

Tea in the Sahel

Clean cooking for Chad's
refugee settlements



Cooking in refugee camps of the Sahel

Access to clean cooking remains a neglected aspect of humanitarian response in displacement settings, largely due to the limited capacity of agencies responding to crises, lack of dedicated funding and the focus on short term needs. Rather than being linked to food assistance programming, cooking interventions often come as an afterthought and with insufficient scope, leading to negative environmental, health, security and socio-economic impacts. This intervention focuses on three refugee camps (Touloum, Milé and Kounoungou) and three towns (Iriba, Guereda, and Amdjarass) in the provinces of Wadi Fira and Ennedi Est in eastern Chad.

Chad is located in the highly vulnerable Sahel region suffering from overlapping ongoing conflicts. The displaced refugee population is the 10th largest in the world, largely hosted in camps. The area is also vulnerable to climate change which has led to a shift in rain patterns, increased frequency of droughts, and desertification. These phenomena have significant impacts on agricultural practices that support local livelihoods. Scarcity of resources and poverty result in tensions arising over limited natural resources, exacerbated by the arrival of refugees.

Chad is one of the poorest countries in the world, with high levels of malnutrition and low GDP (US\$ 1.79 per capita). Access to energy in Chad remains low, with only 3% of the population using clean cooking technologies.



Opposite page:

Chad, Touloum refugee camp. Aché Ahmed Koiké uses wood and charcoal as fuel in her kitchen, where she cooks meals she sells to other refugees to support her family



Listening, learning, understanding

Cooking solutions are highly context-dependent and are intimately linked to people's culture, preferences, habits and convenience, as well as to the local availability and affordability of fuels and appliances. A desk review was conducted to gain a thorough understanding of opportunities for the region, mapping ongoing and past activities, government policies and strategies. This was complemented by an energy needs assessment and market scoping to identify end users' needs and wants, potential solutions, and suppliers already present in the country. Findings from the survey conducted in 2021 showed that most households cook on a Banco stove (raised bundt shaped mud constructions) or three stone fires, with very few using Liquid Petroleum Gas. Restaurants on the other hand were more likely to use LPG stoves, but also Banco ovens, and occasionally electric kettles and microwaves. The most common fuel is firewood at 98% followed by charcoal and LPG. **Firewood is primarily collected (61%) but as many as 43% of respondents purchase it** from retailers at the market within camps or villages.

A range of cooking solutions (LPG, electric, solar cookers, improved biomass cookstoves and biogas/biofuel stoves) were considered and evaluated against criteria designed to ensure successful uptake. Basic requirements were defined as **acceptable** (either familiar to the end user or very convenient to use, also in terms of fuel), **usable** (reasonable learning curve, fitting with local cooking needs), **available** (already offered on the market or ready to be introduced to the market as well as the availability of materials to manufacture solutions and the ability to procure fuel) and **affordable** (sold at the right price level - a combination of willingness to pay and good cost-benefit ratio).

Opposite page: Chad, Milé refugee camp. WFP partners conducting an assessment to identify refugees' needs. The documents in this photo have been blurred

Ideally beneficiaries would always be offered a range of options to choose from, rather than having one imposed on them. The household survey highlighted a preference for cooking solutions that enabled quick and consistent cooking, at a low cost, and with little supervision. While no single cooking solution analyzed resulted was identified as ideal for the context of Chad, most of them were suitable to be part of a fuel stacking mix, including firewood.

Improved biomass stoves were unpopular among interviewees and the use of biomass is also discouraged in Chad's national energy strategy. Low availability of animal manure and water and cultural bias against using excrement to cook made **biogas stoves** unsuited. Despite being cheap to buy and operate, **solar thermal cookers** were not favoured due to their long cooking times, the inability to cover for all cooking needs and for forcing cooks to operate under the sun and heat. Electric stoves such as the **ECOCA**, which comes with its own solar panel, were discarded because of the high cost and lack of after-sale services. **Electric Pressure Cookers (EPCs)** are commercially available in most countries at a cost that enables a reasonable payback period and would be ideal if the national grid reached the area or a Photovoltaic solar mini-grid was to be built.

Factoring in the indirect costs of fuel collection, particularly time loss, **the most promising cooking solutions appeared to be LPG and solar or grid powered EPCs**. Both options align well with the national strategies to address environmental degradation, health impacts, gender inequality and conflicts over resources. The option that most interviewees aspired to was solar electric cookers although the technology is not well known. Despite the very low purchasing power of end users and limited technical know-how, **nearly all respondents declared they were willing to pay a small amount to access clean cooking technologies**.



Opposite page:

Chad, Milé refugee camp. Faiza Abdallah Tiki shows the stove she fuels with twigs and small branches. Behind her and on her left are Banco stoves for which she collects firewood



Delivering LPG to end users ...

Liquefied Petroleum Gas kits were distributed to 5,388 households and 38 enterprises such as restaurant and street food vendors, both in camps and host communities. Commercial activities are large firewood consumers and play an important role in showcasing and promoting technology adoption to the wider community. Two kiosks for selling and refilling gas cylinders were established to ensure supply in camps, while towns were already served by commercial distributors from the oil and gas industry. A direct link between LPG retailers and end users is important to prevent repair and maintenance issues threatening long term sustainability. Targeting different user segments was important to foster systemic change, as communities are made of both service receivers (individuals and households) as well as service providers (the vendors but also the restaurants) and the two sides must work well together to build a sustainably functional system.

Raising awareness of the product's benefits and **training on appropriate usage** was key to address skepticism and avoid misuse or damage. Including host communities in the project, as they often face energy access challenges similar to those of displaced populations, was also essential not to exacerbate tensions.

Opposite page: Chad, Touloum refugee camp. Project beneficiaries are trained in the safe operation of LPG kits before distribution

... sustainably

Camps have existed in eastern Chad since 2005 and over time refugees have started to turn their housing into semi-permanent settlements. The role of handouts to tackle energy access needs over the long term and at scale is limited. This intervention therefore injected incentives for households and enterprises to address the up-front cost barrier and promote adoption of LPG kits (comprising of a burner, a stand and full gas cylinder) that were provided in-kind. However, beneficiaries were then expected to refill the cylinders at their own expense. End users' participation in paying for energy services is important to ensure relevance and ownership. Protracted donations can instead distort or prevent the development of markets and consequently the opportunity for the energy service to become self-sustaining. A further step could be to also address the upfront cost barrier through suited payment systems such as pay-as-you-go, micro-finance and lease-to-own. To ensure inclusiveness for the most vulnerable, these schemes can always be complemented with WFP vouchers/incentives.



Opposite page:

Chad, Iriba city. LPG cylinders stored inside the shop of a gas retailer who supplies local households and restaurants

How did it go? Was LPG adopted?



A total of 832 surveys were conducted among 766 households, 61 enterprises (small restaurants), and 5 LPG vendors randomly selected among all beneficiaries.

Every single household (HH) and enterprise (EN) reported using the gas kit when they first received it and over 95% were still using it at the time of the interview, four months later. Over 60% were cooking exclusively with LPG, whilst the rest used it in combination with other stoves. Only 19 households out of 766 discontinued its use: 3 had issues with repair, 9 with affordability and 7 with refilling, but no-one said that they did not like the gas kit or were not able to use it. On the contrary virtually every respondent found the technology easy to use perhaps also thanks to the training received. A small part of respondents (about 20%) thought the technology could be dangerous and less than 20% were concerned about affordability. Only 21 HHs out of 766 and 4 enterprises out of 61 reported problems with the kit, which the majority solved by taking it to the recharge station. This shows that the link between end users and suppliers was successfully built by the intervention as intended.

The most valued attributes of gas cooking were the speed, ease of use and absence of smoke.

Almost 80% of end users had already refilled the cylinder by the time the survey was carried out, as on average it lasted 20 days. Most people purchased gas using cash in kiosks at the camps or in town. However, **people had difficulties refilling the cylinder** and sometimes reported vendors not filling bottles fully. Because of these issues, and despite high prices and collection time for firewood, the majority thought firewood was easiest to access. All five vendors surveyed mentioned gas prices being on the rise due to security concerns, lack of gas in the country, lack of transportation means and even lack of cylinders.

Opposite page: Chad, Kounougou refugee camp. Nadifa Ibrahim received an LPG kit through another humanitarian project several years ago and she has used it ever since, paying for gas when she runs out

Cooking Habits

Stove stacking, or the practice of using several stove types in one household, is a very common practice and the only cooking solution that is often used in isolation is the three stone fire. In western households cooking appliances range from gas burners and ovens to the myriads of electric appliances available on the market (e.g. kettles, rice cookers etc). Stacking occurred in this intervention too, where 35% (HH) and 25% (EN) were most commonly combining LPG with three stone fires, followed by traditional or improved stoves burning firewood or, to a much lesser extent, charcoal. Among these users, the majority used LPG for about half of their cooking. The survey confirms that the expenditure on firewood decreased after the introduction of the LPG kit for both households and enterprises practicing stove stacking, confirming that LPG is often used in combination.

Surveys found that households prepare diverse dishes with a variety of ingredients, ranging from legumes (beans, lentils), vegetables (okra), cereals (rice, wheat, maize, millet), peanuts, meat (camel, beef, chicken), milk, tea, coffee. Common dishes include soups, porridge, sauces and stews. Dishes that take about one hour or less to cook are most commonly prepared with gas, however firewood is preferred for meals that take longer, indicating that gas might be perceived as more expensive or that the burden of lighting a fire with biomass is not worth the effort for the quicker dishes.



Opposite page: Chad, Kounougou refugee camp. Nahla Oumar Abakar feeds her daughter while having breakfast with her neighbors and children in her kitchen. Next to her is the Banco stove she just used



What changes has LPG brought?

Costs: The reported cost of gas cylinders varied substantially between locations, being about US\$ 4 for the 6kg bottle in bigger town centres and US\$ 4.8-5.6 in camps, reaching up to US\$ 6.4 in times of scarcity.

The vast majority of households (83%) and enterprises (94%) thought that the gas kit was saving them money. A rough calculation considering the cost of a LPG cylinder and its duration as reported by households, indicated a weekly spending ranging from US\$ 0.3 to US\$ 1.5 (according to the prices reported by enterprises or vendors respectively), which results in **savings from US\$ 4.4 to US\$ 5.6 when compared with the expenditure of households on firewood prior to the introduction of LPG.**

Time: Significant time savings were reported by households and enterprises both in terms of fuel collection and cooking times. Further time is saved as pots, utensils and clothes are not stained by charcoal and do not smell of smoke.

Health: Similarly, almost 80% of households and 72% of enterprises reported having much less indoor smoke since receiving the LPG kit, which can be assumed to result in better health in the medium to long term.

Opposite page: Chad, Touloum refugee camp. Abderahim Idries ran away from Darfur to Lybia, where he learnt to cook. When war broke out there, he escaped to Chad where he has settled and runs his restaurant

Sustainability: Evidence from the evaluation shows promising trends, including LPG's ability to replace biomass, retain local diets and menus, save valuable time for households, and improve indoor air quality. The connection between clients and vendors to provide repair and maintenance, an important factor to ensure continuity, has been established. End users went to vendors to solve issues with their kits. All vendors except one said they were providing training and instructions on how to safely use the gas burner, all of them sold spare parts and checked the valve when refilling.

However, only one out of five suppliers offered repair services. In addition, supply seems to be a significant hurdle to overcome as all vendors reported having difficulties with rising gas prices and gaps in delivery from their own supplier.

Through a conservative estimate it has been calculated that this intervention has shifted the cooking of between 65'000 - 100'000 meals a day, from firewood to LPG, making them cheaper, safer, healthier, less time consuming, and less harmful to the environment.

Further expansion of modern cooking solutions in Eastern Chad could aim at addressing these challenges and ideally broaden the focus exploring other modern cooking alternatives to LPG such as electric cooking.



Opposite page: Chad, Iriba city. Djiwairiya Chaibo cooks at home using the three-stone method. Later she will take it to the market to sell. She doesn't cook on location because she can't afford to pay for a stall



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Cover photo: Chad, Kounougou refugee camp. Nahla Oumar Abakar offering tea she made on a Banco wood-fuelled oven in her kitchen.