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Published in:
Weather and Climate Extremes

DOI:
[10.1016/j.wace.2018.09.002](https://doi.org/10.1016/j.wace.2018.09.002)

Publication date:
2020

Document Version
Publisher's PDF, also known as Version of record

Citation for published version (APA):
Thulstrup, A. W., Habimana, D., Joshi, I., & Oduori, S. M. (2020). Uncovering the challenges of domestic energy access in the context of weather and climate extremes in Somalia. *Weather and Climate Extremes*, 27, Article 100185. <https://doi.org/10.1016/j.wace.2018.09.002>

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Uncovering the challenges of domestic energy access in the context of weather and climate extremes in Somalia

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ARTICLE INFO

Keywords:

Climate extremes
Energy access
Protracted crises
Environmental degradation
Deforestation

ABSTRACT

In Somalia, challenges related to energy access is influenced by both weather and climate extremes and associated conflict. The objective of this article is to gain an improved understanding of these risks and challenges, which are faced by the most vulnerable populations in the country. In particular, cooking energy-related challenges faced by households affected by weather and climate extremes and conflicts include protection risks, malnutrition, health risks, environmental degradation and heightened tension and conflict between social groups. Interventions to address these issues should focus on both fuel supply and fuel demand as well as on improving the livelihoods of affected populations. In the aftermath of an extreme weather event it is recommended that assessments of the energy needs of all affected populations, including both hosts and Internally Displaced People (IDPs), be conducted. Post-disaster support should include the promotion of energy-efficient technologies for cooking as well as alternative sources of fuel where available, including non-wood based renewable energy. The implementation of a field inventory to assess the status of natural resources in areas vulnerable to climate impacts could help to determine woody biomass trends and enable the development of ecosystem restoration plans. These could include provisions for the establishment of woodlots and agro-forestry, thus building resilience to environmental degradation while maintaining woody biomass resources in and around displacement camps. Interventions should also be designed jointly with partners, and activities should be conflict-sensitive to ensure an enhanced state of resiliency and preparedness among vulnerable populations.

1. Introduction

Somalia has been devastated by a 20-year long civil war in which the population has suffered from a near-total absence of a functioning national state, frequent natural hazards and a degraded natural resource base. The country's pastoralists and agro-pastoralists are highly vulnerable to weather and climate extremes. For example, a functional safety net in times of food scarcity is to sell livestock in order to purchase food and grains from smallholder communities (Mude, 2015). This is widely practiced by pastoral communities dependent upon rain-fed agriculture in Somalia. Extreme weather patterns potentially remove this coping mechanism, worsening communities' predisposition to absorb shocks, as droughts leads to both crop failure and to a reduced number of livestock, which deepens poverty, loss of assets, loss of livelihood opportunities and the threat of imminent famine scenarios.

Somalia's National Adaptation Programme of Action identifies four

major climate hazards based on extensive consultations with communities throughout the country: drought, extreme flooding events, increasing temperatures and strong winds (Federal Government of Somalia, 2013b). In Somalia, drought negatively impacts livelihoods, decreases agricultural and livestock productivity and has forced people to migrate to urban areas or IDP camps while causing a shift in livelihood strategies from agro-pastoralism to unsustainable short-term income-generating activities such as charcoal production. Extreme flooding events in the country decrease the productivity of agricultural land due to the waterlogging of soils, leading to loss of fertile top soils and deforestation. High temperatures have led to failed crop harvests due to increased evapotranspiration rates, reduced availability of water and increased outbreak of pests. Strong winds have also increased the loss of fertile top soils through soil erosion, which in turn affects land productivity. As natural resources become increasingly scarce, conflicts over natural resources ownership and utilization that arise over time

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<https://doi.org/10.1016/j.wace.2018.09.002>

Received 18 July 2017; Received in revised form 7 August 2018; Accepted 6 September 2018

Available online 17 September 2018

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has further exacerbated internal conflicts and displacement of people (Dehérez, 2009). Furthermore, unsustainable extraction practices intensify negative impacts on the existing natural resource base, already weakened by extreme weather patterns.

Since traditional biomass, such as firewood and charcoal, account for 82% of Somalia's total energy consumption (Federal Government of Somalia, 2015) there are important linkages between the occurrence of natural hazard events and the availability of energy for the majority of the population. Rural women, particularly among displaced populations, face tremendous challenges when collecting and using woodfuels. These encompass health, nutrition, safety and protection risks. Furthermore, the production of charcoal is a risky and unsustainable livelihood activity practiced primarily by the poorest and most marginalized parts of the Somali population. In order to address this precarious situation, an important initial step is to gain an improved understanding of the context-specific challenges in areas where the impacts of climate change and conflict converge, such as the IDP camps and hosting communities found in Somaliland and South-Central Somalia.

The objective of this paper is to understand the risks and challenges faced by vulnerable populations exposed to weather and climate extremes and conflicts in Somalia, in particular women and IDPs who collect and use traditional biomass to satisfy domestic energy needs. The second objective is to provide a set of recommendations to policymakers, development organizations and humanitarian actors on ways to address the specific challenges presented.

2. Linkages between weather and climate extremes, conflicts and natural resources

The theoretical underpinnings for the analysis in this paper include the framing of energy as a multi-sectoral issue, which transcends its mere use as a fuel for cooking, processing and other fuel utilization activities. The analysis is also built on recent discussions about the links between natural resource depletion and the characteristics of fragile states which tends to exacerbate unsustainable utilization practices that worsen the fragile endowments of natural capital, already scarce due to the impact of extreme weather and climatic events. Fig. 1 provides an

overview of cascading impacts of weather and climate extremes and unsustainable use of natural resources.

Weather and climate extremes have severe impacts on arid and semi-arid lands in the country, which are already fragile, as well as on local communities who are dependent on natural resources for their livelihoods. With a high degree of spatial and temporal variability of rainfall determined by the North and South movement of Inter-Tropical Convergence Zone, there are two distinct rainfall seasons known as the “Gu” from mid-March to June that passes through the North, and the “Deyr” from mid-September to November that passes through the South. Since the variability of these rainy seasons is detrimental to all aspects of life in Somalia (Muchiri, 2007; SWALIM, 2018) changes in temperature and precipitation and occurrence of extreme weather events will have an impact on species survival, forest structure and prevalence of pest and diseases. It is expected that with increasing temperature, climate related hazards will be more frequent and intense (FAO, 2013b).

Frequent droughts and floods have had disastrous impacts on communities in Somalia. Droughts have occurred in 1964, 1969, 1974, 1987, 1988, 2000, 2001, 2004, 2008 and 2011 while major flooding events occurred in 1997, 2000 and 2006 (Federal Government of Somalia, 2015).

Frequent weather and climate extremes is also one of the causes of conflict over natural resources in which customary law cannot be relied upon anymore to settle the growing number of conflicts that are becoming increasingly complex and virulent. Unresolved land-based conflicts due in part from competition over warranted claims to resource access and usage, have shown to have weakened the customary management systems and heightened exploitation of natural resources, in a pattern that is on the verge of worsening the existing resource scarcity and humanitarian crisis (Abdi et al., 2008; Dehérez, 2009). The situation is reducing communities' resilience and adaptation in the face of extreme climate events (Schleussner et al., 2016).

Dehérez (2009) argues that the country's history of nationalizing land has allowed the state to have more control and power to share land among influential clan members thus constraining acquisition processes that have only benefited a few individuals rather than larger

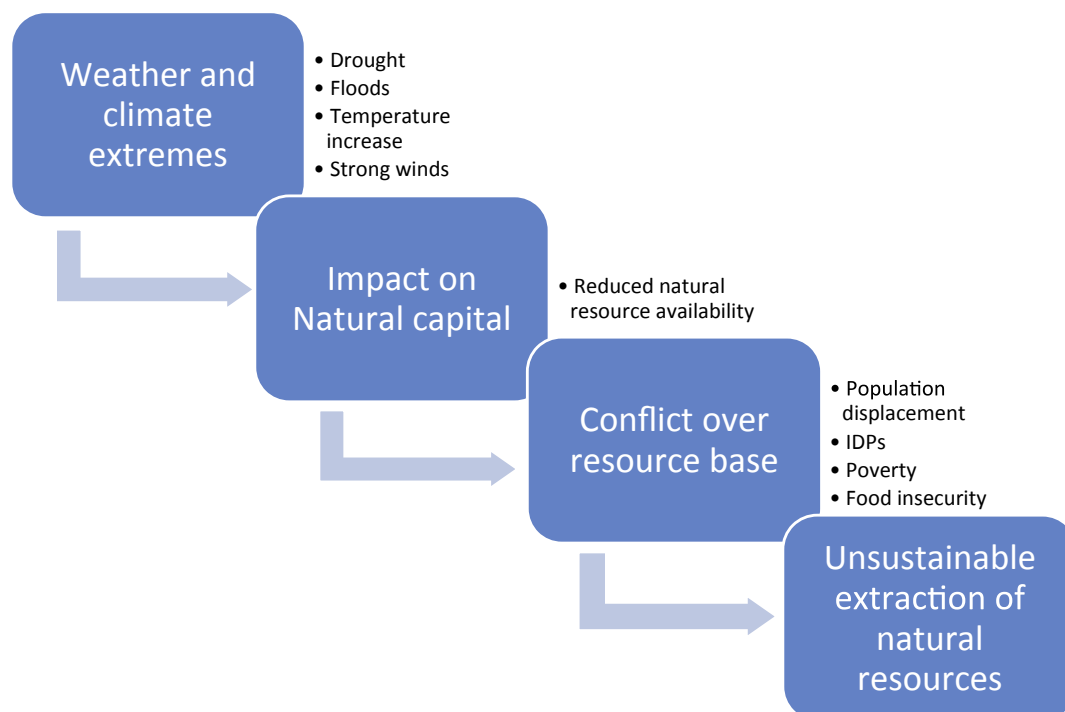


Fig. 1. Linkages between weather and climate extremes, conflict and natural resources.

communities. This has disrupted centuries of traditional order between clans and has increased armed clashes while marginalizing vulnerable groups such as IDPs. The situation has also given rise to illicit and unsustainable production of charcoal which is exponentially driven by profit incentives, disregarding the current fragile state of the environment. The nationalization of land increased the frequency of land grabs and forced evictions by war lords and local jihadists, who entered the lucrative charcoal business in order to finance their activities, thus perpetuating terrorism and forced displacement of people (Abdi et al., 2008). Charcoal is increasing the rate of deforestation and land degradation, crippling the landscape's ability to absorb or withstand natural hazards, thus aggravating the impact of disasters such as floods, sand storms and droughts (FAO, 2013b).

Energy access is key to ensuring food security, particularly in humanitarian settings driven by frequent occurrence of weather and climate extremes. Energy is indirectly linked to food security (Caniato et al., 2017) in humanitarian settings since the large-scale displacement and resettlement of people, whether due to weather and climate extremes or conflicts, often causes significant deforestation and forest degradation in areas surrounding displacement camps due to the demand for wood energy (Lahn and Grafham, 2015). The combined demand for fuel from both displaced and host populations often causes unchecked cutting of fuelwood and the production of charcoal which puts an increased strain on the local environment and can contribute to soil erosion, desertification, increased exposure to natural hazards such as droughts and floods and to the loss of agricultural livelihoods.

These factors can have a long-term impact on the availability of food as a result of the disruption of agricultural livelihoods and food production (Caniato et al., 2017). Furthermore, deforestation and forest degradation can also have a significant effect on the availability of wild foods and other non-timber forest products on which many crisis-affected people depend (Van Huis et al., 2013). Energy is also a gender-related issue since women are nearly always tasked with the collection of firewood and cooking (Thulstrup and Joshi, 2017). Women often spend many hours walking long distances to collect firewood during which they may be exposed to gender-based violence on top of a tremendous work burden which takes time away from child care, income-generating activities and leisure. Livelihoods in crisis settings, including forced displacement contexts, are often reliant on woodfuel-intensive activities such as the production of charcoal and selling of woodfuel. These risks are all highly present in the crisis-affected areas of Somalia.

3. Impact of weather and climate extremes on Somalia's natural capital

Data for this paper was collected in three districts: Burco, Owdweyne and Doolow. The first two districts are located in the Togdheer Region of Somaliland, while the latter is situated in the Gedo Region of South Central Somalia. Both regions are classified as a tropical and sub-tropical desert climate area according to the Köppen climate classification¹ (Arnfield, 2017), with average precipitation for the year between 193 mm and 281 mm. Weather and climate extremes have a profound impact on local communities in the Arid and Semi-Arid Lands (ASALs) who are dependent on natural resources for their livelihoods and food security. The primary climate extreme is drought, resulting from poor or insufficient rainfall which negatively impacts livelihoods, decreases agricultural and livestock productivity, and

forces people to migrate on a seasonal or permanent basis. This situation may exacerbate conflicts between various social groups, such as settled farmers and livestock herders, over competing use of resources. Drought has also led to an increased reliance on charcoal production as an important source of income. The second major threat is extreme flooding events which cause decreased productivity of agricultural land. These floods, mostly affecting areas located in gorges, come as a result of rivers overflowing their banks. The districts of Burco and Owdweyne are in vicinity of the Togdheer River making these areas prone to water degradation.

There is a pressing need to ensure sustainable management of natural resources in Somalia. The country's natural resource base has been degraded due to over-exploitation for personal or clan-based economic gains, which has progressively worsened since the country's civil war as communities and clans compete for access to grazing lands, watering holes and fishery resources (UNEP, 2005). The removal of stands of trees has increased over the years and is no longer exclusive to populated areas, while overfishing is increasing as both offshore- and near shore marine species are selectively targeted. The resulting effects have exacerbated desertification, soil erosion and the depletion of water supplies (UNEP, 2005). This situation affects the vast majority of the population, particularly in rural areas where people depend upon their surrounding environment and natural resources for their livelihoods. The vegetation in Somalia is predominantly dry deciduous bushland and thicket, which is dominated by species of *Acacia* and *Commiphora*. These forest and woodland areas have been significantly impacted by recurrent droughts, unregulated tree cutting and the presence of lawlessness and chaos (FAO, 2014) largely driven by a relatively lucrative charcoal production venture. Irrespective of the continuing export of charcoal, existing resources are hardly able to meet the local demand for fuelwood, charcoal, building materials, feed, furniture and other uses. According to FAO (2014), forest cover declined from 9,050,000 ha in 1980 to 6,363,501 ha in 2015. In addition, *Prosopis* spp. has dominated large areas, particularly along the coast. Figs. 2 and 3 show the types and causes of land degradation in the country. Doolow district is affected by reduced vegetation cover, while Burco and Owdweyne districts are faced with extensive extraction of fuel wood, timber and other construction material.

4. Understanding the risks and challenges faced by vulnerable populations

4.1. Sampling and data collection

This paper is based on the collection and analysis of primary data in Somalia during an FAO mission to support the Resilience Programme and the subsequent analysis of secondary data. An initial review of literature provided the basis for developing qualitative and quantitative field assessment tools. Primary data was then collected in various communities including IDP camps, host communities, rural settings and urban settings in Hargheisa District, Somaliland and in Doolow District, Gedo Region in South Central Somalia. Data on specific energy needs and related challenges was collected through the use of a mixed methods approach. The field methods used included a short, structured questionnaire and two types of Participatory Rural Appraisal (PRA) techniques: Focus Group Discussions and Venn diagrams (Narayanamy, 2009).

In order to gain an in-depth understanding of the specific energy-related challenges faced by households living in both IDP camps and host communities, the qualitative PRA tools were used in order to collect information about the linkages between energy needs and a range of factors, including the depletion of natural resources, gender-based violence, tension and conflict over the use of forest resources, cooking practices, nutritional, health, sources of income, use of cooking technologies and the perceived presence of NGOs and other stakeholders. Focus Group Discussions focused on questions that helped

¹ According to Köppen, the aridity in parts of Somalia and much of the Horn of Africa is unlike the areas with the same classification in Western Africa where precipitation is mostly inhibited. The dryness specific to Somalia is caused by the orientation of the land mass in relation to the atmospheric circulation, where both the high and low monsoonal winds blow in parallel towards the coast creating an infrequent moisture/laden maritime air that penetrates over the land.

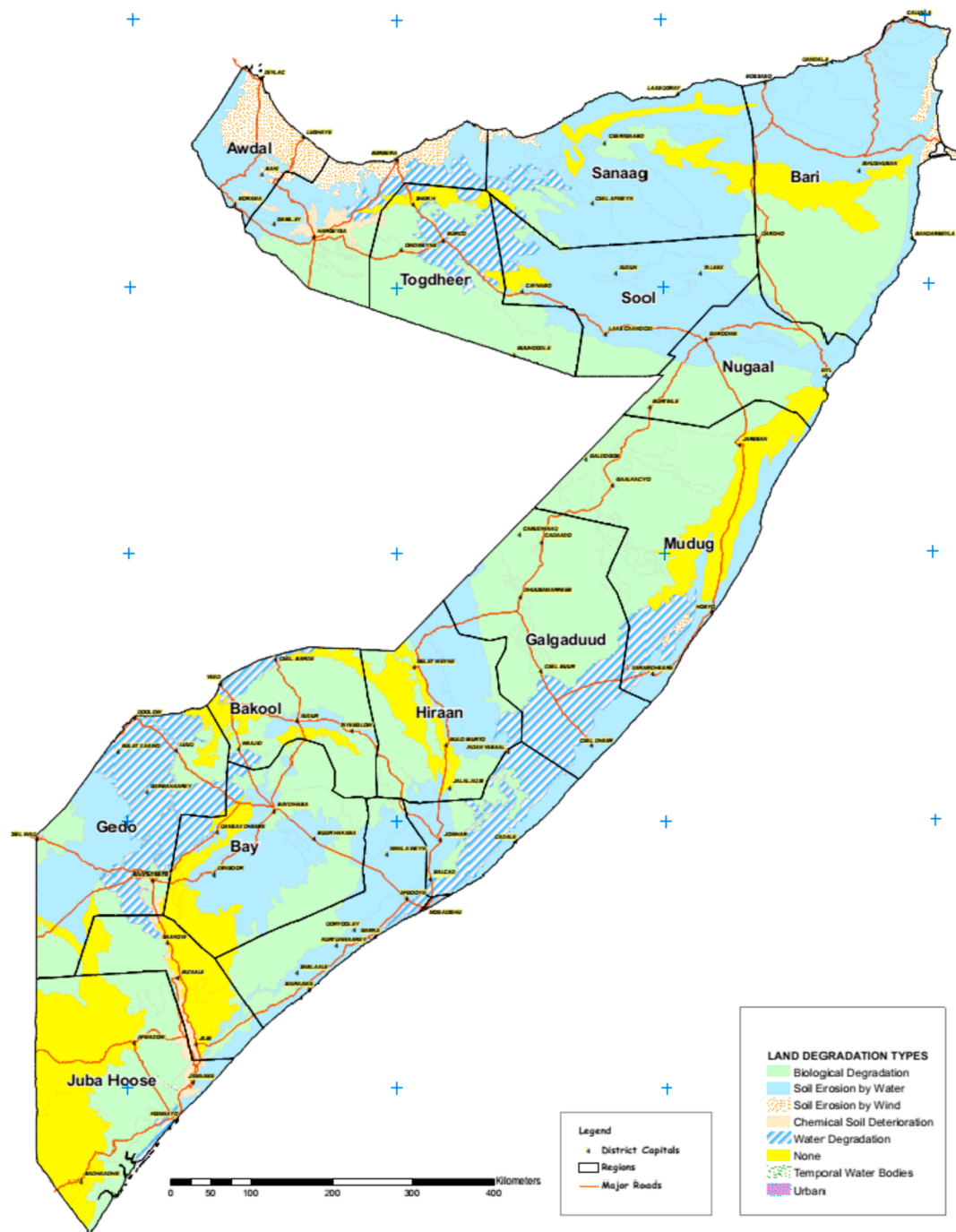


Fig. 2. Map showing types of land degradation present in Somalia (SWALIM, 2009).

understand the circumstances behind displacement caused by either conflict or climate hazards, and provided information on the nutritional status of households, coping strategies linked to the lack of cooking fuel, as well as current cooking stove technologies.

To understand the conflicts that may arise when sharing a common resource base, respondents were first asked about the relationship between their community and other communities and any challenges they face. Respondents were also asked about protection risks related to the collection of fuelwood. The aim of the Venn diagram was to map the presence of external organizations, such as government agencies and NGOs, and how these relate to communities in terms of their role in enabling or constraining access to fuel. For example, using a flip chart paper, a group member was assigned to draw diagram circles with

different sizes and distances in relation to each other, which depicted the perceptions the community had on the strength and influence of organizations (SAFE, 2015).

Quantitative primary data was collected using a short and structured questionnaire. The questionnaire covered the following topics: household information, livelihoods, income sources, sources of fuel, charcoal production, fuelwood consumption, collection of fuelwood from forest areas, cooking technologies and wood fuel provision/availability, including tree planting activities.

The questionnaire survey was carried out over the course of 15 days in Doolow District in South Central Somalia. A total of 74 households were interviewed. Figs. 4 and 5 show the sampling sites chosen in Doolow, Burco and Owdweyne districts. The sites were selected based

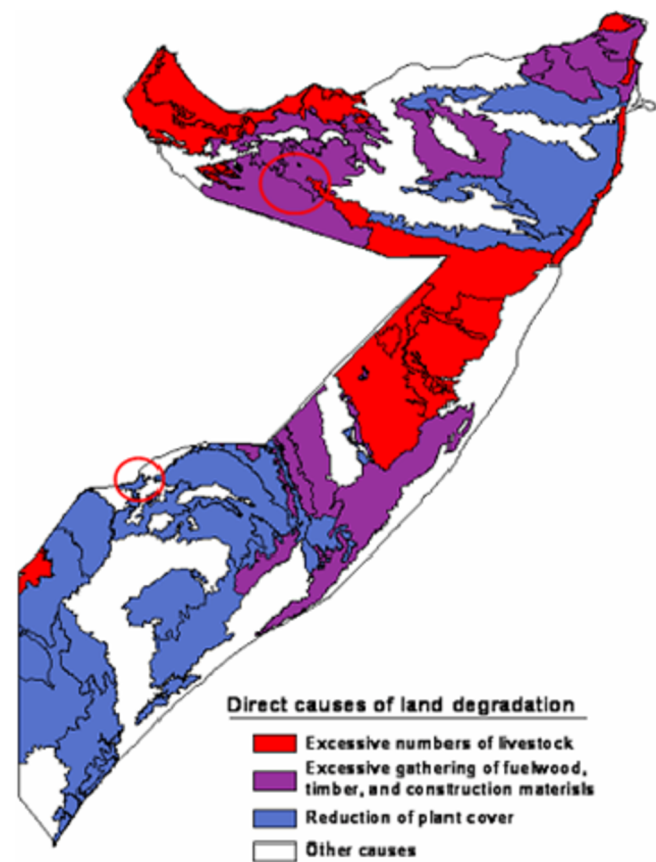


Fig. 3. Map of Somalia showing the direct causes of land degradation resulting from population pressures (SWALIM, 2009).

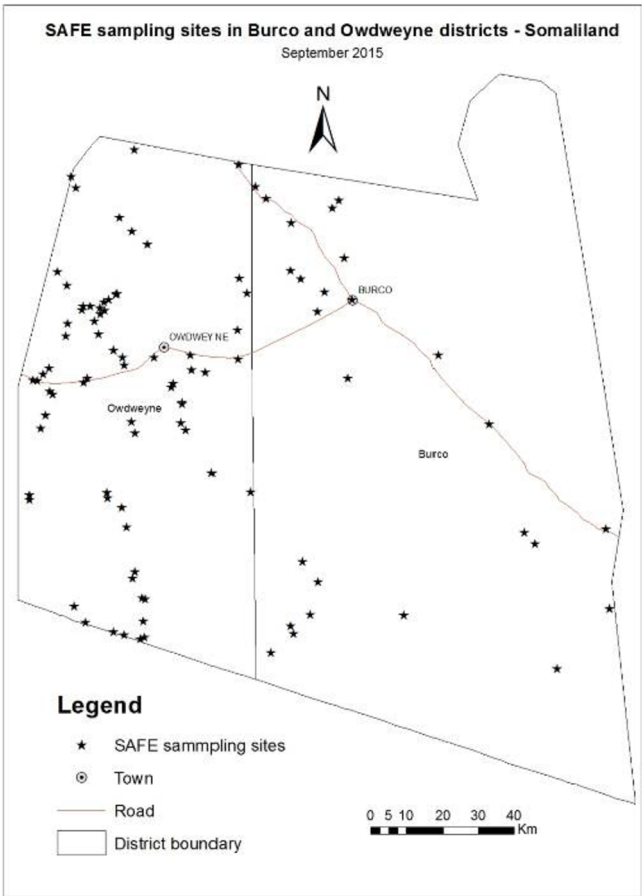


Fig. 5. Sampling sites in Burco and Owdweyne Districts - Somaliland.

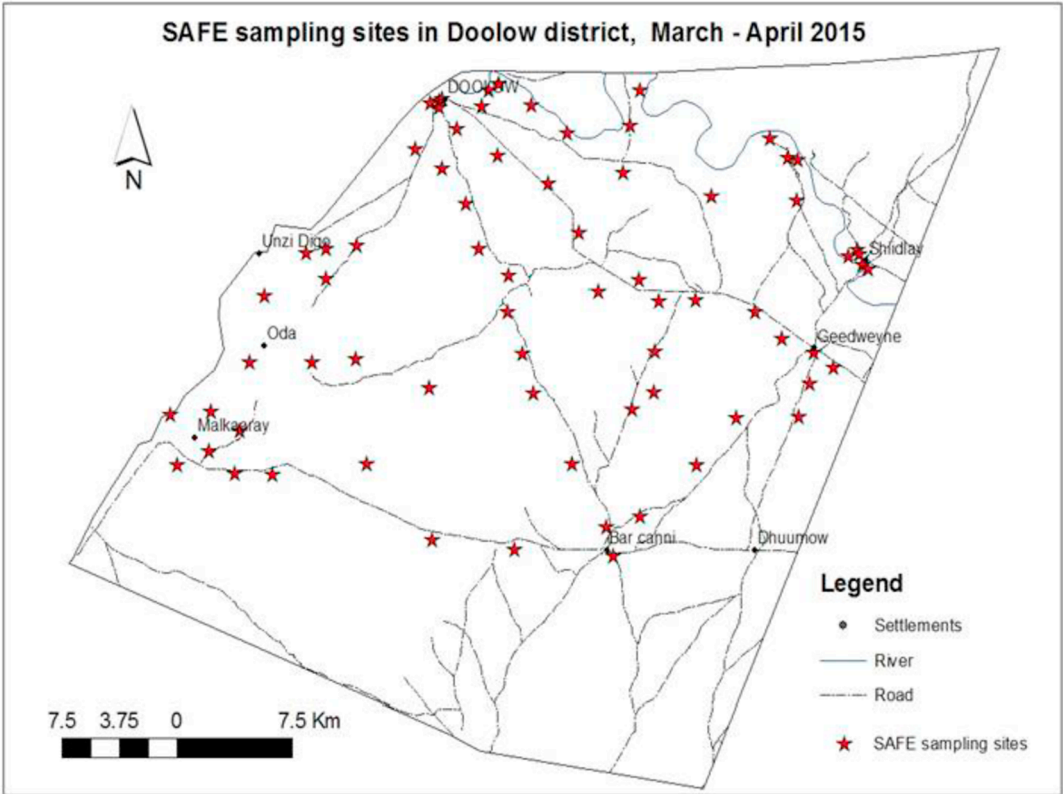


Fig. 4. Sampling sites in Doolow District.

Table 1
Reason for displacement and challenges reported by respondents in IDP camps.

Location	Years in the new settlement	Main reasons for initial displacement	Challenges faced currently in the new settlement
Ahaya IDP Camp (Somaliland)	2 years	According to respondents, who are originally from 8 different locations, were resettled in the new camp by local authorities who needed their land.	<ul style="list-style-type: none"> ● Lack of jobs as the settlement is located far from the main city Hargeisa with means of transportation hard to come by. ● Frequent drought and lack of water ● Lack of education and training ● Rapid spread of invasive tree species <i>Prosopis Juliflora</i> ● Shortage of food and water ● Loss of vegetation cover
Kansahley IDP Camp	5 years	Respondents are originally from the Gedo region having fled mostly from conflicts, but importantly as a result from selling their assets because of drought, severe water shortage and flash floods.	<ul style="list-style-type: none"> ● Lack of food and water ● Lack of firewood and charcoal ● Not enough housing/shelter ● No education and opportunities ● Loss of vegetation cover
Kabasa IDP camp (Doolow District)	6–7 years	Respondents were forced to flee from violence and insecurity from within the Gedo Region as well as from the Bay and Bakool regions and the situation was aggravated due to drought (Maystadt et al., 2014).,	<ul style="list-style-type: none"> ● Lack of food and water ● Lack of firewood and charcoal ● Not enough housing/shelter ● No education and opportunities ● Loss of vegetation cover

on where other activities under the FAO Somalia Resilience Programme were being implemented.

The data collected was analysed and, following an initial review of key emerging issues, categorized according to the most relevant sectors and topics linked to the energy-related challenges highlighted by key informants and respondents.

4.2. Conflict over natural resources

In Somalia, it is common for disputes to be resolved using customary laws and traditions which form part of common land use systems involving elders in arbitration and mediation practices. This is a functional arrangement which has for centuries been utilized to minimize tensions among the various clans (Oxfam, 2008). However, unresolved land-based conflicts due in part from competition over claims to resource access and usage, have been shown to weaken customary management systems and to increase exploitation of natural resources, in a pattern that is worsening the existing resource scarcity and exacerbating the humanitarian crisis (Dehérez, 2009). Table 1 presents information provided by respondents on the main reason for their displacement, and challenges they face in their current settlements.

In addition to the current unregulated exploitation of resources - mainly for illicit charcoal production for export purposes, the traditional system of common land use rights has weakened over the years to the detriment of both pastoralists and farmers living in fragile landscapes and ecosystems. Although respondents in IDP camps claim to feel safe within the confinements of their new settlements, their presence in the area has further heightened pressure on woody vegetation surrounding the camps.

The production and export of charcoal from Somalia has been in practice since pre-colonial times to meet local and regional energy requirements and to provide livelihood opportunities for rural households. However, the last two decades have witnessed a stark increase in the exploitation of forest and range resources for charcoal production. The current patterns of producing, trading and using charcoal are highly unsustainable, which can be attributed to a range of factors, including the breakdown of state institutions in 1991, protracted conflict and illegal imports of huge quantities of Somali charcoal by neighbouring countries in the region. The increasing realization that the charcoal trade in Somalia was becoming a threat to the security and stability of the country, as well as an obstacle in the peace process, prompted the UN Security Council to issue a ban on the export of charcoal from Somalia (UNDP, 2012). While the export of charcoal has continued there has been an overall reduction in the export of charcoal from southern Somalia and a reduction in the revenue gained by Al-Shabaab from the trade.

4.3. Multi-faceted challenges of domestic energy access

As extreme weather events and climate negatively affect the fragile natural resource base, reduced agricultural and livestock productivity tend to exacerbate human conflict over scarce resources (Hsiang et al., 2013). Climate change impacts, such as drought, can act as threat multipliers that negatively impact both natural resource availability and food security, which in turn may lead to migration, resource competition and conflict (UNEP, 2011). This scenario has played out in Somalia where human conflict has also disrupted traditional clan structures (Dehérez, 2009), rendering them unable to solve land disputes effectively and prevent the interruption of seasonal traditional migration routes used by herders and farmers as an adaptation and coping mechanism. The systematic displacement of people has enabled a profit-driven charcoal venture to flourish, which has led to extensive exploitation of wood/vegetative cover resulting in further land degradation and energy access problems. With lack of enforcement of environmental policies and legislation, the vegetative cover is on the verge of being depleted without having a chance to rehabilitate and regenerate itself. Somali IDPs are now forced to settle in remote areas where they face hardships in terms of lack of vegetation cover required for their household wood energy needs. Vegetation cover is still utilized as an important source of energy for the preparation of food to ensure optimal nutritional intake which also helps to prevent malnutrition, contamination and diseases. This section will showcase how energy scarcity resulting from natural capital depletion leads to the adoption of negative coping mechanisms by households.

Respondents in the sites visited reported on the types of fuels and cooking technologies they use most frequently. Table 2 shows the results of the data collection. In these locations, the 3 stone fire is by far the most commonly used cooking method and fuelwood is the predominant fuel used for cooking. Cooking on 3 stone fires using fuelwood is associated with a myriad of environmental, protection, health and safety risks which will be explored further in the following sections.

In addition to the household level, public institutions, e.g. schools and hospitals, also depend heavily on fuelwood for their cooking needs. When fuel is not readily available, this can have a considerable impact on food security and nutrition. The main food security risks associated with a lack of cooking fuel include the undercooking of food, which increases the risk of foodborne illnesses, the skipping of meals which causes malnutrition especially in children, the insufficient boiling of water which may result in the consumption of contaminated water and poorly prepared food as well as selling or trading food for the purpose of obtaining cooking fuel, which leaves vulnerable households with less food. The primary data collected in Somalia confirms the presence of these risks. For example, IDPs in the Ahaya and Kansahley camps reported that the acute shortage of cooking fuel causes their food to be

Table 2
Cooking technologies and fuel used as reported by respondents.

Location	Cooking technology	Cooking fuel	Type and price of purchased fuel	Consumption
Ahaya IDP Camp (Somaliland)	Households predominantly use a 3 stone fire. A few households use charcoal stoves which they bought at the Hargeisa market	Mainly fuelwood while some use charcoal. When there is an acute shortage, women use <i>Prosopis</i>	Fuel is collected, not purchased due to the lack of a nearby market	Difficult to estimate but one collection trip usually provides a bundle of fuelwood which can cover fuel needs for 3 meals
Kansahley IDP Camp	3 stone fire	Mainly fuelwood but during acute shortages twigs and wood fencing materials as a fuel	Fuel is only collected not purchased	1 bundle of fuelwood can be used for 2 days (4–6 meals)
Kabasa IDP camp (Doolow District)	3 stone fire	Most often small twigs and branches are used, sometimes fuelwood and very rarely charcoal (fuelwood is located far away but small twigs are available nearby)	Fuel is almost exclusively collected. Charcoal is almost never used because they do not have any money to purchase it.	1 collection trip provides fuel for 5 meals
Haraf Village (Somaliland)	Households use a 3 stone fire to prepare breakfast and dinner while a fuelwood stove is used to prepare lunch (vegetables are preferably cooked on the fuelwood stove)	Fuelwood, one household uses LPG	Fuelwood is collected	1 collection trip provides fuel for 9 meals
Abaaso village (Somaliland)	Households use a 3 stone fire for breakfast and dinner while using a charcoal stove for lunch	Fuelwood, sometimes charcoal	Charcoal is sometimes purchased	Charcoal is usually purchased for 80,000 Somaliland shillings which lasts for 4–5 days for one household

undercooked. In both Haraf and Abaaso villages, respondents reported that lack of water and fuelwood causes food to be undercooked.

Table 3 presents information on the main types of food cooked in the sites visited. In the IDP camps visited in Somaliland, households rely predominantly on cooking “Laxoox”- a sourdough-risen flatbread with a spongy texture which is traditionally made out of teff flour - and rice while in villages in Somaliland respondents, in addition to these food items, also consume pasta. In the Kabasa IDP camp the main food cooked is rice and this is consumed at lunch time as the only meal of the day. Respondents in Kabasa also noted that the lack of fuel increases the time needed to cook significantly.

Respondents in the Ahaya IDP camp reported that there are very few “coping fuels” used in times of hardship. However, a number of coping strategies were mentioned by respondents such as using wooden fencing, small twigs found nearby and branches from *Prosopis* shrubs as fuel. *Prosopis juliflora* is a shrub native to Mexico, South America and the Caribbean which has become established as an invasive weed in Africa. However, these mainly constitute “last resort” strategies. Respondents in all sites stated that they did not practice communal cooking in order to reduce fuelwood consumption. The reason given was that in some cases the practice is poorly aligned with cultural norms and practices.

Based on these results it is clear that interventions should address both the supply of fuel for cooking and the technologies needed to ensure that food is cooked properly and that nutrition- and health risks related to cooking are reduced. The promotion of fuel-efficient stoves and a sustainable supply of cooking fuel can contribute to ensuring that food is cooked properly, meals are not skipped, people maintain diverse and nutritious diets rather than switching to less nutritious foods.

The fuel needs of an increasing population can become a key driver of environmental degradation, as the collection of fuelwood puts pressure on scarce wood resources. As previously indicated, the negative consequences of weather and climate extremes, including frequent droughts, erratic rainfall and floods, can exacerbate environmental degradation. This also leads women and children to travel ever greater distances to obtain the necessary fuelwood they need for cooking meals for their families (SAFE, 2015). Gender-specific security and protection concerns disproportionately impact IDPs and urban migrants in Somalia. Both in these settings and more generally in rural areas, the task of collecting fuelwood primarily falls upon women and children (FAO, 2013a). When women walk very long distances to gather firewood, they are often exposed to gender-based violence, harassment, assault and rape. Wildlife, including venomous snakes, also pose a serious threat to collectors of fuelwood which could result in loss of life (FAO, 2015b). Fuelwood collection is an arduous and time consuming task that reduces time for women to engage in other productive activities or child/family care.

Table 4 presents data collected from various locations in Somaliland and Doolow, on the time spent collecting fuelwood and associated risks and coping strategies.

The primary data collected shows that women and girls are tasked with the collection of fuelwood. The frequency of collection trips ranges from every 2 days to every 5 days while the time spent collecting ranges from 3 h in the Ahaya IDP camp to a full day in the Kabasa IDP camp. Respondents reported that the collection of fuelwood takes time away from other activities and causes exhaustion, thirst, hunger, accidents as well as exposing women to attacks from wild animals and psychologically unstable men. Women also reported having to sit continuously to watch and manage the fire while cooking.

Improving women's access to cleaner and more fuel-efficient cooking technologies can partly address many of these challenges. However, efforts should also focus on identifying ways in which to provide a sustainable source of fuel closer to camps, settlements and communities. Efforts to reduce the reliance of women on woodfuel intensive livelihoods such as selling firewood and charcoal by promoting appropriate and context-specific alternative livelihood options should

Table 3
Main food types consumed by respondents in sites visited.

Location	Main food	Meals/day	Challenges	Coping strategies
Ahaya IDP Camp	Laxoox (20 min cooking time), Rice (50 min cooking time)	2	Food is undercooked due to lack of fuel. The rice is hard and difficult to swallow	Using branches from <i>Prosopis</i>
Kansahley IDP Camp	Sorghum (2 h cooking time), Rice (2 h cooking time), Laxoox (3 h)	2–3	Food is undercooked due to lack of fuel	Using wooden fences and twigs as fuel
Kabasa IDP camp (Doolow District)	Rice (1.5 h cooking time)	1	–	–
Haraf Village (Somaliland)	Rice, Pasta, Laxoox, (Average cooking time is 20 min)	3	Undercooking, skipping of meals due to insufficient fuelwood	–
Abaaso village (Somaliland)	Rice (30 min cooking time), Pasta, Laxoox (40 min cooking time)	3	Food is undercooked, skipping of meals due to insufficient fuelwood	Using wooden fences as fuel

also be strengthened.

The overexploitation of land and excessive harvesting of trees for charcoal and other commodities have led to environmental degradation and increasing desertification which reduces the availability of fertile land, a key requirement for a primarily pastoral-based economy. Consequently, the unchecked extraction of indigenous *Acacia* trees for the production of charcoal has been the cause of conflict between pastoralists and charcoal producers. This is because *Acacia* trees serve important social and environmental functions including their use as shade for people and livestock, the provision of livestock fodder and as landmarks and windbreaks (Mahoney, 1994).

Primary data collected from respondents in the IDP camps visited confirmed that the collection of firewood has caused tension between displaced households and host communities. In the Kansahley IDP camp for example, respondents mentioned that violent clashes between IDPs and both pastoralist communities and farmers have taken place over the issue of fuelwood collection. Men who accompany women to collect firewood are beaten while in general women are let go. Respondents in the Kabasa IDP camp in Doolow reported that they have good relations with host communities but are chased away when they cut live firewood. When attacks by the host community do occur they report it to the local authorities. Respondents in the Digaale IDP camp reported that the main source of conflict with host communities is the harvesting of fuelwood because women from the IDP camp collect it in the woodlands located around the host communities. This land was formerly communally owned and used but all the trees have been over-exploited. Currently, IDPs in Digaale are forced to go and collect fuelwood on the land of agro-pastoralist communities which is causing significant tension and has prompted attacks. As a result, women are being assaulted on a daily basis. Conversely, respondents in the Haraf and Abaaso villages in Somaliland noted that the community in general has good relations with other communities.

The relationship between communities is complex. While clashes may occur on a regular basis over the extraction of firewood, for example in Digaale, IDPs often maintain good relations with host communities when it comes to trading agricultural commodities. In Digaale, women from the host communities sell milk while men sell animals and meat to the IDPs. In turn, people from the host communities come to the camp to buy food and clothes from the IDPs. These economic exchanges may provide an entry point for improving relations between the two communities. One option would be the exchange, either through bartering or selling, of fuel or energy-efficient cooking technologies between the IDP community and the host community. An improved conflict mitigation mechanism could support such an initiative, ideally building on existing or traditional mechanisms. A number of communities (both IDP and rural villages) have established community-based Elder Groups which serve the important function of managing and reducing conflict with other communities. Hence, assessing the replicability of the Elder Groups would provide important insights.

Based on the Venn diagram exercise conducted in both host villages and IDP camps there were commonalities when discussing issues

concerning the natural resource base. Agro-pastoralists within both groups have expressed the problem of not being able to rely on their drought coping mechanism in utilizing, for instance, drought tolerant vegetation species for their own communities and livestock as these are being depleted due to growing demands for charcoal production. With traditional coping strategies being undermined and as natural resources continue to be unsustainably extracted, community resilience is currently reduced to levels which require protracted humanitarian assistance during and after natural hazard events have occurred. It is estimated that over five million Somalis were affected during the 2010 drought, which has impacted the livestock population in proportional numbers due to the loss of important coping mechanisms (Federal Government of Somalia, 2015). Humanitarian assistance has been more significant within IDP camps for the provision of basic needs such as proper shelters, water and food replenishment, education, sanitation and health services. Some IDP camps were also provided with entrepreneurial skills in setting up small business ventures as well as with solar energy for lighting purposes. Within host villages, humanitarian assistance has been geared more towards farming support, livestock restocking, and health and education services. Unlike IDP camps, host villages have stronger internal community committees organized by groups that mostly deal with social affairs and settling land disputes.

In both IDP camps and host villages there were no external environmental interventions supporting communities to reduce their consumption of fuelwood, e.g. through the provision of fuel-efficient stoves. However, there is currently an FAO-supported initiative focusing on the establishment of a community tree nursery in Bantal village with the aim of growing trees in woodlots for supplying fuelwood and other tree products.

Both IDPs and host community households stated their disdain for the invasive tree species, *Prosopis*, the encroachment of which has spread into important areas of land meant for livestock and agriculture production. Despite the use of *Prosopis* for certain purposes, such as fuel and fencing, there is no interest from both communities in domesticating and utilizing *Prosopis* as a way to restore and recover important rangelands, reduce reliance on important native tree species for fuelwood, or to create sustainable employment and business ventures through product transformation. Awareness-raising on these alternative livelihood options can support efforts to find solutions to the energy, food security and biodiversity problems faced by agro-pastoralists in Somalia, which could eventually help communities strengthen resilience to shocks.

The challenges facing Somalia are complex, multi-faceted and differ according to various political, social and regional contexts. Environmental degradation and energy access challenges recurrently emerge in key policy documents relating to Somalia. Somalia's Intended Nationally Determined Contributions (INDCs) have been developed in line with the UN Framework Convention on Climate Change (UNFCCC) and the decision of the "Lima Call for Action" to formulate its policy, plans and mitigation and adaptation projects intended to achieve the objectives of the INDCs. Such policies and planned projects proposed

Table 4
Time spent on fuelwood collection and associated risks.

Location	Frequency of fuelwood collection	Time spent collecting	Main risks reported	Coping/mitigation of risks
Ahaya IDP Camp	3-7 trips/week	A round trip walking to the site, collecting and going back takes 3-5 h	Scratches from trees, falling down due to heavy loads, thirst, hunger, attacks from hyenas and snakes, harassment and attacks from psychologically unstable men ("mad men")	Women and girls go in groups of 3-5 women but they must often go alone
Kansahley IDP Camp	Women collect together with their daughters every 2 days	A round trip takes 6 h	Conflict with farmers and pastoralist communities. They beat and abuse the men but let women go. In general, women do not face security risks	Women and girls usually go in groups of 5-6 to collect fuel wood
Kabasa IDP camp (Doolow District)	Women collect together with their daughters every 5 days	A round trip takes a full day	They are chased away by the host community when they cut live wood for fuel	Women go in groups of at least 4-5 women. They shift location each week as wood resources are depleted
Haraf Village (Somaliland)	Women collect together with their daughters every 3 days	A round trip takes 4 h	Fatigue, opportunity costs of having to collect, wild animal attacks especially snakes and hyenas, accidents from cutting of wood and harassment from men ("mad men")	Women throw stones at men who harass them and report incidents to the camp police unit. Women also go in groups of 4 to collect.
Abaaso village (Somaliland)	Women collect together with their daughters twice per week	A round trip takes 5 h but may take longer	Fatigue, opportunity costs of having to collect, accidents from cutting of wood and harassment from men ("mad men")	Women and girls normally go in groups to collect

are based on the status of the environment in the country, existing and planned policies for sustainable sector based developments and Somalia's Compact and New Deal. Within the framework of the INDCs, a series of adaptation and mitigations programmes have been proposed, including plans to promote alternative sources of energy to reduce local charcoal consumption, provide alternative livelihood options to households and communities dependent on charcoal production and trade and reforestation and afforestation for the rehabilitation of degraded lands.

Awareness creation of alternative livelihood activities, all ranging from the management and utilization of trees and shrubs, while encouraging the establishment of woodlots that include economically important indigenous tree species, could provide important alternative sources of income in both sustainable production and marketing of various products that have good potential for international export. Furthermore, the Somali diaspora sends an estimated US\$ 1 billion in remittances per year which exceeds Official Development Assistance (ODA). Hence the role of the diaspora in sustaining livelihoods is also considered of key importance and provides an important opportunity for harnessing and channeling these funds into interventions that contribute to job creation, food security and increased incomes, particularly in rural areas of Somalia. Furthermore, these interventions could also help in minimizing pressure on the existing natural capital base and support its recovery.

5. Conclusions and recommendations

This paper highlights various challenges faced by vulnerable populations related to energy in the context of weather and climate extremes and conflict. It draws on the case of Somalia, through the findings of field work in Hargeisa District, Somaliland and in Doolow District, Gedo Region in South Central Somalia. The participatory techniques were utilized in various contexts in these locations including IDP camps, host communities, rural and urban settings generated a rich body of evidence and knowledge on the energy challenges faced by vulnerable households, particularly women.

Competition over natural resources is a key driver of conflict in Somalia which is exacerbated by weather and climate extremes. Hence, in approaching work related to energy in a humanitarian settings driven by weather and climate extremes and conflicts, it is crucial to also address issues relating to social cohesion, trust-building and conflict mitigation. In the case of Somalia, this entails understanding the context of land rights systems in order to help shed light on what needs to be done to shift the business as usual and demand-driven exploitation of wood for energy purposes towards sustainable forest management. In planning and implementing energy interventions, it is important to follow a people-centred approach that ensures full participation of beneficiaries from programme design to implementation. This promotes an underlying tenet that people affected by crises are end users and stakeholders rather than "beneficiaries" of humanitarian assistance, that they have a fundamental right to shape efforts to assist them, and that humanitarian actors have a duty to respond to people's expressions of their rights and needs. In the context of Somalia this may appear to be a challenge due to the remote management of many interventions and extensive use of implementing partners. However, development agencies such as FAO have been able to set up mechanisms to ensure that targeted communities have appropriate ways to provide feedback and obtain information about projects.² Furthermore, efforts should be made to incorporate conflict-sensitivity policies in order to address these key linkages with impacts of weather and climate extremes.

² A "Call Centre" that reaches out to beneficiaries to provide information about project activities and to gather important information for M&E purposes and a "Hotline" that communities can call into in order to make complaints or offer feedback.

It is also important to recall two recent global events (of 2016) that are shaping the way the international community is supporting the rapidly rising numbers of vulnerable people as a result of crises and climate-related disasters. These events generated a number of outcomes several of which are relevant for work on energy in emergencies. The World Humanitarian Summit (WHS) called by the United Nations Secretary-General in May 2016 in Istanbul, Turkey marked a shift towards more decisive and deliberate efforts to reduce needs, anchored in political will and leadership to prevent and end conflict and to bridge the divide between efforts across humanitarian, development, human rights, peace and security interventions. A recurring theme was the importance of humanitarian principles and contributing to the protection of individuals from gender-based violence.

Amongst other things, through the SAFE approach, FAO promotes the use of fuel-efficient cooking practices (and stoves) to reduce the need for fuelwood, and in turn diminishing the protection risks women and girls face when collecting firewood, particularly in displacement due to weather and climate extremes and conflicts. In September 2016, the UN General Assembly convened a high-level plenary meeting on addressing large movements of refugees and migrants. This Global Migration Summit culminated in the New York Declaration for Refugees and Migrants, expressing the political will of world leaders to protect the rights of refugees and migrants, to save lives and share responsibilities. Once again, protection and gender equality were central to the discussion and relevant to the SAFE approach. The New York Declaration states that Member States will ensure that responses to large movements of refugees and migrants mainstream a gender perspective, promote gender equality and the empowerment of all women and girls, and fully respect and protect the human rights of women and girls. In addition, it recognizes the significant contribution and leadership of women in refugee and migrant communities, and commits to ensure their full, equal and meaningful participation in the development of local solutions and opportunities.

Furthermore, it is argued that focusing on energy can be instrumental for contributing to efforts to sustain peace, by reducing the risk of potential conflict between communities (e.g. IDPs/refugees and host communities or pastoralists and farmers) who compete for scarce natural resources, including wood for fuel purposes.

A number of key themes and guiding principles have emerged which will be of use to policymakers, development organizations and humanitarian actors in addressing the specific challenges presented. Partnerships and collaboration are essential in order to respond to the energy needs of populations affected by climate-related hazards and crisis. These need to be developed and fostered between UN agencies, development and emergency organizations, civil society organizations and NGOs, national partners, government bodies, academic institutions and the private sector. Leveraging the comparative advantages and knowledge of the various actors, will ensure that interventions are streamlined, truly inclusive and holistic. From the perspective of the United Nations, several UN agencies have come together to facilitate a more effective and coordinated response to the energy needs of populations affected by weather and climate extremes and conflict through the inter-agency Safe Access to Fuel and Energy (SAFE) initiative and working group. This means working closely with partners and local governments to harmonize approaches and ensure synergies. Very

importantly, the communities themselves need to be consulted and engaged to maximize accountability, inclusiveness and participation in addressing the challenges of energy access in the event of weather and climate-related disasters and conflicts.

Conflict of interest

The authors state that no conflict of interest was involved in the production of this paper.

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