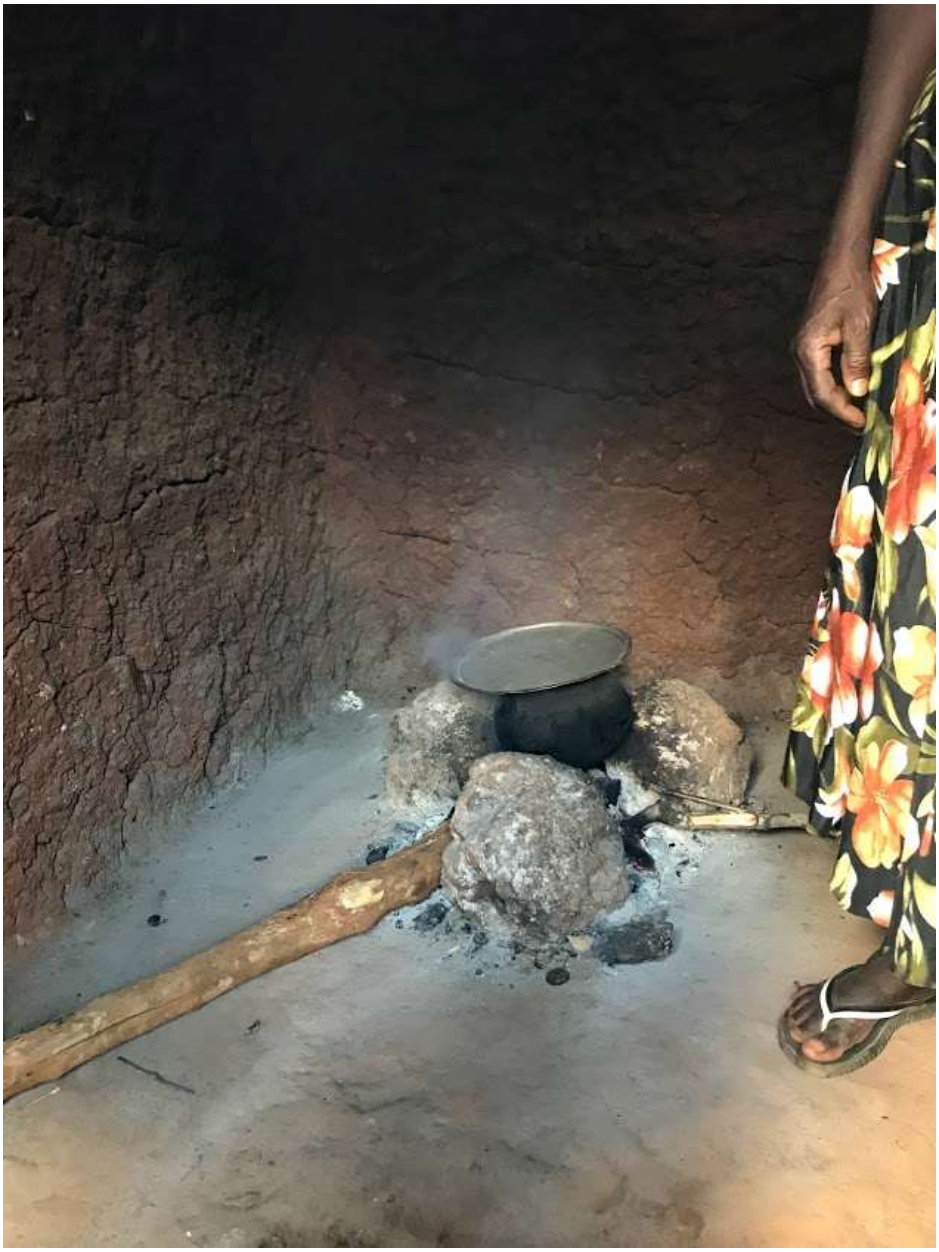

Calibrating cooking for refugee camps and surrounding host communities in Kigoma, Tanzania

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Contents

Executive summary

Cooking activities, deforestation and sexual and gender-based violence (SGBV) are dynamics that closely interact in displacement settings across the globe. Indeed, most refugees and asylum seekers – referred to as persons of concern (POCs) for the purpose of this study – rely on woodfuel to cook food that is usually sourced from areas surrounding their camps. The time and distance to harvest the woodfuel is frequently measured in hours per week and the work is gruelling. This labour typically falls on the shoulders of women and girls, which leaves them open to protection risks such as violence and rape as they source wood outside of the camps for long periods. Harvesting woodfuel can also contribute to deforestation as camps are usually densely packed, which leads to unsustainable harvesting from surrounding forest areas. However, there is no simple interplay between these dynamics and no simple solution for POCs or the communities that host them.

Like other contexts, simply distributing fuel to POCs in camps in Tanzania may not alleviate these problems. The inherent complex nature of fulfilling cooking needs, deforestation and SGBV requires a comprehensive, multi-sector and adaptive approach that enables agencies to understand the community needs, preferences and challenges and develop plans that can ensure intended impact is achieved.

Tanzania has a long history of solidarity with POCs as cycles of violence and instability have ebbed and flowed in the region. This support, built on Tanzania's aim for population growth to fuel economic growth in vast rural areas, began shifting as domestic and regional politics and attitudes hardened towards refugees in the 1990s.

Most refugees and asylum seekers in Tanzania live in three camps in Kigoma. Nyarugusu Camp started in 1996 to shelter thousands of refugees fleeing violence in the Democratic Republic of Congo. In 2015, Burundians fleeing violence arrived into Tanzania. Nyarugusu Camp overflowed past capacity and the government opened two other camps, Nduta and Mtendeli, to accommodate the thousands of additional Burundian families seeking shelter. This influx stressed infrastructure and resources in the region while bringing opportunities for local communities near the camps – also referred to as host communities. Indeed, the camps and host communities have symbiotic relationships of sorts. While grievances exist, such as the camps being built on previously fertile land owned by communities, they have synergies in trade, livelihoods and culture. Indeed, the common markets, now closed, allowed both to interact to mutual socioeconomic benefit.

POCs face considerable restrictions, and economic limitations are imposed on the camps, which means that many POCs seek income-generating opportunities outside the camps. Though POCs and host communities have similar livelihood activities, recent changes in the political climate leave POCs more vulnerable to abuse, especially as they seek economic opportunities and woodfuel outside the perceived safety of the camps.

The office of the United Nations High Commissioner for Refugees (UNHCR) distributes food and non-food items, but POCs must source their own cooking fuel. As happens globally, the majority of POCs source woodfuel from the surrounding areas. Recent consignments of food from the World Food Progamme (WFP) have incurred especially long cooking times of eight hours and more. POCs turn to negative coping mechanisms such as skipping meals and eating raw food to compensate for longer cooking times and issues inherent in the collection of woodfuel. Those who are unable to source woodfuel from outside the camps must barter, buy or are sexually exploited for access to fuel within the camps.

Many entrepreneurs in host communities rely on unsustainable charcoal production to generate essential revenue. Like POCs, host communities report the increasing distances and times travelled to collect woodfuel due to lack of it in close proximity. However, the distance and time taken to harvest wood for host communities is far less than those of POCs. Although some host communities have access to improved cookstoves, it is still common for these households to use three-stone fires to supplement cooking. There is little quantitative data available on host communities, which is an essential gap that must be filled for better understanding the context and use of woodfuel. Additionally, host communities are mostly not linked to interventions from humanitarian actors but do receive some support for more development-focused projects. Linking humanitarian and development approaches will be essential to ensure that POCs and host communities alike feel tangible benefits.

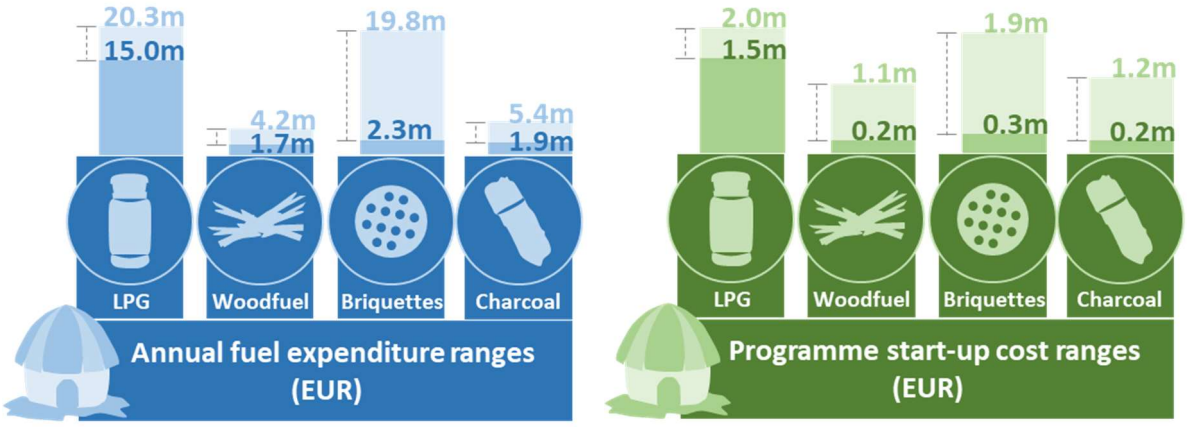
There is evidence that deforestation is significant since the influx of 2015. While woodfuel harvesting is contributing to deforestation, other important factors such as intensifying agricultural activities and land clearance for cattle grazing are also heavily contributing. It is unknown how much each contributes to deforestation. For example, evidence shows that some intensified agricultural activities could be attributable to farmers growing food to sell and trade with POCs. Pastoralists and farmers are also migrating from other areas of Tanzania such as Shinyanga and are clearing land in the Kigoma region. Overall, however, there is not enough data to understand the contributions and scale of these activities towards deforestation.

It is not enough to merely intervene with an energy solution and expect deforestation or SGBV to cease. Indeed, an energy intervention that reflects SGBV mitigation best practices and a forestry programme that is as comprehensive as possible will do much to help alleviate the complicated issues affecting POCs and host communities.

Given the political and economic limitations on POCs in the camps, coupled with restrictions on programme implementation, partnering with the private sector to build a market for energy services and products is probably not currently possible. The only option under the current conditions seems to be bulk procurement and distribution to POCs – which in itself may involve the private sector as service provider but not as a direct market builder. Based on information gathered during IIED's visit, several assumptions underpin any distribution scenarios:

- A percentage of POCs will continue to harvest woodfuel regardless of the type of fuel distributed in the camps
- A percentage of POCs will sell or barter any cooking fuel or mobile stove distributed by aid agencies, and
- Deforestation will continue regardless of energy interventions.

The figure below outlines some basic scenarios around annual fuel costs and start-up programme costs. Since liquid petroleum gas (LPG) programme costs are prohibitively high and POCs are restricted from using sustainable charcoal, the only viable options are sustainable woodfuel and briquettes. Most POCs already use woodfuel and a small programme of distribution exists for people with special needs. These points could be leveraged into a scaled distribution programme across the three camps. Briquettes would require additional costs such as stoves needing to be adapted to hold briquettes and awareness raising on how to use them. They may also not address POC taste preferences, which could limit uptake. To support sustainable development, host communities would benefit from the recommended forestry programme (see below), rather than receiving the same distribution of fuels as the POCs.



Annual fuel expenditure and upfront start-up costs (maximum and minimum estimates)

Overall, more data and information on energy consumption in the camps will inform a well-designed energy intervention and is the first step towards alleviating some of these issues in the camps. Interventions should be done with SGBV protection considerations, such as consultations with community members (especially women), food and non-food distribution in safe locations and at safe times and inclusive of those with special needs who may require transportation or additional assistance.

More collaborative energy programming is needed to meet the diverse needs of different target groups in local communities and camps – where energy is an enabler for needs across other sectors. Improving buy-in to proposed solutions is also essential and local stakeholders should be strongly included as part of designing and implementing solutions. Other external issues (such as climate-related migrations within Tanzania and outbreaks of the Ebola virus within the region, among others) should be watched carefully, as these types of trends could rapidly push families, once again, towards seeking refuge within Tanzania's relatively stable borders – disrupting activities and overwhelming projects and services.

Any intervention must include adaptive management to ensure that shifting dynamics and drivers are integrated into ongoing implementation. Adapted from the IIED/Catholic Agency For Overseas Development (CAFOD) Energy Delivery Models work, below are some core steps that an energy intervention should follow:

1. **Enhance baseline knowledge:** Quality data with clear methodologies must be gathered on energy use and energy expenditures in camps and host communities. This information can inform scenarios and solutions.
2. **Engage and convene:** Cooking and energy should be incorporated into wider development planning. Partners across sectors must work more closely together and with local government. POCs and local communities, especially vulnerable segments such as women and girls, must be central to design.
3. **Establish understanding:** Engage with POCs and host communities to understand priorities and needs from their own perspectives to be inputted into programme design. Priorities of other relevant stakeholders, such as local government's very legitimate concerns on deforestation, must be understood if buy-in is to be created.
4. **Design and test:** Different solution-delivery models should be defined and mapped. Different cooking combinations could be presented and fed back into the design. Using the data from Steps 1–3, more detailed modelling can support programme design.

5. **Optimise and review:** Before going forward with a proposed solution, assess and plan for economic, social and environmental risks – including risks of conflict, changing policies and changing external circumstances. Ensure that the proposed solution is perceived as sustainable and support services.
6. **Manage implementation:** Implementation should be managed in a transparent manner with robust monitoring, evaluation and learning strategies. Reflection points could allow for revisiting intended impacts and reinvigorate stakeholder buy-in.

In addition, a comprehensive land and forestry management programme must be put in place to ensure that remaining forests are protected, and that deforested land is rejuvenated. This programme would benefit host communities with additional skills, jobs, income, and so on. This will require better data on the causes of deforestation to ensure that any solution addresses these root causes. If such a programme includes woodfuel plantations, providing woodfuel through distribution in the intervening years would be a logical conclusion.

The programme would require strong coordination and collaboration across government, partners, and sectors to avoid a 'projectised' approach, which can limit synergies. Stakeholder engagement must be deep enough to establish understanding and buy-in but also practical. Additional engagement and supporting activities are required. For example, the common markets, sanctioned areas that allowed POCs and host communities to trade with each other and interact, provided great socio-economic benefits for many in the region. But these markets are now closed. Both POCs and host communities desire them to be reopened, and this would require close discussions with the government that highlight the trade and economic benefits to Kigoma as a whole.

1 Objectives and approach

1.1 Objectives

To inform options and solutions, Irish Aid at the request of UNHCR tasked IIED to map and analyse projects and parameters related to cooking, household energy needs and any links to protection issues in the complex dynamics of three refugee camps with refugees and asylum seekers from the Democratic Republic of Congo and Burundi and the surrounding host communities in Kigoma, Tanzania.

This exploratory research aggregates inputs from key individuals and organisations to identify some possible solution scenarios and recommendations for next steps.

The objectives of this study are to:

1. **Explore context and evidence** around projects and parameters related to cooking fuel and household energy needs in the Kigoma area.
2. **Review of cooking fuel solutions with recommendations** appropriate for POCs and host communities in Kigoma, with a focus on addressing environmental and social challenges.

1.2 Approach

1.2.1 Methodology

IIED initially conducted a literature review in humanitarian contexts looking at energy needs, environmental issues, sexual and gender-based violence (SGBV) and the linkages between them, both globally and in Tanzania. IIED conducted semi-structured key informant interviews (KIIs) with practitioners and experts who have worked or are working in Kigoma to understand the challenges, opportunities and lessons from past and ongoing energy-focused initiatives.

In May 2019, IIED conducted fieldwork in the two largest camps (Nyarugusu and Nduta) and two villages (Kumahasha and Nyarugusu) in the host communities: one day per camp and one day per village for a total of four days. IIED split the schedule between focus group discussions (FGDs) that separately targeted men, women and adolescent girls, as well as observational walks through a cross section of the camps and the village as guided by the United Nations High Commission for Refugees (UNHCR), Danish Refugee Council (DRC) and their non-governmental organisation (NGO) partners Relief to Development Society (REDESO) and Community Environmental Management and Development Organization (CEMDO). Female facilitators led the women's and girls' FGDs and male facilitators led the men's FGDs to try and provide a comfortable environment that was more conducive to open and frank discussions. IIED also assured participants of their anonymity when sharing their experiences and views. IIED interviewed host community members and POCs during the observational walks to help triangulate information. IIED also met other stakeholders including village leaders, camp authorities, NGOs and local government authorities during the field mission. See list of stakeholders in Section 6.2.

1.2.2 Terminology used

For clarity, below are terms and definitions adopted for the purposes of this study.

- **Persons of concern (POCs):** UNHCR defines POCs as people who have been forced to flee including refugees, returnees, stateless people, internally displaced persons and asylum seekers.[1] There are other POCs in Tanzania, but this report uses the term POCs to collectively refer to the Burundian and Congolese refugees and asylum seekers who are currently residing in the three refugee camps in Kigoma.

- **Host communities:** This report refers to the predominantly Waha communities in closest proximity to the camps in Kigoma.[2] As described by the DRC, it is important to note that communities and segments of communities are positively and negatively affected in different ways due to the presence of POCs.
- **Clean cooking:** The Global Alliance for Clean Cookstoves (GACC) tracks progress using targets for 'clean' and 'efficient'. According to the UN, 'An improved biomass cookstove (ICS) typically describes a stove with higher efficiency or lower emissions than a traditional stove but can include a wide range of performance. Most ICS models do not meet [World Health Organization] WHO Guidelines, but offer some benefits and can be used as transitional solutions'.[3] This study seeks to couple these considerations for cleaner and more efficient fuels (as compared to 'traditional' fuels and methods) with the political and economic realities facing Kigoma.
- **Sexual and gender-based violence (SGBV):** There are numerous reports and best practices that have been developed in the last decade to conceptualise and address SGBV within refugee and conflict-affected populations. No one factor leads to SGBV, but considering it within an ecological model with individual, social, structural and material levels is useful, especially when working in dynamic and constrained settings such as refugee camps where multiple factors will affect the prevalence and impact of SGBV.[4] Consideration for these multiple aspects is crucial for understanding the underlying gender inequality and power imbalances that sustain all forms of SGBV. Experiencing SGBV has an immediate and traumatic effect on women and girls' sexual, physical and psychological health and wellbeing. This can lead to long-term problems if left untreated and unaddressed. Such effects include unwanted pregnancies, complications from unsafe abortions, sexually transmitted infections, injuries, depression, anxiety, substance misuse, post-traumatic stress disorder and suicide. Those who have experienced SGBV may also suffer from the stigma associated with SGBV, including isolation and ostracism, which can put individuals into social and economic disadvantages and strain relationships within households and communities.[5] While this study could not look at these aspects in detail, the review acknowledges the social and health issues women and girls in particular face when looking at the complexity in the situation faced by the POCs in the camps and the host communities.
- **Deforestation:** According to the Food and Agriculture Organization (FAO), deforestation is the 'long-term or permanent loss of forest cover and implies transformation into another land use'.[6] GACC highlights that deforestation is 'rarely driven' by woodfuel collection or charcoal production while land clearance for agriculture or grazing often contributes to deforestation on a much larger scale. However, there is evidence that demand for firewood can lead to forest degradation if harvested 'more rapidly than the landscape can recover'[7]. Keeping these differences in mind, this study sought to identify the multiple causes of deforestation in Kigoma and how the communities from the refugee camps and surrounding areas and external factors have potentially exacerbated the issue.

1.2.3 Key limitations

The issues in Kigoma are complex, multi-layered and deeply rooted in history, with local, regional and global dimensions. While this study tried to peel back some of these complexities, there were limitations on the depth of detail that could be analysed. Some of the main limitations are below and more detailed explanations are in Annex 6.1.

- **Variable reliability, consistency and accuracy of data** gathered from the literature review, field work and other interviewed stakeholders. Analysis and solutions have therefore been based on multiple assumptions and risks for implementation which are detailed appropriately.
- **Limited field visit duration:** Given a one-week limit for the field visit to assess the camp conditions, the team only focused on Nduta and Nyarugusu camps, which encapsulate 87 per cent of the total

POCs in Kigoma. There is a risk that important information specific to Mtendeli was not captured. However, IIED attempted to mitigate this by reviewing literature specifically from Mtendeli.

- **Respondent and research fatigue:** FGD 'fatigue' due to exposure to multiple questions, pilots and agency engagements over a lengthy period was apparent in some of the groups. As a result, responses may have been skewed or misleading at times. Where possible we triangulated the information with other expert interviews and literature which included more detailed data collection or surveys.
- **Openness and power dynamics:** The open forum discussions may at times have limited responses depending on underlying power dynamics, relationships and group dynamics. However, most sessions were participatory and participants were regularly encouraged to share. Additionally, camp authorities attended three sessions, which may have influenced participant answers during these sessions.
- **Language issues**: The FGDs were mostly conducted in participants' native languages of Kirundi for the Burundians and French for the Congolese. Swahili was also used to clarify some questions and inputs. While some translators had experience in research, some lacked understanding around some methods of triangulating information. There is a risk that some of the nuances of responses were lost during translations.
- **Appropriateness of SGBV research:** The team consulted with its own SGBV expert as well as specific experts from the United Nations Population Fund (UNFPA) and UNHCR who shared their first-hand experiences and views from previously conducted research to understand links with SGBV. IIED conducted targeted FGDs with women and girls that had only female facilitators and translators present. Considering the ethics and specialist knowledge and training needed to approach SGBV,[8] IIED avoided deeply looking at SGBV in the camps. To adequately tackle SGBV, studies and implementation should put mitigating SGBV at the very core of objectives, which is not within the scope of this study.

2 Landscape: energy in displacement settings

In order to capture lessons and experiences on how energy needs are being addressed in refugee camps, IIED reviewed several ongoing initiatives from other countries, Tanzania and then more specifically in Kigoma.

2.1 Initiatives for energy delivery in displacement settings

In 2009, an Inter-Agency Standing Committee (IASC), the primary mechanism for inter-agency coordination of humanitarian assistance, released material from its task force on Safe Access to Woodfuel and Alternative Energy in Humanitarian Settings for establishing multi-sectoral fuel strategies, including roles and responsibilities as well as a decision tree on choosing fuel solutions for humanitarian settings. Ten years after publication, the material remains relevant to displaced contexts around the world and has helped validate solutions in this study.[9]

The Moving Energy Initiative (MEI) is a recent multi-partner collaboration aimed at producing research and implementing actions around sustainable energy solutions for POCs across contexts including Kenya, Uganda, Ethiopia, Rwanda, Niger, Burkina Faso, Bangladesh and Tanzania. Funded by the UK Department for International Development (DFID), MEI partners include Chatham House, Energy 4 Impact, Norwegian Refugee Council, UNHCR and Practical Action. Much of the work revolves around building data and evidence for energy interventions in displacement settings as well as engaging private-sector companies to build more sustainable solutions through market building. MEI's experience in Burkina Faso highlights the need to ensure that both POCs and host communities benefit from energy interventions. Highlighting these benefits for both the camp and host communities is crucial to establishing buy-in from the local government, which is critical for success.[10]. MEI's learning from Kenya, Burkina Faso and Jordan highlight that 'government support for energy initiatives serving displaced populations is often contingent on the abilities of initiatives to also benefit the local community. Furthermore, government buy-in often makes the difference between a long-term, sustainable project and a short-term project that peters out'.[11] This partnership approach aims to separate interventions from donor fatigue as well as short-term and fickle donor budgeting processes. MEI has researched and piloted important energy access models that are:

- Connecting private-sector investment to refugee camps in Kenya[12]
- Showing the importance of comprehensive data to design practical and workable energy solutions for POCs globally[13]
- Emphasising that a diversity of technologies and solutions are needed and that there is no single solution,[14] and
- Postulating that attracting the private sector might be the missing link for bringing sustainable energy into refugee camps and meeting development needs in surrounding communities.[15]

However, some of the more difficult displacement settings (such as in Kigoma, where policies and dynamics shift rapidly and protracted crises entrench interests) pose insurmountable challenges to attracting private-sector investment. MEI's research reflecting on Kenya's Refugee Act of 2006 which restricted wage-earning employment and movement for POCs outside the camps, highlights how the law negatively affected the private sector's ability to include POCs in their business models, making market-based interventions difficult at the time.[16]

While MEI has attempted to develop a framework and to share lessons from multiple countries, the initiative has not yet identified approaches in a context where economic and political limitations severely limit POCs and programme implementation options. The recommendations coming out of

this IIED report attempt to identify the challenges and opportunities in Kigoma's complex and particularly vulnerable environment.

Other important energy work in displacement contexts includes MasterCard and USAID Power Africa's Smart Communities Coalition (SCC), which aims to 'improve the delivery of essential services to POCs and host community members through enhanced coordination between public and private entities and strategic implementation of technology'.[17] This includes a strong collaboration among multiple actors, that include private companies like Acumen, GSMA and Microsoft as well as NGOs such as the Danish Refugee Council and Mercy Corps. Concentrating on energy access, connectivity and digital tools, the coalition has an ambitious goal of identifying new models that can better deliver services to POCs and host communities. The coalition's work so far highlights three segments within Kakuma and Kalobeyei refugee camps in Kenya: impoverished new arrivals with few resources, an intermediate group that have small networks and social support, and an economically active group who trade inside and outside the camps and have access to remittances. The longer someone stays in a camp, the more likely they are to move from the impoverished group to the economically active group.[18] The Congolese households in the Nyarugusu Camp of Tanzania are a good example of this, being relatively better off since they have been in the camp for over 20 years.

2.1.1 Cooking and SGBV in displacement settings

Reducing the need for POCs to collect firewood seems like a logical and straightforward approach to reducing overall SGBV. However, a seminal paper from 2014 out of the London School of Economics (LSE) highlights the complexity of the topic. Indeed, the paper cautions that SGBV risks come from inside and outside camps, in public and private spheres of life and that focusing only on woodfuel gathering risks ignoring other important facets of SGBV. Consequently, this could lead to the diversion of priorities and budgets away from other crucial SGBV risks in camps.[19]

For example, a project study from Kenya in 2001 concluded that in providing firewood to refugees, 'the project has reduced the incidence of rape during periods when households are fully stocked with firewood, [but] we see a concomitant increase in non-firewood related rape during the same period'.[20] In other words, reducing protection risks associated with firewood collection does not necessarily reduce overall incidences of rape as these risks can transfer to other facets of daily life as schedules and duties shift. The LSE paper states that to tackle the SGBV and energy nexus, researchers must first put SGBV at the heart of their study – not cookstoves or energy – in order to thoroughly assess the causes of SGBV through a long-term approach, rather than a short-term technology solution.

Indeed, women and girls from refugee camps collecting woodfuel is highlighted as a protection risk in much of the literature and discourse on refugee camps across the globe. WFP's Safe Access to Fuel and Energy (SAFE) initiative aims to address the needs of refugees by combining improved cooking technologies, alternative fuels and livelihoods and environmental activities. The aim is to move POCs away from less sustainable cooking options, reduce exposure to risks of SGBV while collecting woodfuel and mitigate environmental degradation through agroforestry and reduced fuel consumption.[21]

As best practices for reducing SGBV related to energy interventions, the IASC recommends that organisations 'consult local populations to create strategies for accessing cooking fuel; encourage use of fuel-efficient stoves and fuel-saving cooking techniques'.[22] Responses from IIED's own inquiries from SGBV experts in the GBV Area of Responsibility Community of Practice revealed that the sector globally still lacks robust and standardised indicators for SGBV related to energy interventions.[23] Experts agreed that establishing these types of indicators would be beneficial in reducing SGBV risks associated with energy interventions.

2.1.2 Cooking and deforestation

Collecting woodfuel for cooking is described by the FAO as a main driver of deforestation in many displacement settings. The sudden increase in demand from thousands of households puts pressure on resources and the competition for diminishing resources raises tensions between host communities and POCs. Biomass fuels such as woodfuel and charcoal are usually the cheapest and most easily accessible, which makes it the most attractive option, especially as POCs and host communities alike tend to be poor. Beyond fuel, wood is also used for household, commercial and institutional purposes such as building and expanding structures. The FAO believes that wood will be a primary source for fuel well into the future, as alternatives are usually much more expensive and shifting end-user behaviour can be a long and expensive process as well.[24]

Around the globe, POCs collecting wood in displacement settings is seen as a main driver of deforestation. However, there are other important factors that contribute to deforestation, such as shifting land use, intensifying agriculture and slash and burn agriculture techniques, as IIED observed in Kigoma region. The contributions of all of these to deforestation is not well documented. Anecdotal evidence points to many drivers but data on the scale of those drivers is not readily available.

2.2 Refugee camps in Tanzania

Following its independence in 1961, Tanzania held an open-door policy for POCs rooted in President Julius Nyerere's promotion of socialism, solidarity and self-reliance. In the decades that followed, cyclical influxes of POCs poured into Tanzania fleeing periods of post-colonial fragility and wars of national liberation, especially from Rwanda and Burundi. In the 1990s, hundreds of thousands of POCs in the region sought safety in the relative stability of Tanzania, putting extreme pressure on resources, infrastructure and local communities. This specific influx coupled with the rapidly shifting context of domestic and regional politics brought about a general hardening of attitudes towards POCs in Tanzania. The government closed the border to new arrivals in 1995 and repatriated almost a half a million Rwandan POCs in 1996. Anti-POC sentiments manifested into official government policies in the Refugee Act 1998 and the Tanzania National Refugee Policy 2003, which formalised many restrictions on POCs, such as movement.[25] Furthermore, Tanzania signed up to pilot the Comprehensive Refugee Response Framework (CRRF) in 2016, but in January 2018 withdrew from the pilot phase of the Framework,[26] citing a clause that locked the country into receiving money from the World Bank, split between loans and grants, in order to pay for hosting refugees.[27] Regardless the United Nations General Assembly did affirm the Global Compact on Refugees in December 2018, which Tanzania endorsed.

Despite the hardening domestic politics facing POCs, in 2014 the Tanzanian government granted citizenship to over 162,000 refugees who had originally fled violence in Burundi in 1972 and had been living in settlements for decades. However, since then the path for many of these POCs has been uneven, with several thousand legitimate citizenship claims reportedly in limbo.[28]

2.3 Kigoma's refugee camps

POCs can also be found in Kigoma in 'old settlements' (those Burundians living without UNHCR support for several decades), while the government pushed repatriation of thousands of POCs with the aim of making Tanzania 'refugee-free' by 2010.[25] The Nyarugusu Camp in Kigoma opened in 1996 mostly to accommodate Congolese fleeing war and instability.

The flare-up of political instability and violence in Burundi in 2015 saw the latest influx of Burundian POCs, once more stressing existing camp infrastructure and surrounding communities.[29] Between 2015 and 2017, around 253,416 refugees arrived into Tanzania, mostly from Burundi. To support this

influx, Nduta Camp reopened in 2015 and Mtendeli Camp was opened in 2016. The regional turmoil of the last three decades highlights how quickly and dramatically circumstances can shift as families periodically seek stability in Kigoma.

According to UNHCR statistics, 1,775 individuals arrived in 2018 and none so far in 2019. Given the long history of POCs in Kigoma, this could change overnight. As of May 2019, the three refugee camps host 275,563 refugees, mostly from Democratic Republic of the Congo and Burundi.[30] But with ongoing political turmoil in Burundi,[31] the spectre of Ebola virus disease spreading beyond the Democratic Republic of the Congo to nearby countries[32] and other regional dynamics could easily push more families to flee violence and instability for Kigoma.

Tanzania revoked automatic refugee status for new arrivals in 2017 and introduced in its place a process of asylum seeking. Asylum seekers are particularly vulnerable as they are not formally registered and cannot access services such as medical or education facilities. About 13 per cent of the camp population are asylum seekers and the rest of the population are refugees.[30] A sustained push for repatriation since September 2017 has seen 69,508 people returning to Burundi. Of these, the majority (48,056) repatriated between March 2018 and May 2019.[33,34] Furthermore, the Burundian and Tanzanian governments have confirmed their mutual goal of repatriating 116,000 Burundian POCs from Tanzania by the end of 2019.[35] According to a key informant interview, government pressure remained high for POCs to voluntarily repatriate in April 2019.[36]

Overall, international funding to support the camps has dropped from US$88 million in 2017 to US$24 million in 2018 and organisations are struggling to meet basic POC needs and services.[37] Indeed, POCs are feeling the pressure from all angles – they are dependent on aid due to institutional and legal barriers.

Most of the POC population in Tanzania is currently spread across these three camps in the Kigoma district.[a] Over half the population lives in Nyarugusu, a third in Nduta and the remaining 13 per cent in Mtendeli (see Figure 1). Nduta and Mtendeli constitute almost exclusively Burundians who came in 2015–2017, while Nyarugusu has a split of about 55 per cent Congolese from before the 2015 influx and 45 per cent Burundian POCs mostly from the 2015 influx (see Figure 2).[30] Nyarugusu, being the largest and longest-standing camp, has received a lot of analysis in the literature.

The Congolese POCs are relatively better off as most have been settled in the camp for over 20 years, giving them deeper connections and a greater period to accumulate resources. Some Congolese also receive remittances via mobile money from friends and family who were part of a resettlement programme to the USA starting in 2000.[38] Differences between the Congolese and Burundian households in language, culture and religion may be linked to food and cooking preferences, so understanding these more deeply are important for designing cooking interventions for the three camps.

[a] 42,616 POCs live in old settlements from previous influxes or Kigoma villages, with relatively few POCs living in Dar es Salaam. For the purposes of this report, the term 'POCs' is used for people living in the three camps in Kigoma.

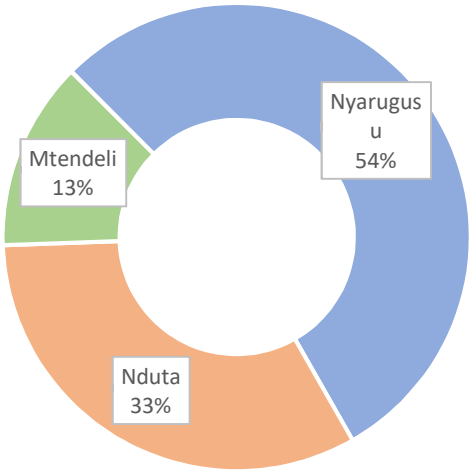


Figure 1 Percentage of total POC population by camp

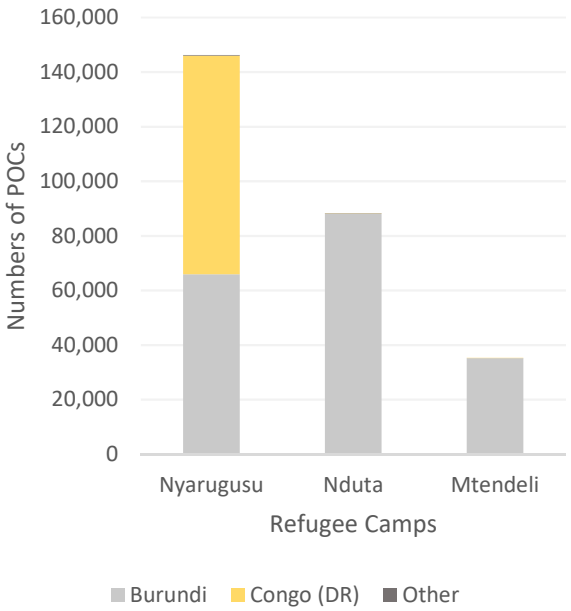


Figure 2 Country of origin by camp

One UNHCR study divides POCs with monetary income into skills-based economic activities (e.g. repairs), labour-intensive activities (e.g. farming), incentive workers (working for NGOs and camp services delivery) and small traders/entrepreneurs (e.g. electronic equipment or barbershops). POCs with the right connections and an above-average command of languages such as English, French and Swahili are usually the most successful. Their ability to raise capital for economic activities is severely limited and 'unforeseen loses' (e.g. bribes, fines, being robbed) and health emergencies dramatically hamper POCs abilities to start economic activities. Host communities have similar socioeconomic characteristics as POCs but with subsistence farming being the primary livelihood. However, host communities have the advantages of the right-to-work and freedom of movement.[39]

The literature highlights a symbiotic relationship between POCs and host communities. Many in the surrounding communities benefit from the presence of the camps. Common markets for refugees and host communities had opened opportunities to trade and interact, which both POCs and host communities overwhelmingly enjoyed. IIED's FGDs confirmed the impression that the common markets were very important economic opportunities for everyone. Their recent closure by the government forced trade into informal settings and places, which reduced transaction volumes and also increased costs and risks.

The camps can pose challenges for some of the most vulnerable segments of host communities, who tend to include women, children, elderly people, people who are disabled and people who are already poor and unskilled. Poorer households in host communities benefit more from accessing public services in the camps such as healthcare but are more likely to miss out on economic opportunities that the camps present, as they will compete directly with POCs for work. Important to note is that while the sudden appearance of thousands of households will stress infrastructure and shock markets, the sudden exodus of these households can also significantly disrupt markets and communities.[40]

Some animosity from host communities stems from longstanding grievances such as the camps being built on previously fertile farming land and competition for natural resources.[2] But overall,

relations between host communities and refugees seems to have been mostly been positive. IIED's own interviews and FGDs confirmed the complex but usually cordial relationships. For example, participants used words such as 'our friends' and 'our family' to describe either POCs or host communities. Various relationships exist from friendships, marriages, to employers, buyers and sellers. They range from cordial to exploitative. In particular, the Burundi and Waha have a common heritage such as language and religion.[2]

These reports are very useful in highlighting important links between the inadequacies in the provision of food and growing tensions between camps and surrounding communities. The reports recommend integrated programming within camps and for the surrounding communities, recognise the power of language and stereotypes across communities and consider social and cultural dynamics related to family and gender in all programming.[2, 49]

2.3.1 Cookstoves and fuel

At the POC household level, some cooking data is available for types of cookstove appliances, fuel type, fuel consumption and preferences.[b] The data shows that improved mud stoves[c] are predominantly used in Nyarugusu Camp, Nduta and Mtendeli.[41] Figures 3 and 4 illustrate a detailed breakdown of the cookstove coverage in two of the camps (stove coverage data for Nyarugusu was not available). Over half of stoves need repair in Nduta and Mtendeli (repair data for Nyarugusu was not available), which means more woodfuel is being burned than should be. IIED also observed that many POCs found the mud stoves to be cumbersome to use as wood had to be cut into much smaller pieces to fit into the burn chamber, increasing the amount of time and work associated with cooking. The same data shows that households' preferences mostly fall in line with what they are currently using. This is probably because of a lack of knowledge of alternatives (LPG, ceramic, etc.).

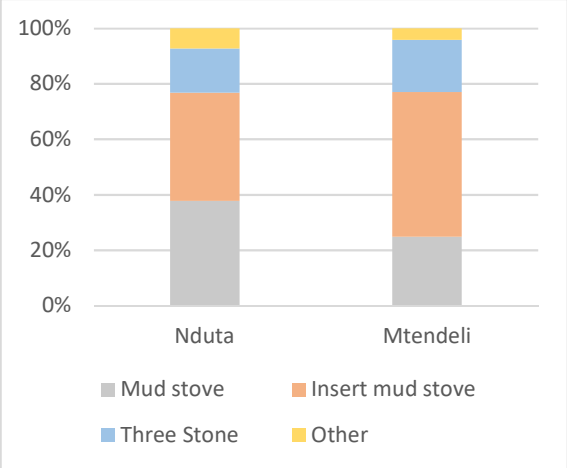


Figure 3 Percentage of cookstove coverage in Nduta and Mtendeli

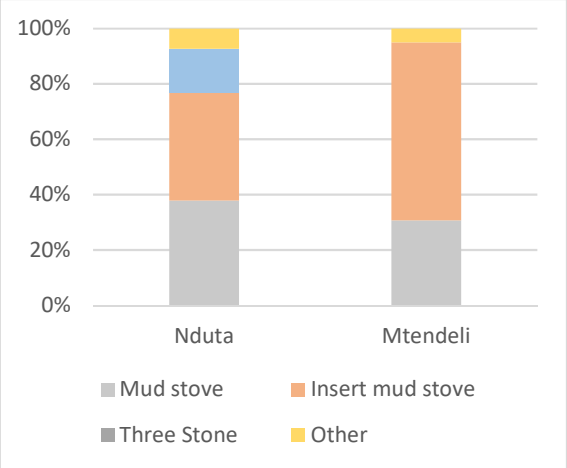


Figure 4 Percentage of cookstove preferences in Nduta and Mtendeli

The same number of households in Nduta preferred and used three-stone fires. But notably, the Mtendeli numbers show almost a fifth of households used three-stone fires, yet none admitted to preferring a three-stone in the survey. One explanation is that respondents' mud stoves may have

[b] IIED has so far has been unable to thoroughly interrogate the methodologies of surveys and studies that measure stove types, fuel consumption and cooking preferences in the camps. A better understanding of the survey designs, enumerator methods, etc is especially important for comparability as different organisations have collected data in the three camps. Thus, IIED is unable to confirm the numbers or present a more thorough analysis of the available numbers.

[c] CEMDO and REDESO have training programmes that teach POCs to use locally available materials such as ash, soil, water, mud bricks and dry grass to construct basic, more-efficient (than three-stone) cookstove types. Basic designs include stoves made of only mud, mud bricks and mud bricks coupled with a metal burner insert.

fallen into disrepair and so they had reverted to three-stone fires. This also might hint at CEMDO's and REDESO's complicated mandate to discourage three-stone fires and to confiscate charcoal from POCs, while simultaneously implementing energy and environmental programming. Given this unusual power dynamic, the data may be skewed away from households admitting to three-stone use and preference.

A Netherlands Development Organisation (SNV) study found that the pure mud stoves are more efficient than the mud brick or mud insert stoves, but not as efficient as stoves fabricated out of metal and ceramic.[42] These results would need to be coupled with field tests, market surveys and FGDs to integrate POC and host community preferences, tastes and cooking habits to improve adoption rates and confirm reductions in fuel consumption.

Additionally, IIED observed that many households are stove stacking (where families use different combinations of cooking technologies at the same time, such as charcoal and LPG) and surveys by Technical University of Denmark (DTU) in Nyarugusu Camp and REDESO in Nduta and Mtendeli have found that eight[43] to forty per cent[44] of households are indeed stacking. This hints at complex needs, preferences and tastes that have not been fully understood and incorporated into energy interventions, which can reduce the intended impacts of these interventions. More robust data on stove stacking, cookstove use and preferences are important inputs to designing viable cooking interventions.

IIED also observed that rather than fixing broken mud stoves, many households simply revert to three-stone fires due to the lack of materials or skills for repairing and rebuilding mud stoves. Some also found that mud stoves were not very durable overall. Other households found three-stone fires to be more convenient as mud stoves require wood to be chopped into much smaller pieces. Many POCs also perceive that a three-stone fire can cook food more quickly than the mud alternatives. Whether or not that is true is irrelevant as the perception is there, which influences use. More robust surveys and datasets are needed to further understand preferences and tastes to cater to POC cooking needs to increase adoption rates, in addition to follow-up trainings on cookstove fabrication and quality-control monitoring.

2.3.2 Paying for cooking and dynamics of affordability in Kigoma's camps

In the camps, woodfuel is the dominant cooking fuel,[d] but at least in Nyarugusu Camp, 35 per cent of households use charcoal.[43] IIED found that some POCs scavenge charcoal burn sites outside camps for leftover pieces. While it is illegal to produce charcoal without a permit, it is not illegal to use it in Tanzanian households. However, it is illegal for POCs to use charcoal inside the camps. Better-off POCs can afford to buy woodfuel and charcoal. IIED's discussions in Nyarugusu revealed that many Congolese households buy wood or charcoal from Burundians who venture outside of the camps to collect. The Congolese are relatively better off as they have been in the camps for much longer and some receive foreign remittances via mobile money. Those who cannot afford to buy or travel outside the camps to collect firewood or charcoal tend to barter their food provisions or other rations or face sexual exploitation to access woodfuel.

The Smart Communities Coalition found that despite having limited formal financial options, refugees still have complex financial lives in Kenyan refugee camps.[18] This is probably the case in most displacement settings and is an important component to designing energy interventions. Indeed, a

[d] Woodfuel is observed as being used by the majority, but hard numbers are not available. UNHCR cites a statistic of 95 per cent of POCs using woodfuel, but this number is actually a reference to global average POC usage, rather than a statistic captured in the Kigoma context. Globally, most POCs rely on woodfuel (https://data.humdata.org/organization/moving-energy-initiative), so it is a reasonable assumption for the Kigoma context, triangulated with IIED's observations.

2017 GSMA study in Nyarugusu Camp found that mobile phones connected POCs with family left behind or resettled in a third country, provided important economic opportunities via mobile money, provided vital entertainment in dire circumstances, and allowed access to educational materials. Two-thirds of households had access to a mobile device, but the study also found that vulnerable populations had noticeably less access. Despite limited income opportunities, POCs spent more per month than the average Tanzanian on credit and data in 2017. Since then, IIED heard from POCs that mobile money use has dropped significantly, especially after the closure of the common markets, as market trade and transactions were pushed underground.

A 2017 DTU survey in Nyarugusu Camp found that 53 per cent of POC respondents buy their fuel, spending a monthly average of €10.29 (26,393.90 Tanzanian shillings).[43] These same respondents stated that they would only be willing to pay an average of €2.05 (5,250 Tanzanian shillings) per month for LPG – far below the market rate of €8.97 (23,000 Tanzanian shillings) for a 6kg refill. Indeed, given the more stringent policy environment now, the willingness to pay is presumably even lower. Indeed, when asked during an FGD if they would be willing to pay for fuel, one Burundian responded, 'How can I pay for fuel? I don't have anything! I can't pay for anything!' MEI's own pilots shows critical factors that must be in place for a successful, market-building partnership with the private sector: POC's must have the ability and willingness to pay and have an open economic and political environment with strong support from local governments. The Kigoma context does not have any of these factors and consequently, this type of private-sector partnership is unlikely to work in the Kigoma context.

3 Unpacking a complex and dynamic situation

The Kigoma region has a deep history associated with POCs and the dynamics are many. However, there are a few key issues that must be addressed. The government, UNHCR, Irish Aid, other donor agencies, and implementing partners all believe that deforestation is a critical issue affecting the region. Other critical issues associated with collecting woodfuel that women and girls mostly face include SGBV and protection risks, as well as the drudgery of work. Partners are equally concerned about these issues, the effects of which are felt inside and outside the camps and across population segments. POCs and host communities feel the results of these issues in different ways but remain united in their belief that solutions must be implemented at scale – and soon. The problem trees in figures 5–7 attempt to show the relationships between the different underlying causes of these issues.

3.1 Deforestation dynamic

In interviews, IIED found that most stakeholders believed that POCs needing to collect woodfuel was the primary cause of deforestation in the areas surrounding the camps. This simplification of a complex issue may reduce the impact of programmes on deforestation, as these programmes may not be designed to consider other important factors contributing to deforestation, which means that the deforestation problem is not resolved.

There is some evidence pointing to the causes of deforestation. For example, FAO analysed temporal satellite imagery and confirmed that deforestation rapidly increased after the influx of Burundians in 2015[45] and a recent REDESO survey also confirmed that areas within 4km of Mtendeli and Nduta are heavily deforested.[46] However, the literature and IIED's observations reveal more nuance to the roots of deforestation. While the recent influx of Burundian POCs seems linked to deforestation, POCs collecting woodfuel is just one contributing factor. Figures 5–7 below try to illustrate the complicated dynamics driving the high demand for woodfuel for POCs and host communities.

Figure 6 outlines what pushes demand for charcoal, which 33 per cent of POCs in Nyarugusu use. Data on host community fuel use is limited but it is probably a mix of wood and charcoal, with richer households using more charcoal because they can afford it.

Finally, Figure 7 details some of the findings of IIED's research related to intensifying agricultural production and land clearance for cattle. Important to note is that one study states that POC camps are also large markets, which have boosted trade and production in host communities and led to the intensification of agriculture practices to feed these markets.[47]

Comprehensive and higher-quality data is needed to compare and confirm the scale and extent of how these dynamics are interacting and contributing to deforestation. At the very least, interventions should be based on an acknowledgement and understanding of the complexity of these dynamics.

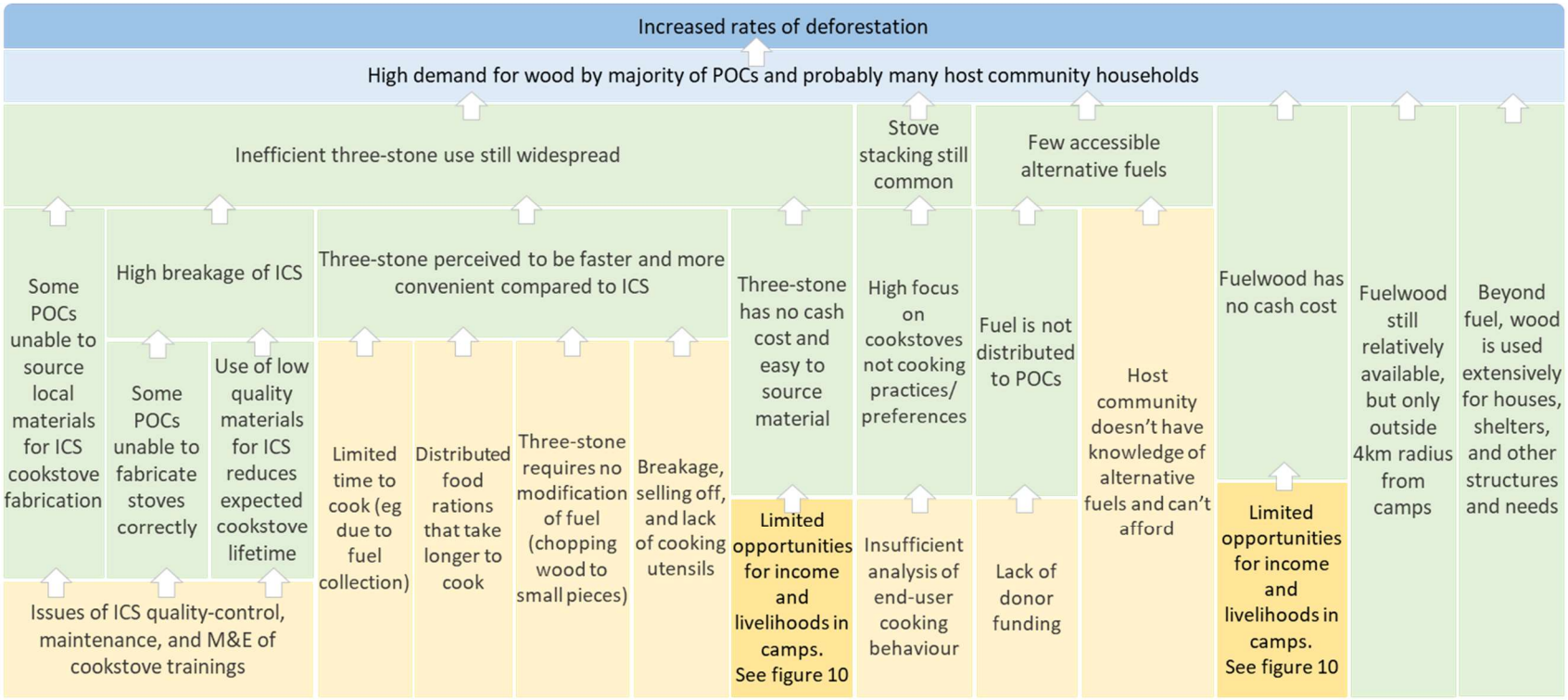


Figure 5 Causes of high demand for woodfuel and links to deforestation

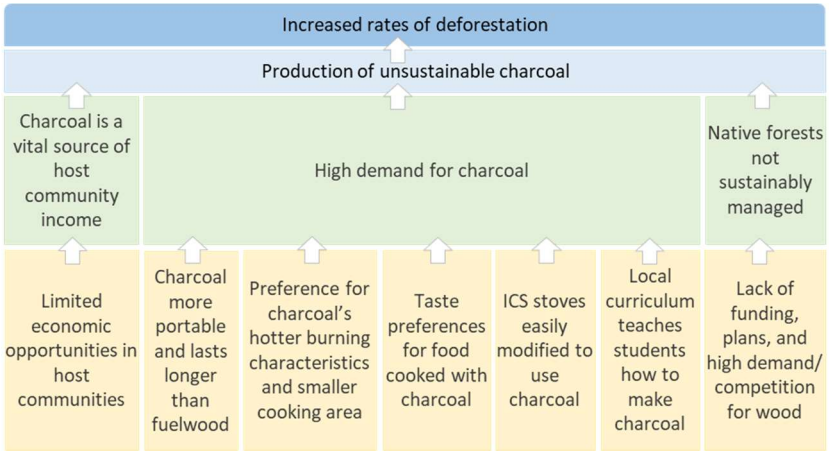


Figure 6 Causes of unsustainable charcoal production linked to deforestation

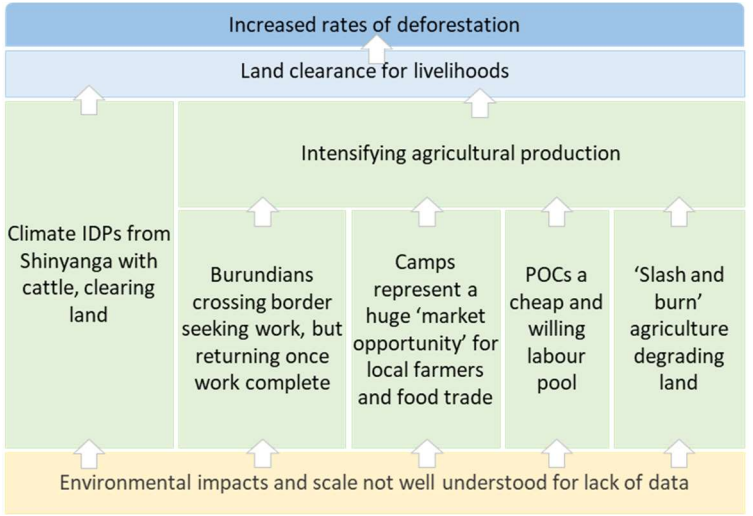


Figure 7 Causes of land clearance linked to deforestation

3.2 Conflict and protection risks increased for POCs when outside the camps

The literature underlines how dangerous collecting woodfuel is, with POCs giving examples of incidents while gathering fuel such as sexual assault and robbery.[48,49] Figure 8 brings together the multiple causes that result in conflict and protection risks for POCs when outside the camps.

Women have a traditional role of collecting firewood and during FDGs, many women and girls stated the risks related to firewood collection outside the camps, including rape, sexual exploitation by unknown men or those who can provide firewood, being physically abused by strangers, abductions of younger children and snake and wildlife attacks. Targeting of POC men by local police or attacks on POC men was considered a key concern by both women and men in FGDs. It was noted that men often attract more attention than women and are often regarded as thieves by police or local communities. Arrests often result in detention for long periods with or without charge. The underlying causes for conflicts and protection risks (Figure 8) related strongly to the reason why POCs are having to leave the camps to meet their woodfuel needs.

It is also important to note that one of the most common forms of SGBV is intimate partner violence.[5] For example, UNHCR found that of 1,978 reported SGBV incidents in 2018 in all three camps in Kigoma, the majority (68 per cent) were due to intimate partner violence[50] and were not directly associated with the act of collecting firewood. SGBV experts from UNHCR and UNFPA believe that reported cases are much lower than the actual total number of incidents. A SAFE study at Nyarugusu Camp found that rape is often not reported due to stigma, or fear of local authorities such as police.[51] This is reflective of the global understanding that official reports of numbers do not reflect the reality. Reporting issues related to protection risks are associated with perceived risks and benefits of reporting and their effect on the willingness of affected persons to report.

3.3 Unhealthy cooking practices and issues faced during woodfuel collection lead to serious social and health issues among POCs

Figure 9 shows the key social and health issues faced by the POCs related to cooking, food preferences and extended hours spent collecting firewood.

The food rations that are provided to refugees are not diverse. While refugees were mostly reluctant to admit that they are selling their rations (food and non-food items), host communities interviewed highlighted that even with the policy restrictions for livelihood activities, there is trade happening between the two communities. POCs sell their food rations and obtain smaller quantities of more diverse food in return. Though more diverse diets can support better mental and physical health, smaller quantities of food intake can also lead to health issues. Our observations revealed that receiving the same types of food for long periods together with restrictions on growing food in gardens may make POCs want to sell their rations and diversify their food supply. Recent consignments of peas from WFP have incurred especially long cooking times of eight hours and more. POCs turn to negative coping mechanisms such as skipping meals and eating raw food to compensate for longer cooking times and issues inherent in the amount of woodfuel required to cook for longer periods. FGDs with women also revealed that delays in collecting firewood can also lead to conflict with their partners, often resulting in violence towards women.

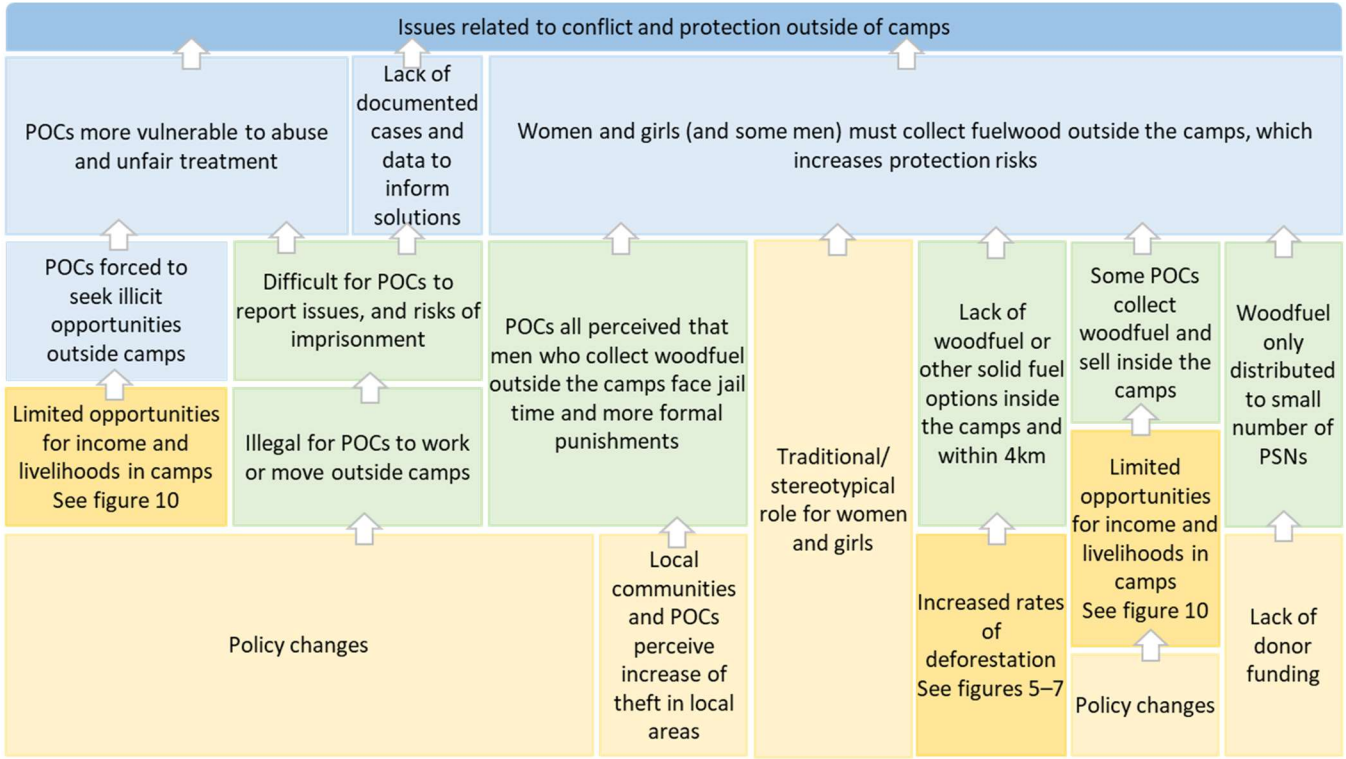


Figure 8 Causes of conflict and protection risks on POCs

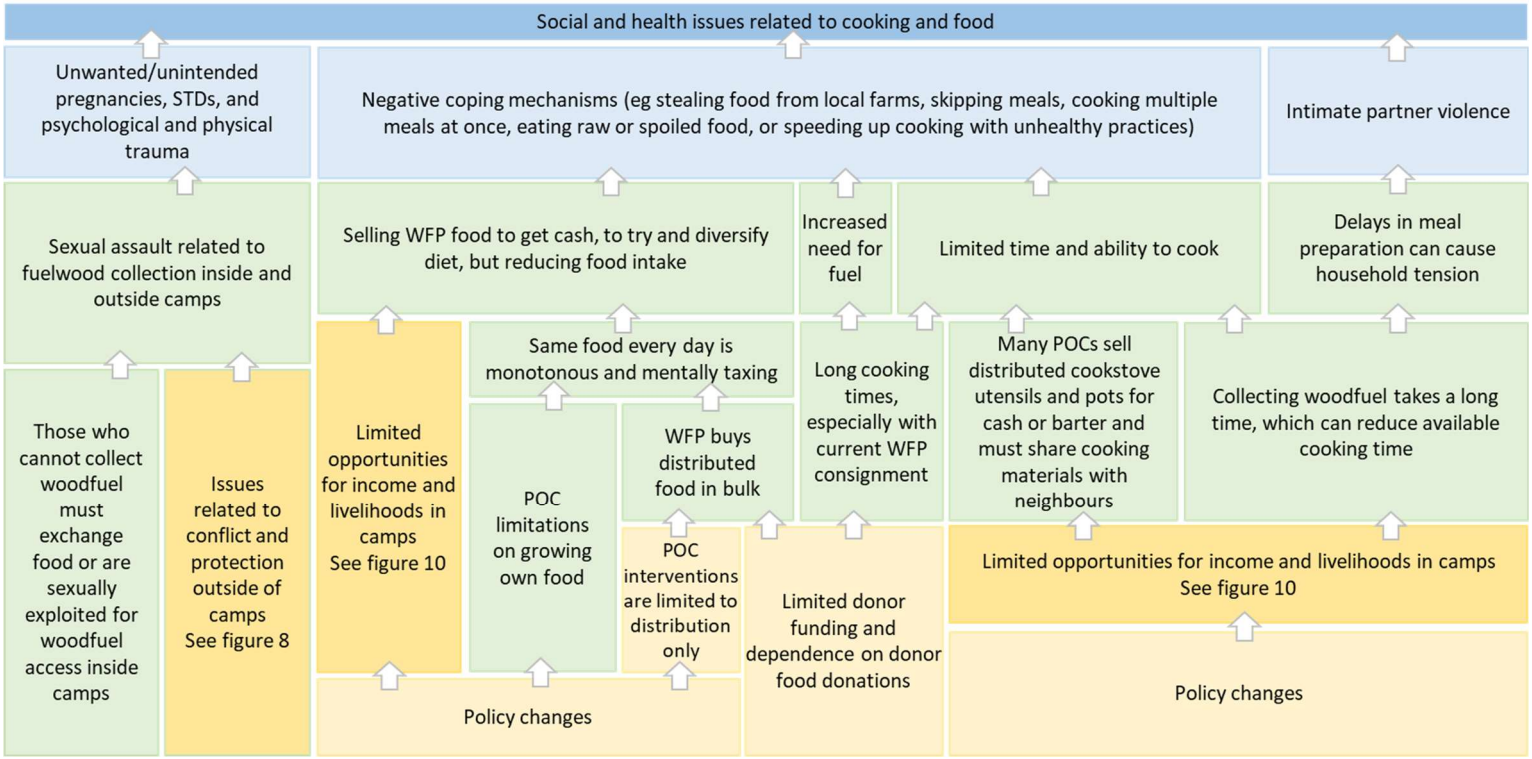


Figure 9 Causes of social and health issues related to cooking and access to food

3.4 Recent restrictions on income-generating activities for POCs

At present, POCs' required encampment, restricted movement outside the camps and a controlled camp economy make them particularly vulnerable and completely reliant on aid distributions and support by UN agencies and NGOs. These restrictions have been in place for some time, but POCs report that recently they have been more strictly enforced. Additionally, small livelihood activities and formal savings efforts, such as a United Nations Capital Development Fund (UNCDF) savings programme, have been limited, reducing opportunities to supplement food and create capital for POCs to invest in trade businesses that have also benefited host communities.

Recent restrictions on cash transfer programmes, livelihoods, and formal savings, such as UNCDF savings programme, also constrains POC opportunities and choices. Official salaries for the few POC 'incentive worker' positions are available but are capped at 60,000 Tanzanian shillings per month (about €24). But accessing these coveted positions often depends on higher levels of education and an individual's connections. Overall, accessing cash for POCs is difficult. This means few POCs have any disposable income to spend on energy solutions themselves, or anything else for that matter. Therefore (and though illegal to do so), many POCs seek economic opportunities outside the camps.

When speaking about POCs during IIED's FGDs, host communities including village leaders used amicable terms such as our 'neighbours' and 'friends'. Indeed, the common markets helped foster trade and social capital between POCs and host communities. According to both, the closure of the common markets has dramatically reduced volumes of trade and pushed most transactions underground, increasing risk and cost for all parties. Beneficial social encounters are far less frequent as well.

These impacts of restrictions on income-generation activities remain an underlying cause for the three key problems discussed above in Kigoma's context: deforestation, protection issues and conflict outside camps, and social and health issues, as shown in detail in Figure 10.

3.5 Disjointed and uncoordinated effort in Kigoma limits achieving impacts as intended

Given the humanitarian mandates and the strategic programming and funding restrictions of many organisations, much of the projects are exclusively implemented in the camps without linking in host communities.

While many clean cooking pilots have been tried out with the intention of providing technical solutions to POCs and host communities, none has borne enough positive results to attract financing and appropriate business models to scale up. Indeed, stakeholders from government to POCs are wary of further piloting of activities and rightly wish to see results and scaling of pilots to programmes as soon as possible.

There has been very little focus on host communities. Lack of indicators to measure impacts, lack of enforcing of effective monitoring and evaluation procedures and gathering evidence and sharing lessons to maximise lessons are some of the failures of past interventions. Changes in policy direction from pilot to design stages (including scaling up and fundraising for implementation) and the fickle nature of policies have also had a significant impact on obtaining buy-in from important stakeholders such as financiers and the private sector for larger and longer implementation projects.

While the host communities receive fewer energy-focused interventions than in the camps and aid agencies are often only present in the region due to the presence of refugee camps, it was apparent from IIED's own observations that many development projects have been implemented in an ad-hoc

nature. There was clack of coordination among the different donors, government and implementing agencies. It was also apparent that specific infrastructure-focused donations without a sustainability plan had been given to one or more communities and the installations branded with the agency name to demonstrate that they are working to help both local communities as well as POCs.

While funders rely on a regional development plan to select projects that meet their focus in sectoral areas, there is a clear gap in reviewing plans and understanding whether they are comprehensive and developed with wider inputs from communities and key stakeholders, or if plans were developed using a top-down approach where community needs are least prioritised. Figure 11 brings together these dynamics.

3.6 Increasing drudgery for collecting woodfuel

In Nyarugusu Camp, a study by DTU states that women and girls spend an average of 19 hours per week collecting firewood outside the camps,[52] while a UNHCR study estimates an upper range of 36 hours per week.[53] Figure 12 illustrates the main factors that cause these extended times for woodfuel collection. Deforestation is a primary cause, and shows how the different issues intersect. Most women and girls tend to carry heavy loads of woodfuel bundles on their heads for long distances. Organised transport has so far been allowed only for people with special needs (PSNs). Bicycles are used predominantly by men in both refugee camps and the host communities. While some men use bicycles for firewood collection, it is not common practice to support women with woodfuel collection. POCs (both women and men) highlighted that while using bicycles can be a useful way to reduce the burden, they restrict someone's ability to run when attacked. Bicycles can also be stolen from them and attract more attention from potential attacks than going on foot.

Both POCs and host communities interviewed noted that they have to travel greater distances now to collect firewood, particularly due to deforestation of close-by forest areas.

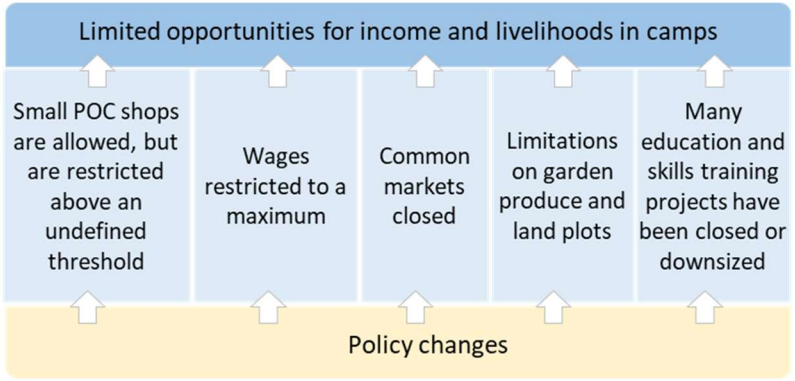


Figure 10 Causes limiting income generation for POCs

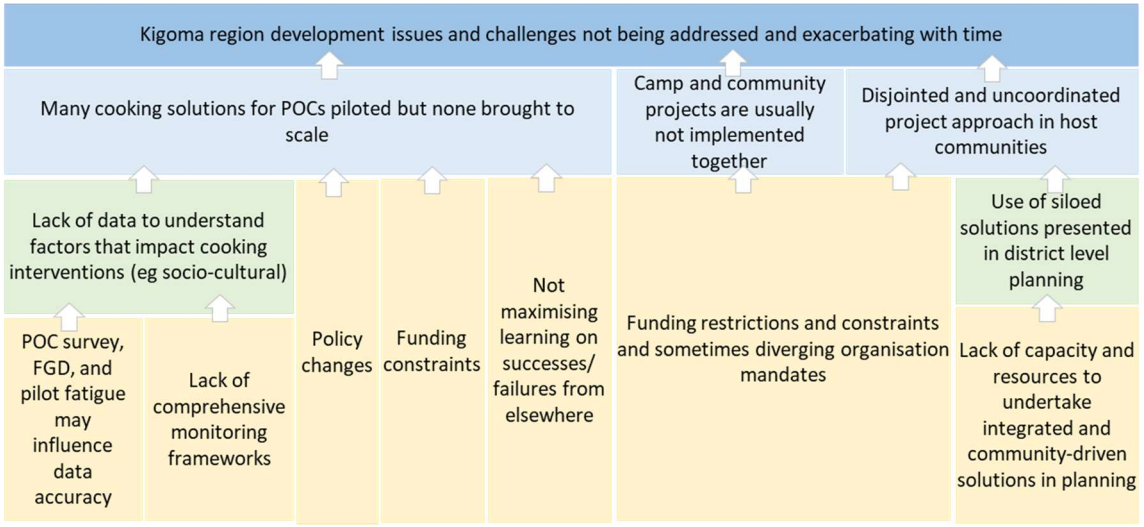


Figure 11 Causes for delayed impact of programmes in Kigoma

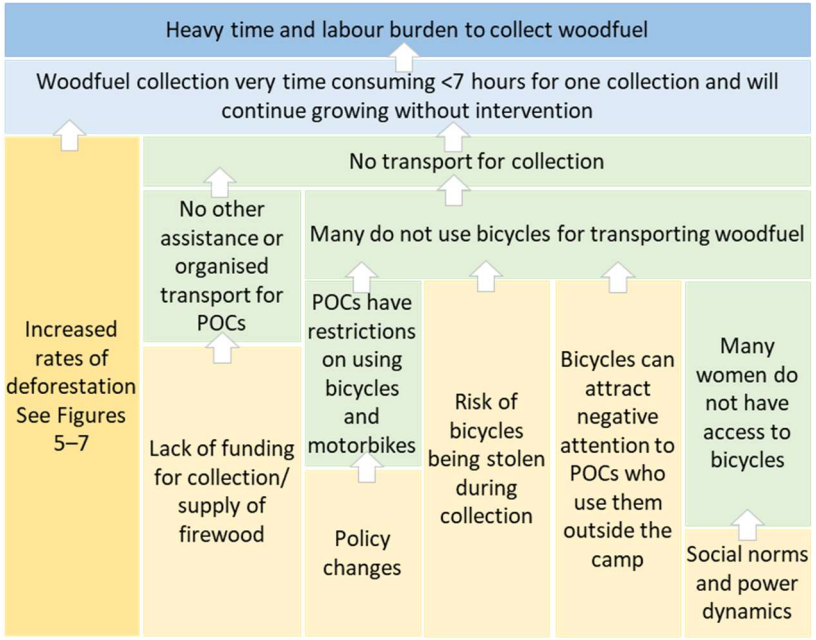


Figure 12 Causes for heavy time and labour burden for collecting woodfuel

4 Towards solutions

The complexity of the Kigoma context demands considered, multi-dimensional solutions, which are designed to feedback and adjust to shifting local and regional dynamics. The solutions that follow provide a starting point to understanding the scale of the needed intervention.

4.1 Context assumptions for programme design

The Kigoma camps are in a state of protracted crisis with carefully controlled economies, enforced limitations on partner interventions and rapidly shifting local and regional dynamics. Designing a long-term sustainable cooking solution in such circumstances is challenging and complex. Table 1 outlines some of the assumptions and dynamics that should be considered for any intervention, based on IIED's interviews and camp observations as well as the literature review.

Table 1 Assumptions and dynamics for solutions

Context limitations	Findings
All food and non-food items must be distributed free of charge to POCs	Precludes POCs paying for cooking solutions that are bulk purchased by UNHCR or partnering with private sector to invest.
Policy changes are rapid and evolving	Long-term planning and achieving scale is difficult as hasty new policies can severely disrupt planned interventions (e.g. UNCDF's savings programme). Limits private sector appetite for partnerships and investments.
Cash transfers to POCs are not allowed[54]	Limits the mechanisms for delivering cooking interventions as POC disposable income is very limited as it is.
No clarity on interventions based on vouchers	Heavy engagement with government needed to clarify use of vouchers. If confirmed, consider a voucher programme tied to the intervention.
Charcoal use by POCs is forbidden and confiscated if found. Manufacture of charcoal is strictly controlled in Tanzania and use will be banned by 2025	Sustainable charcoal is probably not a viable solution.
Stove stacking is happening	Limits impact of interventions. Consider market sensitisation and/or integrating user preferences better into stove design.
Most POCs have already built improved cookstoves made of mud, but quality control and durability seem to be issues	Consider programming that targets either more efficient stoves (SNV's Matawi) or reinforces the training programme. Solutions should consider any durability issues identified.
Woodfuel is 'free' and still relatively available	Complicates distributions of any fuel type.
POCs are scapegoats for a more complex deforestation problem	High expectations that energy and environment interventions for POCs will dramatically curb deforestation.

Based on these limitations, IIED has established some basic drivers for any energy and environment programme in the Kigoma context.

4.1.1 Some POCs will continue to harvest woodfuel regardless of the type of fuel distributed

For POCs, collecting woodfuel is dangerous, time consuming and exhausting. But since wood does not cost cash money and is still relatively available in the areas surrounding the camps, it will remain a vital resource for POCs to continue to access. The opportunity cost of collecting woodfuel outside the

camps is relatively low because POCs have limited opportunities inside the camps to use time in a productive and income-generating manner. In other words, even with enough distributed fuel at home, some POCs will continue collecting woodfuel to supplement fuel consumption and/or household income because alternative economic activities are strictly controlled. As a result, a large portion of POCs will probably continue to collect wood, regardless of the fuel type distributed in an intervention.

POCs still collecting woodfuel may fall under several categories:

- Opportunistic harvesting (e.g. selling harvested wood for cash or bartering)
- Preferences (e.g. if briquettes are distributed and wood gives a preferred taste to food)
- Supplementing consumption (e.g. some households need more than what is distributed)
- Lack of knowledge (e.g. lack of understanding of new-to-market fuels like briquettes), and
- Other needs (e.g. such as heating at night).

Importantly, if the distributed fuel does not meet the overall consumption needs of a majority of households, then the majority of POCs must supplement by harvesting woodfuel.

4.1.2 Some POCs will sell or barter any cooking fuel or mobile stove distributed by UNHCR

POCs have a history of selling food and non-food items distributed from UNHCR and partner organisations for cash in order to fulfil their needs and preferences and enable more dignity, choice and control over their lives. It is therefore reasonable to assume that a large percentage of POCs will continue this dynamic and sell or barter distributed fuel or cookstoves.

There is a high risk that stoves with relatively high market value and mobility (e.g. LPG stoves or SNV's energy-saving Matawi stoves) are at risk of being stolen or resold on the market, which would reduce any programme's impact.

The reselling of these items can affect markets in camps and host communities and other adjacent markets, for example, by having positive effects on consumers through lower prices of fuels and stoves and negative effects on distributors and traders through lower profits.

4.1.3 Deforestation will continue regardless of energy intervention

Since POCs will probably continue gathering woodfuel even if fuel is distributed, POCs as a contributor to deforestation will inevitably continue but probably at a slightly reduced rate as perhaps not all POCs will continue harvesting woodfuel. In other words, distributing any cooking fuel will not necessarily solve the complex problems of deforestation. Indeed, as referenced in Section 3.1, the causes of deforestation are multiple, but attribution and scale are not clear. An energy programme must be comprehensive and include forest management components to address deforestation.

4.2 Fuel distribution scenarios

UNHCR has identified LPG, briquettes and sustainably sourced woodfuel as viable energy scenarios.[55,56] The IIED scenarios in Figure 13 also included sustainably sourced charcoal as a comparison and to acknowledge that there is a large preference in the POC and host community populations for this type of fuel, regardless of legality.

Given the context limitations cited in Table 1, the most probable and workable scenario in the short term involves bulk-procuring fuel and distributing it to POCs. Preferably this is linked to a voucher system to build in expectations of cost and worth into the programme, where POCs can acquire vouchers through various beneficial work initiatives and activities tied to environmental protection activities, the common good, UNHCR operations and so on. This will require careful considerations

and advocacy since activities such as cash transfers and vouchers are currently restricted. The programme should also be tied to a forestry management programme that would give substantial benefits to host communities and POCs, while rejuvenating forests in the surrounding areas.

Figure 13 shows the ranges of costs for bulk-procuring the fuel types with LPG being the most expensive solution, followed by briquettes, charcoal, and fuelwood. This modelling is imperfect and is completely reliant on many consumption values that do not have published methodologies. Given the high variance between these consumption values, a minimum and maximum range is presented. The initial briquettes maximum seemed unreasonably high and was discarded (see Annex 6.3) for Figure 13, but the presented maximum value also seems unreasonable in comparison to the other fuels. Consequently, these numbers and ranges should be taken with caution.

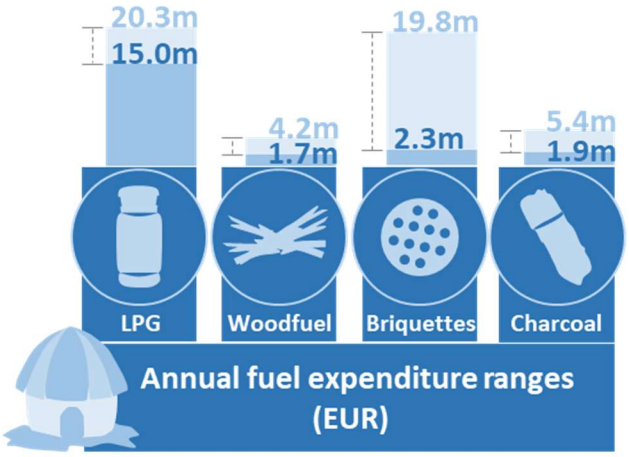


Figure 13 Annual fuel expenditure by fuel type

However, it is useful in understanding some of the scale of the needed interventions. The biomass solutions are mostly less expensive than LPG. Given that a programme of this type would need sustained funding over many years, the costs quickly add up. These scenarios are simplified to cooking-fuel consumption only and do not consider additional fuel needs such as heating at night.

Critically, the scenario costings do not consider providing fuel to host communities. A major assumption is that communities would benefit from the agroforestry programme and would not be linked directly to handouts or fuel distribution. The benefits of a forestry programme (income, jobs and so on) for the host communities would help mitigate any issues that may arise from this arrangement. Benefits for host communities should be considered in a sustainable development framework, which usually avoids handouts except for the poorest and most vulnerable. Distributing fuel should be considered a short-term emergency humanitarian necessity, at least until POCs have greater economic and political rights to participate in local markets. Box 1 highlights a possible framework to work from if a market-building approach becomes feasible.

Box 1. Framework for private partnership approach for energy intervention[15]:
Based on examples from other displaced contexts and current best practices, if camp restrictions are lifted, there is potential for a public/private partnership approach to energy interventions in Kigoma. Below are simplified steps for how this programme might be implemented.

1. Household survey representative sample to understand preferences, ability to pay and willingness to pay consumers (POCs and surrounding communities).
2. Design subsidy for alternative fuels to consumers (POCs and surrounding communities), capped at a price deemed reasonable based on household survey results.
3. Launch competition for private companies to integrate concession into long-term business plans (including refugee camps and surrounding communities).
    - Gap between true cost of fuel and subsidised price to consumer is paid upon proof of sales by programme implementer or donor
    - Companies to design phase out of subsidies over time
    - Design should support government policies and initiatives (lower environmental impacts of fuel harvest/use, phasing out of charcoal, etc.), and
    - Winning design might include income opportunities, training and entrepreneurial skills for women and youth.

A prize fund to be used as a revolving fund for households to finance any initial capital expenditures dependent upon fuel and stove type (such as making adjustments to stoves for charcoal use, LPG kit, etc. which is a common barrier for adoption).

Programme start-up costs (such as acquisition of new stoves or repair of existing stoves and training for end-users) are all considered in Figure 14. Programme staff and overhead costs have not been considered. The LPG starter kit is quite expensive, so it is likely that again, this solution would cost the most. LPG would also require additional investments from a private LPG company for at least three additional fuel stations (€32,000) and the annual costs of staff and contractual services required to maintain refill services (€500,000)[52].

The remaining fuels have similar programme costings, with the difference between them mostly made up by a 5 per cent compensation to local fuel traders, which is proportional to the fuel costs from Figure 13. More detailed data on current cookstove state and use for example, would be needed to give more accurate costings.

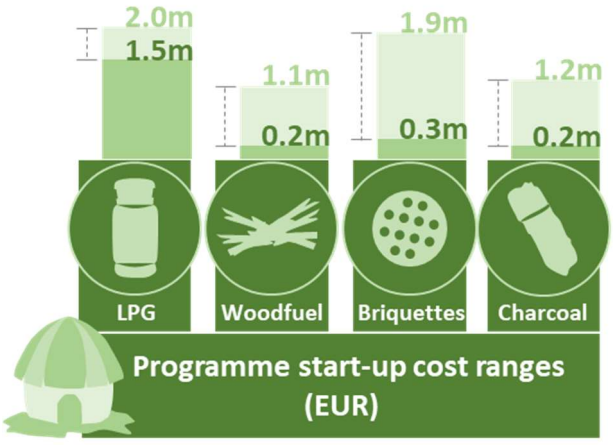


Figure 14 Start-up costs by fuel type

IIED added a conservative 10 per cent 'transportation cost' to biomass fuel numbers given Kigoma's location far in the west and its limited infrastructure. This probably gives a more conservative estimate as assumedly negotiations and bulk purchases of fuels could bring pricing well below market rates. The market prices are the best estimates from IIED's literature and fieldwork, but these should be considered with caution.

Stove models have a range of costs with the double-burner Matawi stove (SNV design) chosen to be the upper limit of around €11.70. The Matawi stove has the additional benefit of supporting local entrepreneurs who construct the stoves in Kigoma, but the mobility of the stoves also allows them to be easily stolen or resold. The REDESO and CEMDO mud stove designs have minimal construction

costs. Importantly however, not all POCs have access to the materials such as grass and clay required to construct such stoves, which should be considered in any programme design.

A briquette programme where local supply and value chains are built up to fabricate briquettes has great job creation and economic potential. A programme like this would need careful costing and consideration and would potentially be very risky given the complexity of setting up such value chains.

Box 2. An organised solution
During one of IIED's FGDs, a POC suggested that UNHCR provide transport for POCs to go and collect woodfuel. They stated that this could be organised by camp section to go on different days to designated areas outside the camps where POCs could then collect woodfuel to bring back to their camp section. This could build community cohesion in the camps, reduce security and protection risks and could help with issues of concentrated deforestation as they could target different areas. However, the government must agree to setting aside forest land for POC use, which may be difficult to negotiate. The transportation costs could potentially be quite high as well depending on distances, which may make this a non-starter. However, it does show that POCs should be engaged more deeply as they have many ideas and solutions to offer through their own lived experience.

4.2.1 LPG

LPG annual fuel expenditure range: €15–20.3 million
LPG programme start-up cost ranges: €1.5–2.0 million

LPG gives instant heat for cooking and is also considered one of the cleanest burning fuels, which potentially has effects for better health outcomes. But distributing LPG to the camps is probably the most expensive option. The government states that food and non-food items must be given free of charge to POCs and a 6kg LPG cylinder refills costs about €8.97 (TZS 23,000), which quickly adds up over the roughly 75,000 households. Even if a large subsidy on refills was allowed and implemented, few POCs have the ability or willingness to pay for LPG. Additional costs include the LPG starter kit (€23.4 per kit) as well as education and awareness raising for end-users on how to use LPG safely. The DTU study estimates that a household consumes two 6kg cylinders per month.

The LPG programme would require capital expenditure for additional fuelling stations to meet demand, preferably borne by a company that would see long-term investment potential for the area. The company would assumedly pay for the additional staff needed to maintain and provide services.

It is possible that LPG refill rates would reduce in negotiation or over time through the aggregation of the sustained demand of POCs and the bulk purchasing of gas. But the LPG refill cost in Dar es Salaam is roughly €7 (18,000 Tanzanian shillings) so it is unlikely to reduce below this rate. That still leaves LPG as far more costly than biomass choices. To include 5,000 households in an LPG distribution as the DTU study suggests would need an additional €1.3 million per year. However, this is based purely on a distribution of fuel, which is not recommended for host communities and why the calculation for host communities was not included. Including host communities in a subsidised approach, as DTU suggests, is feasible. But as mentioned in Section 4.2, a market-building short-term subsidy would most likely not work in this context. See Box 3 for more details on what a successful LPG context may look like.

Box 3. Success of LPG in a different context: Niger

UNHCR successfully set up an LPG programme for POCs in Niger by leveraging the aggregated demand of POCs for LPG and partnering with a private LPG distribution company. The model worked well because POCs enjoyed the right to work, study, access finance and open bank accounts, which gave them access to cash and other opportunities. Additionally, the POCs lived among communities of Nigeriens, without restrictions on movement. Crucially, since wood was relatively scarce in this context, the price of LPG was cheaper than wood, which easily established a clear business case for the programme. Adoption of LPG on the market went from 1 per cent to 30 per cent in one year. Important to note is that once the price subsidy on LPG phased out, 30 per cent of families stopped refuelling, citing an inability to pay the market rate. Woodfuel traders also adjusted their offerings to the changing consumer preferences and increased charcoal production, which brought the charcoal price level with LPG.[15]

4.2.2 Woodfuel

Woodfuel annual fuel expenditure range: €1.7–4.2 million
Woodfuel programme start-up cost ranges: €0.2–1.1 million

The majority of POCs use woodfuel for their cooking needs, which means less end-user awareness raising of how to use the fuel. UNHCR distributes woodfuel to people with special needs already, so this could be used as a model and scaled. This distribution choice could also connect easily to sustainable land-management efforts outlined further below. Woodfuel could be distributed in the short-term over a three-year relief period, until the sustainable forestry programme began providing sustainable woodfuel starting in the fourth year. Since there would be no change in fuel type after the three-year relief period, there would be no additional costs around end-user training during this period. It is possible that new stoves will be needed by the fourth year, but without solid data on stove durability, IIED chose to leave these costs out. Programme training activities, however, should probably focus on proper construction of improved mud cookstoves and their use, quality-control monitoring of the constructed improved cookstoves, as well as provision for materials for stove construction, if required.

Woodfuel would need additional space for storage compared to charcoal or briquettes. These additional costs (land leasing, fencing, security, etc.) have not been included.

4.2.3 Briquettes

Briquettes annual fuel expenditure range: €2.3–19.8 million
Briquettes programme start-up cost ranges: €0.3–1.9 million

IIED had difficulty sourcing accurate data for briquettes in the Tanzania context. IIED found that household consumption values referenced varied widely: 0.2kg, 1.7kg and 3.0kg per household per month. For the purposes of this study, only the consumption values of 0.2kg and 1.7kg were used, which highlights why the range of cost spreads so far for briquettes. Using a consumption value of 3.0kg brought programme costs to seemingly unreasonable €35 million. The cost for briquettes also has higher uncertainty than the other fuels, as to date, IIED was unable to verify the makeup and consistency of the briquettes used to estimate consumption to reasonably compare them, which may explain the vast range of costs.

Briquettes made from different types of agricultural waste have different burn properties, which would result in different consumption rates and consequently adoption rates. Additionally, IIED has interviewed several experts in the field and a common theme to ensure briquettes are of a useful

quality is sufficient compression when producing the briquette. Quality deteriorates severely when using low-tech options such as hand-operated compression devices. This brings into question whether these low-tech devices are suitable, despite their appeal as a lower cost and easier to manage option. More research would need to be done to fully interrogate consumption rates of the types of briquettes to better understand the scale of costs.

An effective briquette programme could be linked to building up local value chains tied to the manufacture of briquettes. A study by ARTI Energy, a local energy NGO, concluded that there is potential to source agricultural waste all year round, but the types of waste would vary, which may affect adoption rates. This would need close consideration for any briquette fabrication programme. However, this programme could be paired with a sustainable forestry programme to rejuvenate surrounding forest areas.

4.2.4 Charcoal

Charcoal annual fuel expenditure range: €1.9–5.4 million
Charcoal programme start-up cost ranges: €0.2–1.2 million

This scenario is presented for comparison as the Tanzanian government is trying to phase out charcoal, which makes this scenario politically unpalatable. Many POCs prefer charcoal to other types of fuel based on personal tastes and its fuel properties, which would probably mean higher initial adoption and uptake rates than LPG and briquettes. Charcoal also requires less storage space than wood for the same amount of energy. With small modifications, existing mud stoves can be modified to use charcoal. Indeed, IIED noted that many POCs used old bicycle gears as trays to hold charcoal inside the mud stoves.

4.3 Replenishing deforested areas

Comprehensive programmes for 10-year forestry management

The fuel scenario costs do not include an essential and comprehensive forestry development program that this report recommends should be implemented simultaneously. Consequently, the chosen fuel and forestry program costs must be combined, which would require humanitarian and development donor agencies to uniquely join forces.

In 2018, FAO put together a comprehensive study looking at interventions to reverse deforestation around the three camps including forest rehabilitation, wood-energy plantations and agroforestry, outlined in Table 2. These three options listed are different models for providing sufficient woodfuel to meet the needs of the camps. The wood-energy plantations and agroforestry interventions both have positive benefit–cost ratios, while the forest rehabilitation programme is negative. FAO states that the forest rehabilitation assessment did not fully cost some benefits such as diversity and ecosystem services. These interventions should be as inclusive as possible to ensure that both communities and POCs benefit, which would also help safeguard activities and the programme. Since FAO published the study, the number of POCs has decreased by almost 14 per cent, which ostensibly would reduce demand for wood and hence programme implementation costs.

Table 2 FAO proposed 10-year forest management programmes to meet woodfuel needs of the camps

Programmes	Annual cost (US$)	10-year total cost (US$)	Benefit–cost ratio	Required amount of land (Ha)
Forest rehabilitation	6.25 million	62.5 million	0.87	79,944
Wood-energy plantations	4.49 million	44.9 million	1.21	7,008
Agroforestry	7.31 million	73.1 million	1.31	34,467

All three proposed interventions could supply enough wood to meet the needs of the three camps, but would not necessarily cover the demand of host communities. Admittedly, demand from the approximately several thousand households in the host communities would be far less than the camps. These programmes necessitate that the long-term cooking fuel for the area would be sustainably harvested woodfuel, looking at that choice for years to come.

Crucially, the harvesting of wood from this component would only begin in year four of the proposed forest management interventions, which necessitates a short-term cooking fuel intervention in the three years leading up to it. Consequently, choosing wood as the cooking fuel has the benefit of reducing frictions around adoption rates of 'new' fuels such as LPG and briquettes, which would require large awareness-raising and behaviour-change campaigns. They additionally require development of value chains and infrastructure, which can be costly investments and pose a level of complexity that increases risk of failure.

Assuming host communities are mostly agriculturally based, agroforestry may be the best choice as it allows the growing of woodfuel and agricultural products like maize simultaneously. This would provide communities with an income until the wood matures, after which farming and harvesting of wood could happen simultaneously. However, there is the risk that communities may be tempted to supplement their income by harvesting wood too soon and jeopardising the programme.

The study does not include numbers for community wood demand, only refugee camp consumption. The study also does not consider how POCs would be supplied or pay for the wood that is harvested. From year four, UNHCR could source and purchase wood from the land management component, which would have large benefits for the surrounding communities.

Importantly, these programmes must include POC and host community benefits. Without more economic opportunities, POCs would potentially still try to source woodfuel even with fuel distribution and a sustainable forestry programme. It is important that POCs are allowed more freedom to pursue economic opportunities in the camps, which would then increase the opportunity cost of collecting fuel.

4.4 Integrating SGBV from the start

To address SGBV, programming must acknowledge how gender inequality and associated harmful norms, attitudes and behaviours affect women and girls of all ages, and that women and girls are frequently excluded from decision-making processes that affect them.[57,58,59] Programming designed to address gender inequality often includes responses to incidents of SGBV such as the provision of healthcare as well as prevention efforts which should aim to transform gender inequality and harmful social norms. Initiatives to address SGBV should not only target women and girls deemed vulnerable to experiencing violence, but also families of girls, particularly mothers and fathers, who, if engaged effectively, can be catalysts to shift beliefs and attitudes that further stigmatise women and girls who

experience violence.[60] Many best practices and lessons have emerged from DFID's investment in the What Works to Prevent Violence Against Women and Girls programme, which includes research studies on violence against women and girls in conflict and humanitarian settings.[61]

Solutions presented in this report aim to decrease deforestation and fulfil cooking fuel needs of POCs. Solutions should integrate designs and activities that have been proven effective in reducing SGBV risks. None of the solutions should be expected to directly affect the incidence and severity of SGBV in the camps or host communities, but they can mitigate risks in the way the solutions are designed and delivered. This is often referred to as 'mainstreaming' SGBV.

Below are some examples of how to mainstream protection and SGBV considerations into cooking fuel programmes:

- Consult community members (including women) and select locations and times for food and non-food distribution that are perceived as safest (e.g. times during daylight hours and locations that do not require heavy loads to be carried long distances). Assistance should be provided to transport items to shelters for those with childcare or other caring responsibilities or mobility challenges.
- Livelihoods and food security programmes that include work in their design should not include hazardous work for children (i.e. work which due to its nature or the circumstances in which it is carried out is likely to harm the health, safety or morals of children). This includes:
    - Work that exposes children to physical, psychological or sexual abuse
    - Work environments such as at dangerous heights, or in confined spaces
    - Work with dangerous machinery, equipment, tools or which involves manual handling or transport of heavy loads
    - Work in unhealthy environments that could expose children to hazardous substances, agents, processes, temperatures, noises or vibrations
    - Work for long hours or during the night or where the child is confined in the premises of the employer.
- All field teams involved in the implementation of the project, including those teams involved in distribution and monitoring the intervention, should aim to be gender balanced, having equal numbers of men and women.
- Any information provided to POCs regarding the intervention should be provided in a variety of methods and using different channels (e.g. leaflets, radio messages, posters) and ensure those with low levels of literacy can access all information on distributions, trainings or other elements of cooking and fuel interventions.
- Programme staff should liaise with SGBV and child-protection actors and open communication channels for discussions on the effect of cooking fuel interventions on perceptions of SGBV and protection risks and to inform monitoring of cooking fuel programming.

4.5 Kigoma Joint Planning

Most of the aid agencies present in Kigoma are there because of the refugee camps. That is not to say that different agencies over the years have not engaged with and supported host communities. This engagement has been ad hoc and often focused on specific infrastructure installations in one or more communities that are branded with the agency name to demonstrate that they are working to help local Tanzanian populations as well as POCs. These types of infrastructure projects are mostly donated and many do not have sustainability plans in place and lack a sense of ownership within communities. A dependency culture can also be created and aid agencies can be played off against each other for support.

Different target groups also have quite differing types of needs – whether within local communities or in the camps. Within the camps, differences are quite apparent – for example when comparing the needs of more wealthy Congolese with less wealthy Burundian POCs. This can be a cause of increased tension and conflict.

The aid agencies have recognised the issue of ad hoc engagement with local communities. Efforts to better coordinate include the UNHCR Dashboard which gives an overview of all the projects/programmes from different agencies in a single view. This is a useful first step in identifying where projects have been clustered if it is continued to be updated and used. However, it is fairly passive and is more about information sharing than active coordinated or collaborative planning.

In 2017, UNHCR launched the Kigoma Joint Programme, aimed at programmatic work in host communities in a number of key sectors. The programme is limited to programmatic work by UN agencies and so far, has not received the levels of funding that the plan lays out.

Government district planning pools community-defined priorities into a list. This largely tends to be infrastructure ideas coming up from community level. Aid agencies have used this list to pick projects they want to implement, according to their mandate and funding criteria.

Globally, experience from energy planning shows that energy is often not seen as a top priority from the end-user's perspective. Without informed dialogue and capacity building on linkages into other sectors such as health, education and livelihoods, energy access can often be deprioritised. Energy planning in Tanzania is also a centralised function, so district-level interest in energy is often restricted to interests of specific local government departments such as environment (cooking), health etc.

WFP's Building Resilience through Safe Access to Fuel and Energy (SAFE) initiative includes useful performance and impact metrics and also outlines multi-sectoral areas to consider for programmes: improving nutrition, livelihoods development, women's health and safety, relationship of conflict and tension to energy, disaster risks and climate change, and the water–food–energy–ecosystems nexus.[21]

This emphasises the multi-sectoral nature of 'energy as an enabler' where there is a greater need for more integrated approaches to planning. As highlighted earlier, there are also very diverse needs across and between host communities and the camps and a dynamic and changing context. This points towards identifying an approach to energy planning and implementation that better identifies the needs of different target groups, cuts across sectors, focuses strongly on local contextual factors and is adaptive or iterative to ensure impacts are delivered over the longer term. This framework could be adapted to other districts or regions, such as Shinyanga where the negative consequences of climate change is a concern.

The recommendations in Section 5.1 identify guiding steps to planning that include the factors discussed here. The overarching intention is to improve levels of local buy-in, to develop context-appropriate solutions based on root-cause analysis of needs and associated desired impacts and to use an adaptive management approach which integrates monitoring and learning to move beyond pilots to achieve scale.

5 Recommendations

The situation in Kigoma is protracted, complex and subject to ongoing change. An energy and environment programme should be comprehensive and aim for scale with long-term solutions that build in the ability to adapt. Such a programme should also be integrated with wider development planning that impacts host communities as well as POCs. Any solution will require government buy-in and close collaboration between the many components.

More research and planning are needed to develop sustainable long-term solutions. Action to move beyond pilots is also needed and Section 5.1 provides recommendations for an adaptive planning and implementation process that aims to reach scale. This builds in adaptive management and learning. This process includes aspects that the report has highlighted on integrating contextual factors – including planning to mitigate SGBV risks – and moving beyond considering the 'cooking issue' as only related to supply of fuel and appropriate cooking appliances.

This report does not at this stage recommend any specific solution on cooking. Having said this, the findings from Section 4 point to the need for a strong consideration of sustainable woodfuel which in the long term (beyond four years) can be an income source to host communities as part of the solution. If a longer-term, locally sourced and sustainable woodfuel solution is used, it makes the most sense to retain wood as the main source of fuel in the short-term through a bulk purchase programme of sustainable wood from outside of the region. One important factor highlighted in Section 4.1 is that for any fuel type and associated solution developed there will be continued use of wood by some POCs in the camps as a source of fuel due to factors such as cooking preference, stove stacking and the opportunity to sell the prescribed solution in preference of 'free' wood.

Hence, some level of better forest management is required irrespective of the energy solution as laid out in Section 4.3. Deforestation is a complex issue and better understanding the root causes, which are not solely attributable to POCs in the camps sourcing woodfuel, is critical if it is to be addressed. Recommendations on planning for reforestation are given in Section 5.2. Lastly, beyond stakeholder engagement and buy-in that the adaptive planning and implementation process aims to foster, Section 5.3 provides recommendations for further improving stakeholder collaboration and buy-in.

5.1 Planning and delivering energy solutions

The following six-step process is adapted from the IIED/CAFOD Energy Delivery Model (EDM) approach[62] and integrates learning from this study. It is intended as a guide for more adaptive design and implementation of energy services, understanding the root causes of problems from a more holistic perspective and building in solutions which consider local contextual factors. The process also aims to foster buy-in through inclusion of a broader range of stakeholders, which is in line with findings in Section 4.4 on joint planning. These steps can be repeated periodically to review, improve and adapt solutions to changing local contexts.

Specific references in the six steps below, guided by the EDM approach mentioned above, are made to bring out the issues identified in the report. These steps also apply more broadly to energy planning where energy (including electricity) can be seen as an enabler for other sectors such as health, agriculture and education when planning for impacts for host communities and POCs in Kigoma.

1. **Enhance baseline knowledge:** Build and establish data on energy use and energy expenditure in the camps and host communities. A deeper understanding of POC and host community monthly household fuel consumption and energy expenditure is needed in order to design appropriate cooking solutions at scale. This data is essential to ensure that the best possible

solution is chosen and that the proposed fuel and cookstove solution will adequately address the needs of POCs and host communities. Other important data, such as causes of deforestation, are needed to ensure that other issues like deforestation are addressed appropriately. Although a critical step, these activities are often limited by resource availability. A representative sample survey, which considers different groups of people based on specific criteria (e.g. socioeconomic status, gender, age, nationality, vulnerability etc.) may be used. This needs to be coordinated across the three camps.

2. **Engage and convene:** A comprehensive mapping of stakeholders must be conducted. The mapping should determine which stakeholders would have the greatest influence and which stakeholders would be most affected by interventions. Stakeholders from the region need to work together to achieve sustainable results and to enable sufficient social and political buy-in. This means integrating cooking and energy considerations into wider development planning by understanding development priorities of the local government in Kigoma and for aid agencies to work together with the local government from the early stages of programme development through to implementation of solutions. Most importantly, local communities and POCs must be central to the design and implementation process and early engagement with them through awareness raising would help design a programme that meets their needs, enhances their buy-in and understanding, and manages expectations.
3. **Establish understanding:** Engage with POCs and host communities to understand priority needs from their perspectives, their preferences and willingness to pay for energy. It is essential to understand POC and host community priorities. For example, reducing time and heavy labour spent fetching woodfuel is a top priority for POCs – and must be considered as a key part of a workable solution. But other root issues, such as limited economic opportunities in the camps, must also be addressed. Host communities are keen to trade with POCs, which creates benefits for many. Priorities of other relevant stakeholders (including other aid agencies who provide non-energy-related support such as provision of water, food etc.) are also important to understand if buy-in and integrated solutions are to be created.
4. **Design and test:** Different solution-delivery models should be defined and mapped. As a first step to engaging stakeholders, new scenarios for cooking and energy need developing. The scenarios in this study are a start to understanding the scale of a programme, but more accurate consumption and end-user usage data is needed. Different and more accurate cooking combinations could be established and, using the data from steps 1–3, more detailed modelling can support programme design. The design stage should include engagement with POCs and host communities to ensure the programme has the greatest impact possible and to establish initial buy-in. Critical aspects relevant to the camps and surrounding communities to build into the design include:
    - **Preferences:** Tastes and preferences should also be incorporated into fuel and stove solutions – arguably as well into the food rations issued.
    - **Enabling environment:** Explore current and likely policy and regulatory opportunities and barriers to any particular proposed solution – including access to finance through existing channels.
    - **Local contextual factors:** Other social, economic and environmental contextual factors are also highly important. For example, information on mud stove durability given how they are installed and used will be important for costing.[e] Though it is unlikely that POCs will be allowed to pay for fuel and cookstoves in the near term, this

[e] SNV has design recommendations for the REDESO and CEMDO mud stoves such as pot holders, burn-chamber size and burn-chamber door-opening dimensions.

data point gives more information on the market and could also help if the policy environment shifts.

- **Existing delivery structures:** Linking with existing energy and non-energy delivery models and the implementing partners that exist in the camps will provide opportunities to learn more about the contextual factors that can affect programme implementation and scale-up from pilots. Identifying programmes with the potential to integrate energy into or support priority needs (e.g. food and water provision) will build opportunities for cross-sector collaboration.
    i. PSNs already receive a distribution of woodfuel: Consider using this as a model to reach scale, while evaluating areas for improvement.
    ii. Food distribution to POCs: Consider sourcing foods that take less time to cook and consequently use less fuel.
- **External factors:** Risks beyond the control of programmes, such as the spread of the Ebola virus or another cycle of upheaval in neighbouring countries, must be continually monitored and mitigated. The programme must be buttressed with a flexibility to adapt to these risks and changing conditions.
- **Conflict and SGBV:** Protection risks for POCs and host communities can be investigated with the use of specialist experts and linked closely with agencies which are able to provide more detailed and comprehensive information beyond official reports of SGBV incidents. Understanding perceived views such as stereotyping among the different communities is also important for minimising risks of internal communal conflict.
- **Market disruption:** Any mass distribution of items will affect markets. Consider identifying those who will be affected and build in compensation for them and/or include them in other programme components such as land management or training opportunities.
- **Acceptance:** Cordial relations and easing tensions between POCs and host communities are critical to designing interventions with greater adaption by end-users. Recognise the power of language and stereotypes across communities and consider social and cultural dynamics related to family and gender in all programming.

5. **Optimise and review:** Before going forward with a proposed solution, assess and plan for economic, social and environmental risks – including risks of conflict, changing policies and changing external circumstances. Also ensure that the proposed solution is perceived as sustainable and that support services (such as the engagement activities described in Section 5.3) are in place. Regular reviews should include realistic and impact-focused indicators which are built into programmes. As previously mentioned, too many pilots are being implemented without coordination on implementation and results and without aiming for scale. Steps 1–4 should establish data to design a proper programme with the flexibility to adapt and scale incrementally.
6. **Manage implementation:** Any agreed implementation needs a transparent and robust monitoring, evaluation and learning strategy for the programme to ensure a level of adaptive implementation. Preferably, an independent organisation would monitor and evaluate, which would provide a much-needed level of robustness and independence. Reflection points can be built into the programme and should revisit this process to ensure intended impacts, to reflect on whether original objectives are still valid and to reinvigorate stakeholder buy-in.

5.2 From deforestation to reforestation

As presented in Section 3.1, the problem of deforestation is multi-faceted and not well understand in terms of the scale of the various contributions. The following recommendations will help fill that knowledge gap and highlight key points to take forward to help alleviate deforestation.

- **Gather more data:** More evidence is needed to understand the causes and scales of deforestation to ensure that any land-management or forestry programme (integrated with cooking solutions) will address deforestation issues. This includes better understanding of non-woodfuel deforestation for agriculture and cattle which extends the scope beyond the cooking issue and refugee camps, and would include host community activities.
- **Build on FAO's recommendation for a comprehensive sustainable forestry/consumptive conservation programme** that benefits local communities with an eye towards immediate and long-term revenue generation. This should recognise that 'stove stacking' and use of wood will be a continued issue irrespective of technology solutions and utilise the analysis of deforestation to help feed conservation-management strategies.
- **Integrate local government and agricultural/forestry officers more closely into energy/environment programming**, particularly those who are keen to collaborate to reach their key performance indicators (KPI). This will both help government deliver and alleviate concerns on deforestation and coordinate the various partners on the ground as well as more easily identifying gaps.
- **Ensure that host communities benefit from any sustainable forestry programme:** Host communities must generate some benefit, preferably revenue, in the three years until woodfuel can be harvested. Many already depend on the land for agriculture so it might make sense to implement an agroforestry programme.

5.3 Improving stakeholder collaboration and buy-in

In addition to the programme design and implementation steps outlined in Section 5.1 which have an integral intention to foster buy-in, the following supporting engagement activities are recommended.

- **Coordinate better on energy and environment and between other sectors:** UNHCR's new energy and environment position is useful, as is its information-sharing 'dashboard'. More can be done to strengthen and advance coordination efforts on existing and upcoming initiatives especially at the local level and moving beyond the short term 'projectised' approach towards integrated planning and implementation. Discussions between stakeholders, including with government (national and local) on key issues must be supported with data and evidence and different stakeholder priorities must be addressed. Understanding must be collectively built on how different themes cut across sectors and projects. For example, how cross-cutting topics such as fuels and stove technologies affect nutrition, deforestation, SGBV, health and so on.

- **Highlight and quantify the important economic benefits of the common markets** and refugee labour use realised by host communities. Trade between local communities and POCs continues regardless of the common markets. Better to formalise to allow greater control, benefits and to remove unfair treatment of POCs.

- **Work with local NGOs to strengthen capacity**, particularly on the social aspects of cooking and understanding cooking needs, and in undertaking continued monitoring and learning on

impacts. This could include some level of independent or cross-organisational monitoring and effective approaches for sharing knowledge among partners and external stakeholders.

The Kigoma context has layers of complexity that can be difficult to unpack and requires a package of comprehensive solutions that can impact the drivers laid out in Sections 3 and 4. The problems inherent in the Kigoma context are not insurmountable. Stitching together an inclusive energy and environment programme that integrates best practices from SGBV, nutrition and others into the initial design can help mitigate and address the dynamic and overlapping issues facing people in Kigoma. Built-in and ongoing feedback mechanisms coupled with adaptive management can help correct the course of implementation if impacts are not as intended. This programme flexibility will also buttress against external and regional changes that can rapidly shift, sometimes quite literally overnight.

Buy-in and collaboration must be addressed at the onset, ensuring that programme components are appropriately structured and staffed so that partners across sectors are communicating effectively and the spirit of collaboration is felt by all. Staff turnover threatens institutional memory, as is apparent in many programmes already implemented. Projects must be designed to capture important information and lessons to help mitigate the inevitable issue of turnover.

Crucially, the programme must benefit POCs and host communities alike, with particular care taken to ensure the participation of women and girls and that the most vulnerable of all communities are included in design and implementation. People without skills should be trained and involved. Those who are relatively rich should be engaged in harnessing market opportunities.

To ensure the success of the programme, local and central government should be involved as soon as possible. The symbiotic relationship between POCs and host communities must be highlighted and discussed and the programme benefits for both should be emphasised. Realities must be discussed at the very least in private sessions, so that frank discussions can lead to workable solutions. For instance, continuing to use POCs as scapegoats for wider deforestation problems might mean that forests are never rejuvenated.

In sum, the strengths of humanitarian short-term impacts must be linked to the long-term vision of sustainable development, including the crucial step of connecting humanitarian response budgets and donors to those of international development. This study's findings have hopefully given a structure and a nuance that can be used as a roadmap for partners to move forward in holistically supporting the Kigoma region.

6 Annex

6.1 Limitations

As best as possible, this research strives to provide a comprehensive overview of the key issues faced by POCs and host communities with potential solutions moving forward. The issues in Kigoma are complex, multi-layered and deeply rooted in history, with local, regional and global dimensions. Given this complicated context and a limited timeframe, this study has an ambitious aim.

IIED's initial literature review unearthed many relevant and context-specific reports. KIIs also validated materials that IIED had already gathered and pointed towards other pertinent sources of information. However, there may still be other relevant reports and documents that IIED has been unable to review that could have importance to this study.

Given the limited timeframe of the one-week field visit to assess the camp conditions, the team needed to focus and simplify the approach. While all three camps present extremely unique circumstances, Nduta and Mtendeli offer populations with mostly the same country of origin, similar institutional environment framing around restrictions on movement and dearth of food, as well as UN agencies and NGOs that offer very similar services.[49] Consequently to save time, the team chose to visit Nduta and Nyarugusu camps, which encapsulate 87 per cent of the total refugee population of the three camps and include Burundian and Congolese households. There is a risk that important information specific to Mtendeli was not captured. However, IIED mitigated this risk by reviewing material and reports specifically from Mtendeli.

IIED had limited control over the selection and makeup of the focus group discussions (FGDs). Indeed, although IIED supplied a list of participant criteria to UNHCR and DRC, ultimately the implementing NGOs in the camps chose the individuals for the FGDs, which might have led to selecting the 'usual' participants. FGD fatigue was apparent in some of the groups, where some participants complained that they had sat many times in FGDs but are not seeing their inputs translating into improvements on the ground. The open forum and discussions may also have limited responses depending on underlying power dynamics, relationships and group dynamics. However, most sessions were participatory, and participants were regularly encouraged to share. Additionally, camp authorities attended three sessions, which may have influenced participant answers. The FGDs were mostly conducted in participants' native languages of Kirundi for the Burundians and French for the Congolese. Swahili was also used to clarify some questions and inputs. Some of the translators seemed experienced in dealing with academic researchers, but others lacked understanding around some methods of triangulating information.

Also, there is a risk that some of the nuances of responses were lost in these translations. For example, in one surrounding community the authorities spoke of the POCs as 'them', but in the focus group discussions the community members spoke of POCs as 'neighbours, family and friends'. This important nuance was not initially flagged by translators and did not become apparent until much later. However, given the limited scope of this study, the methods chosen simply helped validate reports and documents related to the three camps.

Approaching SGBV in any depth in such a setting requires specialised training and approaches.[63] The team consulted with specific experts from UNFPA and UNHCR who shared their first-hand experiences and views from previously conducted FGDs. IIED also carefully captured feedback from women and girls on protection-related issues raised during the FGDs. However, considerations for ethical approaches on the topic and the short timeframe constrained the team's ability to approach SGBV in a deep and meaningful way within the camps and the host communities.

Furthermore, the varying degrees of reliability, consistency and accuracy of data gathered from the literature review, fieldwork and stakeholders posed an additional challenge and this study has therefore presented solutions with multiple assumptions and potential risks for implementation.

6.2 List of stakeholders interviewed

Key informant interviews pre-field trip: *Emmanuel Biririza (UNHCR), James Haselip (DTU), Inga Brill (SNV), Megan Gerrard (Clean Cooking Alliance), Nicolas Thonus (ARTI), Mark Gibson (former UNHCR Tanzania), Poul Thisted and Katrien Denys (Danish Refugee Council), Ivana Damjanov (UNCDF). All the experts were generous with their time and answers. These interviews were roughly an hour each and helped tremendously in painting the broad picture of the situation on the ground.*

1. **Review of literature on energy in dynamic settings pre-field trip**
2. **Focus Group Discussions in communities and camps**
3. **Observational walks through communities and camps**

Key informant interviews with organisations: Government officials, camp officials, SNV, Good Neighbours Tanzania, CEMDO, REDESO, UNFPA, UNCDF, DRC.

6.3 Fuel scenario-modelling data

LPG

Assumptions			Consumption per day			Consumption HH per month			Consumption Camp HHs per month			Consumption Camp HHs per year				Cost -camp HHs per year		
Area	Ppl	HH	UNHCR LPG Estimate kg/person/ day	DTU Report LPG Estimate kg/HH/ day	UNHCR LPG Estimate kg/HH/ day	UNHCR LPG Estimate kg/person/ month	DTU Report LPG Estimate kg/HH/ month	UNHCR LPG Estimate kg/HH/ month	UNHCR LPG Estimate kg/camp person/ month	DTU Report LPG Estimate kg/ camp HH/month	UNHCR LPG Estimate kg/camp HH /month	UNHCR LPG Estimate kg/camp person/ month	DTU Report LPG Estimate kg/camp HH/month	UNHCR LPG Estimate kg/HH camp/month	1 kg Cylinder Refill Cost	UNHCR LPG Estimate kg/camp person/ year in EUR	DTU Report LPG Estimate kg/HH/year in EUR	UNHCR LPG Estimate kg/HH camp/year in EUR
Nyarugusu Camp	150,302	36,790	0.10	0.39	0.49	3.04	12.00	15	457,169	441,480	551,850	5,486,023	5,297,760	6,622,200	1.50	8,202,508	7,921,024	9,901,280
Nduta Camp	89,225	29,608	0.10	0.39	0.49	3.04	12.00	15	271,393	355,296	444,120	3,256,713	4,263,552	5,329,440	1.50	4,869,322	6,374,713	7,968,391
Mtendeli Camp	36,036	9,191	0.10	0.39	0.49	3.04	12.00	15	109,610	110,292	137,865	1,315,314	1,323,504	1,654,380	1.50	1,966,611	1,978,857	2,473,571
									838,171	907,068	1,133,835	10,058,050	10,884,816	13,606,020		**15,038,441**	**16,274,593**	**20,343,242**
															Assumptions from DTU Study			
															Additional Program Costs			
															23.40	1,768,978	1,768,978	1,768,978
															5%	751,922	813,730	1,017,162
															5%	751,922	813,730	1,017,162
																1,503,844	**1,627,459**	**2,034,324**
															Assumptions from DTU Study			
															Additional Investment from Company			
															10,676	32,028	32,028	32,028
															41,734	125,201	125,201	125,201
															113,769	341,307	341,307	341,307
																498,536	**498,536**	**498,536**

Woodfuel

Assumptions			Consumption HH per day			Consumption HH per month			Consumption Camp HHs per month			Consumption Camp HHs per year				Cost -camp HHs per year		
Area	Ppl	HH	KOSAP Cooking Study Min kh/ HH/ day	KOSAP Cooking Study Max kh/ HH/ day	DTU Report 'Conservative Estimate' kh/ HH/ day	KOSAP Cooking Study Min kh/ HH/ month	KOSAP Cooking Study Max kh/ HH/ month	DTU Report 'Conservative Estimate' kh/ HH/ month	KOSAP Cooking Study Min kh/ camp HH/ month	KOSAP Cooking Study Max kh/ camp HH/ month	DTU Report 'Conservative Estimate' kh/ camp HH/ month	KOSAP Cooking Study Min kh/ camp HH/ year	KOSAP Cooking Study Max kh/ camp HH/ year	DTU Report 'Conservative Estimate' kh/ camp HH/ year	1 kg Firewood (IIED Interviews 50kg=TZS12000)	KOSAP Cooking Study Min kh/ HH/ year in EUR	KOSAP Cooking Study Max kh/ HH/ year in EUR	DTU Report 'Conservative Estimate' kh/ HH/ year in EUR
Nyarugusu Camp	150,302	36,790	1.60	2.30	4.00	48.67	69.96	121.67	1,790,447	2,573,767	4,476,117	21,485,360	30,885,205	53,713,400	0.1044	2,243,072	3,224,415	5,607,679
Nduta Camp	89,225	29,608	1.60	2.30	4.00	48.67	69.96	121.67	1,440,923	2,071,326	3,602,307	17,291,072	24,855,916	43,227,680	0.1044	1,805,188	2,594,958	4,512,970
Mtendeli Camp	36,036	9,191	1.60	2.30	4.00	48.67	69.96	121.67	447,295	642,987	1,118,238	5,367,544	7,715,845	13,418,860	0.1044	560,372	805,534	1,400,929
									3,678,665	5,288,080	9,196,662	44,143,976	63,456,966	110,359,940		4,608,631	6,624,907	11,521,578
														Transport Costs		460,863	662,491	1,152,158
														Total		**5,069,494**	**7,287,398**	**12,673,736**

	Assumptions (USD)			
Additional Program Costs	Min	Max	Min	Max
Stove Kit Cost	1.00	11.70	75,589	884,489
Additional Stove Kit Construction Training Costs	1.00	2.00	75,589	151,178
Compensation to fuel traders	5%	5%	230,432	331,245
			381,610	1,366,912

Briquette (type unknown)

Assumptions			Consumption HH per day			Consumption HH per month			Consumption Camp HHs per month			Consumption Camp HHs per year				Cost -camp HHs per year		
Area	Ppl	HH	Mkaa Endelevu Briq Estimate kg/person/ day- Wood Waste from Commercial plantations	UNHCR Briq Estimate kg/HH/ day	ARTI Briq Estimate kg/HH/ day	Mkaa Endelevu Briq Estimate kh/ HH/ month	UNHCR Briq Estimate kg/HH/ month	ARTI Briq Estimate kg/HH/ month	Mkaa Endelevu Briq Estimate kh/ camp HH/ month	UNHCR Briq Estimate kg/camp HH/ month	ARTI Briq Estimate kg/camp HH/ month	Mkaa Endelevu Briq Estimate kg/ camp HH/ year	UNHCR Briq Estimate kg/ HH/ year	ARTI Briq Estimate kg/ HH/ year	1 kg Briquette	Mkaa Endelevu Briq kg/ HH/ year in EUR	UNHCR Briq kg/ HH/ year in EUR	ARTI Briq kg/ HH/ year in EUR
Nyarugusu Camp	150,302	36,790	0.20	1.70	3.00	6.08	51.71	91.25	223,806	1,902,350	3,357,088	2,685,670	22,828,195	40,285,050	0.38	1,033,178	8,782,010	15,497,664
Nduta Camp	89,225	29,608	0.20	1.70	3.00	6.08	51.71	91.25	180,115	1,530,980	2,701,730	2,161,384	18,371,764	32,420,760	0.38	831,485	7,067,620	12,472,271
Mtendeli Camp	36,036	9,191	0.20	1.70	3.00	6.08	51.71	91.25	55,912	475,251	838,679	670,943	5,703,016	10,064,145	0.38	258,112	2,193,951	3,871,678
									459,833	3,908,581	6,897,496	5,517,997	46,902,975	82,769,955		**2,122,774**	**18,043,581**	**31,841,613**
														Transport Costs		212,277	1,804,358	3,184,161
														Total		**2,335,052**	**19,847,939**	**35,025,775**
																2.34	**19.85**	**35.03**

Additional Program Costs	Assumptions (USD) Min	Max	Min	Max
Stove Kit Cost	1.00	11.70	75,589	884,489
Additional Stove Kit Construction Training Costs	1.00	2.00	75,589	151,178
Compensation to fuel traders	5%	5%	106,139	902,179
			257,317	1,937,846

Charcoal

Assumptions			Consumption HH per day			Consumption HH per month			Consumption Camp HHs per month			Consumption Camp HHs per year				Cost -camp HHs per year		
Area	Ppl	HH	KOSAP Cooking Study Min kh/ HH/ day	KOSAP Cooking Study Max kh/ HH/ day	DTU Report 'Conservative Estimate' kh/ HH/ day	KOSAP Cooking Study Min kh/ HH/ month	KOSAP Cooking Study Max kh/ HH/ month	DTU Report 'Conservative Estimate' kh/ HH/ month	KOSAP Cooking Study Min kh/ camp HH/ month	KOSAP Cooking Study Max kh/ camp HH/ month	DTU Report 'Conservative Estimate' kh/ camp HH/ month	KOSAP Cooking Study Min kg/ camp HH/ year	KOSAP Cooking Study Max kg/ camp HH/ year	DTU Report 'Conservative Estimate' kg/ HH/ year	1 kg Charcoal	KOSAP Cooking Study Min kh/ HH/ year in EUR	KOSAP Cooking Study Max kg/ HH/ year in EUR	DTU Report 'Conservative Estimate' kg/ HH/ year in EUR
Nyarugusu Camp	150,302	36,790	0.80	1.70	2.30	24.33	51.71	69.96	895,223	1,902,350	2,573,767	10,742,680	22,828,195	30,885,205	0.0936	1,005,626	2,136,955	2,891,174
Nduta Camp	89,225	29,608	0.80	1.70	2.30	24.33	51.71	69.96	720,461	1,530,980	2,071,326	8,645,536	18,371,764	24,855,916	0.0936	809,311	1,719,787	2,326,770
Mtendeli Camp	36,036	9,191	0.80	1.70	2.30	24.33	51.71	69.96	223,648	475,251	642,987	2,683,772	5,703,016	7,715,845	0.0936	251,229	533,861	722,283
									1,839,332	3,908,581	5,288,080	22,071,988	46,902,975	63,456,966		**2,066,166**	**4,390,602**	**5,940,227**
														Transport Costs		206,617	439,060	594,023
														Total		**2,272,782**	**4,829,662**	**6,534,249**

Additional Program Costs	Assumptions (USD) Min	Max	Min	Max
Stove Kit Cost	1.00	11.70	75,589	884,489
Additional Stove Kit Construction Training Costs	1.00	2.00	75,589	151,178
Compensation to fuel traders	5%	5%	103,308	219,530
			254,486	1,255,197

Endnotes

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