



Fuel-efficient mud stoves in Darfur, Sudan

Support for widespread adoption of fuel-efficient mud stoves to strengthen resilience to conflict in protracted crises

→ Context

The protracted conflict since 2003 in Darfur, Sudan has resulted in massive loss of human lives and assets, disrupted livelihoods and led to severe food insecurity in some areas. As of December 2015, more than 2.6 million people are currently displaced in Darfur – approximately 42 percent of the total population. Internally displaced persons (IDP) and their host communities have limited livelihood options and often rely on unsustainable coping strategies, such as unmanaged cutting of trees and shrubs for fuelwood and charcoal production. This places an additional burden on Darfur's fragile ecosystem and related livelihoods. Since 1990, the Food and Agriculture Organization of the United Nations (FAO) has provided support with a number of partners on the production and use of fuel-efficient mud stoves to address these challenges in Darfur.

→ Challenges

Access to and availability of fuelwood has become a highly contentious issue, with implications for human and environmental security due to:

- heavy burden for women and girls who have to venture far from their home and travel up to 13 km three times a week to harvest the necessary fuelwood;
- exposure of women and girls to sexual and gender-based violence (SGBV) while collecting fuelwood;
- increased conflict over scarce forest and tree resources;
- unsustainable exploitation of forest resources;
- the high cost of fuelwood and charcoal on the markets especially when used inefficiently; and
- health and safety risks associated with cooking on traditional three-stone fires which can generate toxic smokes and fires.

→ Methodological approach

The following steps are included in this approach:

- selecting beneficiaries for practical and theoretical training, targeting women and involving women leaders among IDPs and host communities;
- awareness-raising on the need to reduce wood cutting, so as to conserve forests and protect the environment;
- disseminating the message that fuel-efficient mud stoves reduce fuelwood consumption per meal and curb smoke emissions from using open fires inside dwellings; and
- improving current practices through a combination of theoretical training, practical demonstrations, group work, individual stove production with local and low-cost materials and training on stove maintenance.



Key facts

Location → All five states of the Greater Darfur Region in Sudan, with a specific focus on El Fasher (North Darfur) and Geneina (West Darfur) for training.

Target group → Women, traditionally responsible for cooking and fuelwood collection, among IDPs and host communities.

Gender → Women are disproportionately affected by reduced access to fuelwood, as they are traditionally responsible for collecting fuelwood and cooking. FES technology can reduce the exposure of women and girls to SGBV associated with fuelwood collection. This strengthens synergies with humanitarian protection priorities for women and girls. FES technology also eases women's work burden and empowers women economically by giving them skills in manufacturing stoves for sale.

Nutrition → FES are key to addressing nutrition and food security of displaced populations and host communities in Darfur. Traditional stoves consume significant wood energy, an overexploited and diminishing resource for the poor. Restricted access to fuelwood means families cannot have a diversified diet and risk eating undercooked food. They also rely on less nutritious foods that do not require cooking or may skip meals.



What is a fuel-efficient stove and how does it contribute to increasing resilient livelihoods?

Fuel-efficient stoves (FES) can be made of mud, clay or metal, and can use different types of fuels, such as fuelwood, charcoal, briquettes, biofuels, liquefied petroleum gas or kerosene. They provide a substitute for the traditional three-stone fire and are specifically designed to reduce fuel consumption. As such, FES adoption and use can make an important contribution to strengthen the resilience of livelihoods in refugee and IDP camps and their host communities, but also in other areas with high population density and scarce natural resources.

→ Impacts

Enhanced livelihoods and improved environmental protection:

- FES technology reduces exposure of women and girls to sexual and gender-based violence (SGBV) because they have to collect fuelwood less often;
- women and children's health is better protected from the smoke emissions of traditional stoves;
- containment of cooking fires reduces safety risks linked to the commonly used three-stone fires;
- FES saves up to 60 percent of fuelwood traditionally consumed by the three-stone fire which reduces workload for women and burden on forest resources; and
- when FES production is accompanied by tree planting, vegetation cover is improved.

FES responds to the humanitarian protection needs of women and girls by reducing exposure to SGBV as they collect fuelwood less often

→ Sustainability

The viability of the practice is ensured by the following:

- together with other partners, FAO's support on the production and use of FES has been in place for more than 15 years, since 1990;
- FES have been successfully adopted by 74 percent of the population of South Darfur and 95 percent of the population of West Darfur and training continues to be delivered by partners and local trainers;
- the life span of the improved mud stove is longer and estimated at between 6 and 36 months;
- beneficiaries are trained to produce FES using easily accessible, low-cost local materials and training includes guidance on stove maintenance;
- trainees are taught how to make stoves in different locations, according to needs and climate conditions; and
- The use of FES allows women to dedicate more time to child care and other productive tasks as well as to generate additional income through selling of stoves.

FAO's support on the production and use of FES has been in place for more than 15 years, since 1990

→ Replicability and upscaling

FES training and production can be replicated and upscaled in situations of crisis and disaster involving displaced persons, temporary settlements (camps, etc.) and their host communities. Replicability can be further ensured through these recommendations:

- pursue awareness-raising among decision-makers and communities on benefits of FES;
- clarify the link between household energy consumption, impacts on surrounding forests and environment and the need for rational use of available resources to meet the demand of both the current population and future generations;
- provide flexible stove designs that can be adjusted to local conditions based on consultations with community stakeholders, especially women, who are the main users;
- create a core training team of trainers (if possible, within the community) to monitor, report and share the results with stakeholders and researchers;
- in each location, establish and maintain a reference team that communities can consult on FES.

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Safe Access to Fuel and Energy (SAFE)

FAO is carrying out resilience building activities under the SAFE initiative in many different countries, mainly in Africa and Asia. SAFE addresses the multi-sectoral challenges linked to collection, production and use of fuel in crisis settings. SAFE partnership activities include the provision and/or local production of fuel-efficient stoves, sustainable natural resource management for the supply of fuel and promotion of alternative, less fuelwood-dependent livelihood activities.



→ More information

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- Conflict and forest resources in Darfur: www.fao.org/3/a-i4447e/i4447e07.pdf
- Ensuring safe access to energy for all (p.4-5): www.fao.org/3/a-i4964e.pdf
- SAFE webinar series: <https://tinyurl.com/SAFE-webinars>

On resilience good practices:

- KORE@fao.org
- www.fao.org/in-action/kore/good-practices/en/

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