors the multisectoral value of their funding for cooking fuel in crisis settings. LPG distribution is very expensive, and with overlapping crises and changing donor priorities, the study played an important role in mobilising donor's support to the SAFE2+ programme, including by securing continued commitment from donors from Canada, Sweden and Norway. An estimated one million people indirectly benefited from the study via support to the SAFE+2 programme as a result of the findings.

Carbon credits are being explored as a way to sustainably finance future SAFE programmes, with this study providing supporting evidence to inform ongoing conversations by policymakers. The study attracted interest from key global decision-makers, including UNHCR, IOM, USAID and other UN agencies exploring innovative financing mechanisms for humanitarian energy initiatives.

> ***"There was not a lot of understanding how [carbon credit] actually works [...] [The research] really has expanded from simple research on just the LPG, to more of a discussion on what other funding modalities would be there, and what would be possible to do and how to do it."*** **– SAFE2+ stakeholder**

LESSONS LEARNT

Consistent personal engagement with key stakeholders

The research teams engaged local authorities and humanitarian actors regularly during the project cycle through technical working groups, clusters and via one-on-one meetings to update stakeholders and maintain relationships (especially important during periods of staff turnover). This provided consistent touchpoints for the team to explain the purpose of the research, its implementation and its results. This also enabled the team to tailor policy communications to the priority issues and questions arising.

Concise, engaging communications materials suited target audiences

The production of a short and visually engaging policy brief and documentary video proved accessible and useful for donor and implementer audiences in the study setting, particularly since they were produced in several languages spoken locally. This was especially useful in the dissemination and engagement activities because some academic publications were delayed.

PARTNERS

International Centre for Diarrhoeal Disease Research, Bangladesh (icddr,b); International Organization for Migration (IOM); Stanford University; United Nations High Commission for Refugees (UNHCR)

ABOUT ELRHA

Elrha is a global organisation that finds solutions to complex humanitarian problems through research and innovation. This study was funded by Elrha's Research for Health in Humanitarian Crises (R2HC) Programme which aims to improve health outcomes by strengthening the evidence base for public health interventions in humanitarian crises.

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R2HC captures detailed case studies through a process that triangulates and validates evidence on uptake and impact. The case study methodology and full version of this summary case study are available on request.

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