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Towards an integrated understanding of the triple nexus: climate, water and conflict impacts in Somalia

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Table of contents

1. Introduction 6

Project background 7
Research Methodology 7
Theoretical Pathways from climate change to conflict 12
Limitations 13

2. Context – Somalia 14

Country Profile 14
Water Scarcity in Somalia 15
The clan and conflict 17
Gender and Climate-Induced Conflict 19

3. Emerging Findings 20

Key Finding 1: Increase in communal conflict during times of extreme climate stress – both dry and wet (up to a point) 20

Key Finding 2: Correlation between the existence of water sources and increased conflict (up to a point) 21

Key Finding 3: Conflict between pastoralists and agriculturalists over trespass of land 23

Key Finding 4: Conflict over the establishment of settlements by clans displaced by drought and/or flood waters 25

Key Finding 5: Finding a single unidirectional link between climate change and conflict is complicated by other factors 26

4. Summary of Key findings 28

5. Conclusions 29

6. Recommendations 30

Bibliography 34

Annexes 38

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Executive Summary

This research identifies a positive correlation between water sources and non-state conflict in Somalia. Further, it identifies climate stress as a contributor to conflict risk amongst communities, or clans, in the Shabelle basin, both in cases of water scarcity (i.e., drought) and abundance (i.e., floods). However, this relationship, in cases of water scarcity, are seen to be relevant only up to a point, after which conflict is reduced as survival becomes the priority. As such, the opportunity cost of conflict during times of extreme conflict stress is a significant factor in predicting conflict.

Below this point, climate-induced communal conflict appears to be predominantly between agriculturalists and pastoralists and, in these cases, over land and resources. As contributing triggers to conflict, cases predominantly noted trespass of pastoralists onto more fertile farmlands, but also long term and local migration of agriculturalists from farmland under flood risk to safer grazing areas. As a result, issues around land and their resources, notably water, are seen as a contributor to conflict risk, exacerbated by climate variability. Security and legality of these lands and resources are noted as factors to be addressed in mitigating climate-induced conflicts.

However, in line with wider studies, this research confirms that conflict dynamics are influenced by many complex and interlinked factors, such as politics, culture, economics and history. This is specifically the case regarding deep-seated clan relations. Further, amongst Somali-specific factors, the impact upon women and their ability to contribute to solutions are rarely considered. Equally, wider online discourse rarely focuses on the conflict-climate-water nexus. That said, although knowledge of climate variability may improve predictions of conflict risk, these other factors predict conflict occurrences much more effectively and may provide better indicators to inform responses beforehand. Due to this complexity, academic consensus therefore settles on examining theoretical pathways whereby climate is one of many possible factors that can contribute to conflict, rather than seeking hard causal correlations between climate and conflict.

The research also recognises, from wider literature, that at a local level, collaboration, rather than conflict, is often to be the result of climate-induced consequences. As such, local solutions and development are worthy of deeper examination.

The five key findings are as follows:

1. There is an increase in conflict during times of extreme climate variability – in both dry and wet conditions (up to a point. See Note).
2. There appears a correlation between the existence of water sources – namely *berkado* constructed on disputed land – and non-state-based conflict, especially during drought (up to a point. See Note)

NOTE: During extreme drought, the correlation between conflict and climate cited in Key Findings 1 and 2 no longer holds past a certain, undefined point.

3. Conflict is notable between pastoralists and agriculturalists over trespass of the former, with their livestock, on to the land of the latter, due to climate-induced water availability. Such instances are also observed across Sub-Saharan Africa.

4. Conflict is notable over the establishment of settlements of clans, often agriculturalists displaced by flood waters, in areas traditionally used by pastoralists. Migration, particularly at a local level, as opposed to long range, can enflame already deep-seated animosities.
5. A single unidirectional link between climate change and conflict was not observed. Whilst conflicts are reported and seem to be more frequent in times of climate-induced water stress, these conflicts are the product of a complex interplay of factors, such as history, culture and politics. And are also dependent upon conditions on the ground during extreme drought.

1. Introduction

Over the past three decades, research has demonstrated a relationship between climate change and conflict, leading many to claim that climate change is a 'threat multiplier' (Koubi, 2019). However, research also suggests that the relationship is complex and multi-layered, with experts emphasising that climate change aggravates pre-existing political, social and economic issues and can push tensions over a tipping point, giving rise to violence or reigniting old cycles of conflict.

While the impacts of climate change are multiple and diverse across the globe, when focusing on Africa, aside from sheer temperature levels, water is the most serious issue. Thus, in examining the dynamics of conflict and climate change, unadulterated water, directly available from natural sources, is considered a suitable proxy.[1] This equally applies in the case of Somalia.

However, conflict is borne of many factors, even in areas where the impacts of climate change, and specifically water scarcity or abundance, are patently obvious. These factors, predominantly socio-economic and political, are often closely interlinked and interacting. The Water, Peace and Security (WPS) Partnership[2] identify the following factors that can mesh with conflict drivers:

- The specific geographic and hydrological conditions in a region, as for example, semi-arid and arid regions face very different challenges than the tropics or subtropics
- The dependence of a community, country or region on (external) water resources for survival and socio-economic development
- The number and variation of actors and interests involved in water resources, and their impacts on water resources
- The technical, human and financial capacity available to deal with water-related challenges and to mitigate negative human, economic and social impacts of, for instance, short-term water scarcity
- Marginalisation of certain groups
- Political system fragility, including the legitimacy of leadership and governance capacity (Schmeier et al, 2019, Schmeier et, n.d.).

Alongside this complexity on the ground, decision making in policy interventions can also often be subject to behavioural forces through heuristics, expediency and access to readily available data – urgency infused with a gut instinct drawing upon a "one size fits all" approach.

It is thus readily apparent that highly contextual variables contribute to the outcome of a coincidence of climate change and conflict and, as such, cases must be examined at a granular level to fully understand the dynamics at play and thus enable better policy decision-making.

1 This research does not consider water indirectly supplied, affected by local contamination or environmental damage.
2 See https://waterpeacesecurity.org

Project background

This research undertakes to examine potential case-specific relationships between community conflict/inter-clan conflict and access to, or control of, natural resources (notably water related) in a limited and explicit geographical context (notably an area of Somalia).

By examining previous research, national conflict and water resource data, field research, and ultimately examining national, local and individual commentary and narratives, a better understanding of the relationship between water-related climate impacts and conflict dynamics is sought. As a pilot project conducted within defined geographical and contextual limits, the findings may not only be applicable to certain, although considered replicable, conditions but may also contribute to the wider academy of research and be instructive in the conduct of similar future research. Furthermore, this research project intends to provide insights to guide policy recommendations for the UNEP Mission to Somalia.

This research project focuses on two locations in the area of the Shabelle Watershed in Hirshabelle State: Deefoow (in the Beledwayne District) and Matabaan.

While the focus of our research was on conflict-affected communities in those two locations, the goal of this pilot is to inform key stakeholders within the aid and stabilisation architecture in Somalia of the dynamics between conflict and natural resources, and provide policy recommendations on how to implement environmental mediation approaches and environmental security interventions going forward.

Research Methodology

The research was careful to define and limit its scope to examining the climate-related causes of conflicts, not the causes of climate change, which, given the extensive popular, media and research interest in that field, can be alluring. Further, in narrowing down the research vectors, water, as opposed to temperature, was chosen as a proxy for climate change.[3] As such, water scarcity and abundance were used as further proxies. These predominantly included floods, localised and dynamic events, and drought, wider and prolonged events. Given the time period of the research, during the dry season, drought became more central to examination.

Conflict was confined, after initial literature research, to the predominant and therefore research-relevant mode of non-state conflict, narrowed down to communal conflict.

3 There remains considerable debate over the influence of temperatures on civil conflict. At best, temperature differentials are a 'relatively modest predictor of violence' (Levy et al, 2017).

The following research questions were approached:

1. What is the nature and effect of the contemporary linkage between conflict and water-related climate change impacts in the Shabelle Watershed in the Hirshabelle State of Somalia?
2. What forms of conflict are related to these specific climate change impacts?
3. What underlying direct or indirect climate-related factors contribute to these conflicts?
4. What are the direct and indirect social impacts of these climate-related conflicts?
5. How can

    5a. these climate-related conflicts be prevented?
    5b. the effects of these climate-related conflicts be mitigated?

The research project was completed through four different strands, and one cross-cutting strand, delivered by three different delivery partners:

- **Strand 1: Literature Review** carried out by the Peace and Research Institute Oslo (PRIO).
- **Strand 2: Desktop Research** carried out by the Peace and Research Institute Oslo (PRIO).
- **Strand 3: Digital Research** carried out by Albany Associates.
- **Strand 4: Field Research** carried out by local partner KasmoDev.
- **Cross-cutting Strand: Gender Analysis** completed by Albany Associates Gender Consultant Maimuna Mohamud.

The methodologies for each strand of research are outlined below.

Strand 1: Literature Review

Regarding the literature review of Somalia-specific material, convenience samples of the most cited literature on the topic accessible through Google Scholar. The following search phrase was employed, on April 22, 2022: Somali* AND (drought* OR natural resource* OR water*) AND (Conflict OR Violent* OR dispute*). Sorted by the Google scholar algorithm for relevancy, the first 100 entries (excluding citation-only hits) were reviewed. Findings from studies focusing on areas outside Somalia were excluded unless they included empirical references to socio-economic processes in Somalia.

The full General Literature Review can be found at Annex A, where details of the research process may be found.

Gender was considered a cross-cutting theme across the climate-conflict nexus and was reviewed separately in order to reflect specific relevant issues that interplay with the main pathways, with specific attention paid to the particularities of Somalia and Hirshabelle State itself. This review traced secondary sources such as academic journal articles, practitioner reports, existing policy and key relevant UN publications. Notably these resources included

the new Somali Health and Demographic Survey Report (2020) and the Hirshabelle Health and Demographic Survey Report (2021).

The original Gender Literature Review can be found at Annex B.

Strand 2: Desktop Research

The focal point of the entire research project is the climate-water-conflict nexus. However, this specific element of desktop research mainly focuses on the relationship between waterpoints, conflict and drought, as a result of climate variability. Analysing directly the effect of climate change is challenging, and there are few good ways to measure it statistically, other than using proxy variables such as drought and precipitation. As such, the desktop research does not seek a direct relationship between climate change and conflict, but it does address how intermediate variables such as water access, which is likely to be affected by climate change, or rather variability, can further potentially affect conflict.

The desktop research was conducted to explore the statistical relationship between waterpoints and conflict and water scarcity. Using GIS software, statistical software and linked geo-coded data on conflict with data on various types of geo-coded water points and precipitation data, the research identified patterns related to conflict surrounding waterpoints.

Waterpoint location data was sourced from Somalia Strategic Water Source Database (SWALIM) (FAO/SWALIM 2018). Geo-coded conflict data was sourced from the UCDP Georeferenced Event Dataset (GED) (UCDP, 2022). Regarding climate variability, water scarcity, or drought, information was sourced from the global Standardized Precipitation and Evapotranspiration Index (SPEI) database sourced by the Climatic Research Unit of University of East Anglia, which is a standard way of measuring climate variability with climate research, in addition this data is already embedded into the data structure.[4] To link the conflict and waterpoint data the PRIO-GRID was used. PRIO-GRID is a vector grid network with a resolution of 0.5 x 0.5 decimal degrees, covering all terrestrial areas of the world (which represents grid cells of about 50km x 50km at equator). The PRIO-grid has become a standard data structure with sub-national conflict research (Tollefsen, Strand and Bughaug 2012).[5]

4 In climate-conflict literature, it is more or less a standard to derive drought conditions with SPEI, also because it captures value in relation to longterm trends.

5 This is of course still a large area, and ideally we would have liked to use a smaller resolution. However, this is currently what is available. Nonetheless, it is a great improvement from country level analysis. We also need to take into account that spatial coded data is not always accurate and that by using smaller grid-cells we might end up with flawed estimates as we might code the wrong grid-cell.

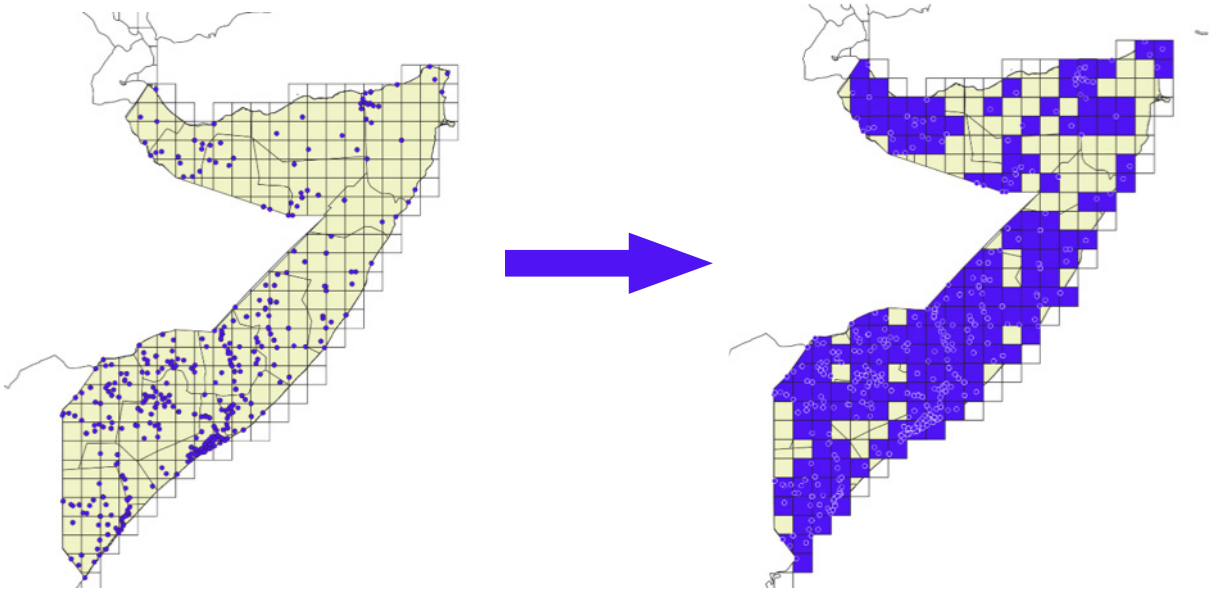

Figure 1: The conflict data captured in Figure 1 is associated with the PRIO-GRID overlayed on Somalia.

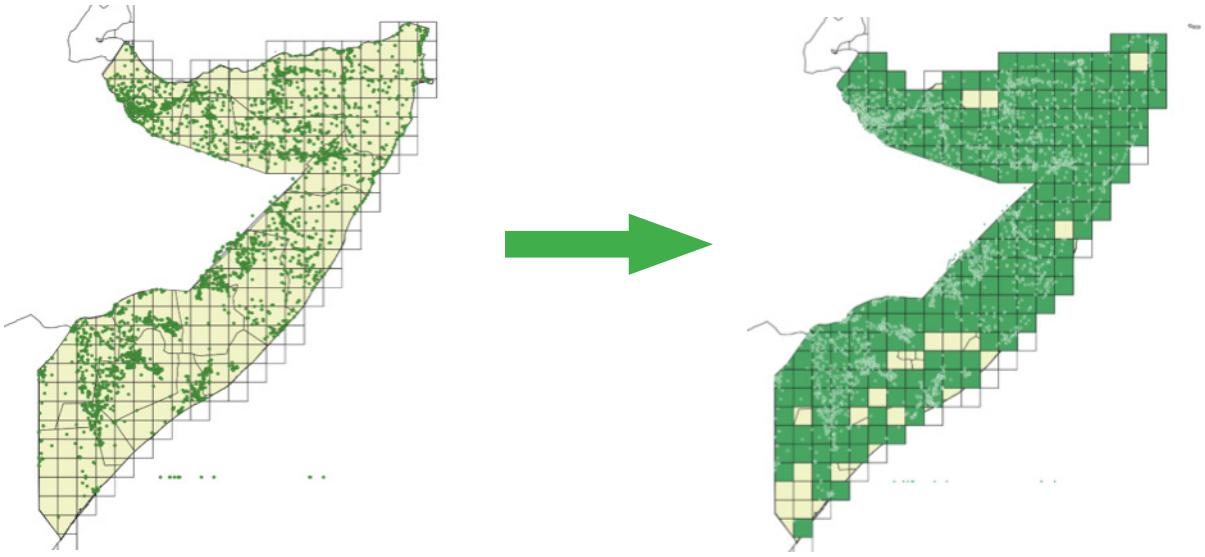

Figure 2: The waterpoint data captured in Figure 2 is associated with the PRIO-GRID overlayed on Somalia.

Three levels of analysis were conducted, providing descriptive data and regression analysis:

a. Cross sectional analysis – Seeking geographical coincidence of conflict and waterpoints occur, irrespective of time.

b. Temporal analysis – Including time variation on the conflict variable.

c. Contextual analysis – Testing whether water scarcity, as a direct consequence of climate variability, affects the relationship between waterpoints and conflict.

The original Desktop Quantitative Analysis Report can be found at Annex C, including a more in-depth explanation of the methodology used for this strand of research.

Strand 3: Digital Research

This research attempts to identify and understand online discussions around the relationship between conflict and climate change in Somalia over a specific current time period covering March 2022. To obtain relevant data, a standard but highly comprehensive Boolean expression, using a set of keywords and phrases in English and Somali, related to the climate-conflict nexus in Somalia, was applied to the Pulsar TRAC platform, a social media and online content listening tool.

Analysis was conducted by firstly assessing *where* conversations around conflict and climate change in Somalia were taking place (i.e., on which online platforms and channels). Subsequently, the content of these conversations was examined and common themes were identified. Pulsar's sentiment tracker was then used to analyse the sentiment of these thematic conversations. Finally, an examination of *who* was contributing to these conversations was conducted. However, it was not possible to gain more granular information about the location of individual posts.

However, the digital research proved to be rather less fruitful than other strands in servicing the research questions. Most online activity during the research window was produced by news outlets, activists or international stakeholders and, further, provided little discourse on the Somali-specific conflict-climate-water nexus directly. Rather, posts were concerning climate change itself, general impacts of conflict and the humanitarian needs resulting from it. Further, digital forensic analysis was not conducted on the online content and thus should be viewed as discourse not objective ground truth. As such, this research did, however, provide an atmospheric and narrative backdrop to the other research strands.

The original Digital Discourse Analysis Report can be found at Annex E.

Strand 4: Qualitative Field Research

In support of the entire research project, a qualitative study was done to investigate climate change and its implication on clan conflicts in the Matabaan and Deefoow areas of Hirshabelle state.

Primary data collection was conducted through 24 key informant interviews (KIIs), with community leaders, local authorities, and community members, and four focus group discussions (FGDs), each with 10 participants. Two FGDs were held for each location, one for males and one for females. In total, 64 participants were engaged. This was done through purposive sampling. Unfortunately, precise census data of the area is unavailable.

Key informants were selected through purposive sampling, accounting for key attributes such as political and social power, age, gender, clan affiliation, occupation, and geographical location. Data collected from participants were triangulated with information from the literature review and background knowledge.

Throughout the field visit, researchers faced several challenges, including security issues in Deefoow and Matabaan. Participants were transported to Beledwayne and Guriceel towns, where the FGDs and KIIs were conducted. Another challenge was informants' lack of

specificity, who tended to provide general opinions rather than specific facts. However, this was resolved by paraphrasing and narrowing down questions.

The original Qualitative Analysis Report can be found at Annex D. Again, this report contains more detailed information about the methodology adopted for this strand of research.

Theoretical Pathways from climate change to conflict

Four generally accepted theoretical pathways from climate change to conflict (van Baalen & Mobjörk, 2016) guided the epistemic framework for the research, as well as the analysis and synthesis of the findings from these four different strands of research.

The climate-conflict nexus has proved a difficult one in which to find obvious causality. It has been commented that "ten years of generalizable quantitative research on climate change and armed conflict appears to have produced more confusion than knowledge" (Buhaug, 2015, p.269). To the extent that climatic conditions affect conflict dynamics alongside a wide spectrum of interacting contextual and specific variables, causality can probably never be detected with statistical significance in a comparative, generalizable analytical design. In recognition of this, academia has moved from an emphasis on empirical methods to developing better theoretical models of the possible links between climate and conflict, and then subsequently formulate hypotheses that can be explored empirically.

As such, research in this area has recalibrated its general approach to hypothesize 'pathways' to conflict instigated by climate change, neatly resolved, by van Baalen and Mobjörk (2016), down to four interrelated pathways:

Pathway 1: Worsening livelihood conditions can, under certain circumstances, increase the risk of people joining armed groups and of resource competition turning violent

Pathway 2: Populations confronted by increasing resource scarcity often respond by moving to areas where resources are available or by varying existing mobility patterns, notably in the case of pastoralists

Pathway 3: Climactic conditions have an impact on tactical considerations of armed groups (mainly livestock raiders) regarding when to attack

Pathway 4: Local resource conflicts can provide elites with the opportunity and incentive to exploit local grievances for selfish reasons, for example by using environmentally marginalised nomadic groups as proxies for state violence

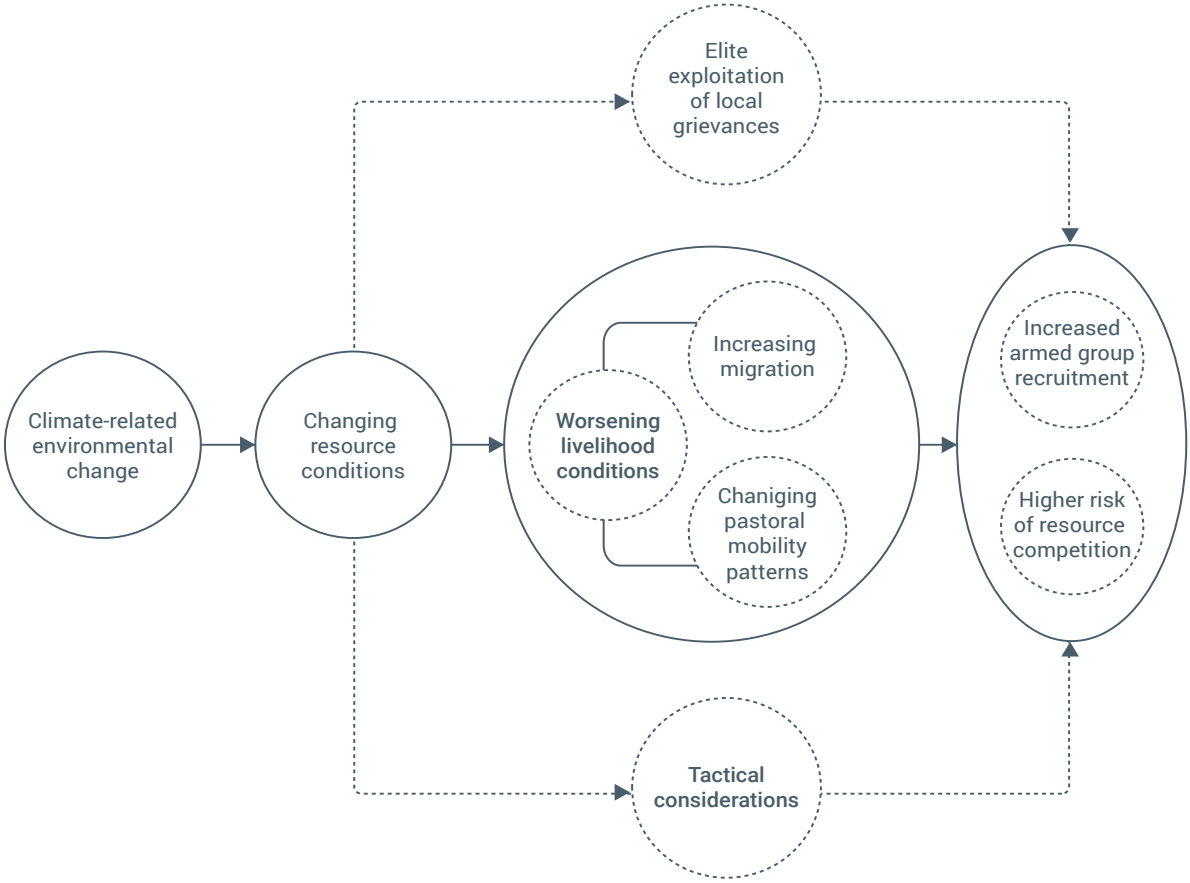

Figure 3: Visual of van Baalen & Mobjörk's four pathways to conflict instigated by climate change (Source: van Baalen & Mobjörk, 2016, p. 19)

Limitations

Methodology – Due to the compressed timeline, resulting from contracting issues and funding deadlines, the research was constrained to a convergent parallel design. The timeline was also further compressed by Ramadan falling within the project period, meaning that certain activities or individuals were not available during that time. This had impact on the desktop, digital and qualitative field research, as they had to be started or conducted before a full literature review had been completed. Time being given for a more sequential approach may have better focused enquiries of the research.

Temporal scope – The time frame of the digital and qualitative field research was constrained to the dry season. The time frame of the digital and qualitative field research was limited to the dry season because of the above-mentioned time constraints, as well as budgetary constraints. Future iterations of research could include historical data and cover multiple seasons, which may provide a greater level of insight into the relationship between climate change induced water variability and conflict. Further, the research can only look at the present and past. Given the uncertainties and multiple variables surrounding climate effects, and therefore upon conflict dynamics, any recommendations forthcoming from research must be caveated to reflect the limits of projecting into the future.

Geographical and demographic scope – The focus on two locations did provide a degree of granularity. However, cross-referencing with more urban areas and how a wider demographic sample view climate-induced conflict, may have provided more insight.

Philosophical approach – Less a limitation but more a boundary, the allure of focusing on only climate effects or general conflict dynamics, which are much covered in wider research, had to be constantly fought against. This research is aimed at a tightly defined niche: the *conflict* risks and dynamics associated with climate change or variability. This is notable in the recommendations, which shy away from how to prevent or mitigate the impacts of climate change or how to mediate conflict, but how to do so in instances where the two collide, in the specific locations and circumstances being researched.

2. Context – Somalia

Country Profile

Located in East Africa, and neighbouring Kenya, Ethiopia and Djibouti, Somalia has a population of over 12 million people. The country is divided into 18 regions, which are further divided into 90 districts. The three largest cities in the country are Mogadishu, Beledweyne and Baidoa although the field research focussed on Deefoow and Matabaan in the Shabelle basin.

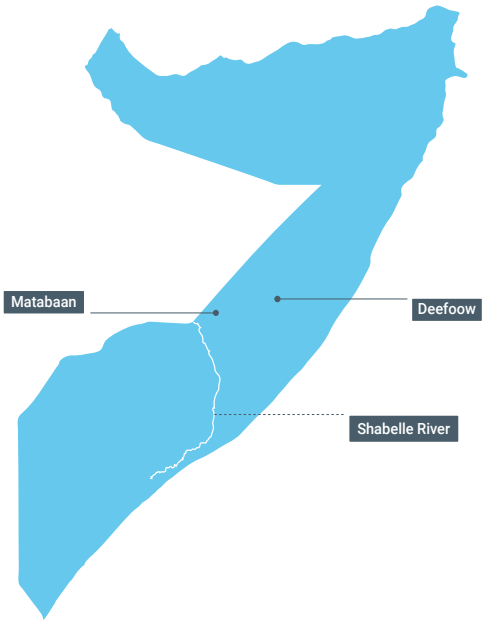

Figure 4: Density map of Somalia. Matabaan and Deefoow highlighted.

Central to existence in Somalia is clan membership, or clanship. Clan structures remain particularly central to life in areas where formal governance is degraded or even absent. Clanship, or tolnimo in Somali, is largely based on well-defined patrilineal genealogical structures. However, this is not always the case and is sometimes based on an agreement among members of various lineages who decided how to coexist and collaborate. Clans are responsible for the protection and welfare of their members, and clan members are obligated to protect the honour, assets and resources, including natural resources, of the clan. Within this is the principle that the liability incurred by one is equally dispersed among all, and clan members are morally obliged to avenge wrongdoing against the clan.

In Somalia, these clans tend to be differentiated by whether they are pastoralists or agriculturalists. Pastoralists tend to be sheep or cattle herders, whereas agriculturalists tend to cultivate the land and grow crops.

There is no agreement as to how many clans there are in Somalia, but there are five major or "noble" clans. These are the Darod, Hawiye, Dir, Isaaq, and Rahanweyn. There are countless minority plans, the largest of which are the: Ashraaf, Aw Xasan Bravanese, Benadiri, Eyle, Carab Salaax, Gaboye (Madhiban), Muse clan (s), Tumaal, and Yibir. Within each clan, there are smaller sub-clans. For example, the Hawadle are a sub-clan of the Hawiye. For the purposes of our research, we focused on clans in the Deefow and Mataban Districts along the Shabelle river.

Deefoow is an agriculturally rich town on the Shabelle river, located about 37km to the north of Beledweyne, close to the Ethiopian border. The Eastern side of Deefoow town is predominantly populated by the pastoralist Hawadle of Hawiye and the agriculturalist Fiqi Umar sub-clan of Surre – Dirr. On the Western side, are the agriculturalist Makanne sub-clan Somalized Pantu and pastoralist Jajele subclan of Hawiye.

Matabaan is about 75km to Beledweyne towards the north on the Main Road to Mogadishu. Administratively, Matabaan is a district of Hiiraan Region headquartered at Beledweyne. Different subclans of Cayr, and Habargidir, predominantly populate the town, while Hawadle subclans populate the surrounding areas. Both Hawadle and Habargidir are predominantly pastoralists but have fought with each for more than a century, according to an elderly informant. Although being at a distance from the river these conflicts involve disputes over water, territory or/and grazing, but notably around water storage.

Water Scarcity in Somalia

Somalia is one of the hottest and most conflict-riven countries on the planet, but despite common conceptions, it in general is *not* yet a water scarce country (Mourad, 2021).

The most recent data available from the Food and Agriculture Organization (FAO) global information system on water resources and agricultural water management (FAO-AQUASTAT), estimated that the total available renewable water resources (surface and groundwaters) was some 14.7 km3, whereas the total withdrawal water (domestic, agricultural, industrial, and environmental demands) was estimated at 3.3 km3 (FAO, 2022). Taking the country as a whole, currently on average the total available renewable water resources far exceeds the total actually withdrawn.

However, several decades of civil war and widespread insurgency have severely hindered any maintenance or development of water infrastructure. The impact is significant – all nine barrages on the Shabelle river itself, all built before 1991, are in various states of serious disrepair (Mohamed, 2013; Federal Government of Somalia, 2021).

Further, poor water governance, low groundwater quality, temporal factors, inadequate WASH services, intractable conflict, transboundary resource issues, damaged infrastructure lead to low levels of water availability in specific areas (Mourad, 2020). Climate change, or variability, is also cited as a significant factor and a highly visible one.

According to the Somalia Drought Impact and Needs Assessment (Drought Impact Needs Assessment (DINA) 2018), the Shabelle River dried out completely for three months in 2017, an after effect of the 2016-17 drought (Federal Government of Somalia, 2018). Food and Agriculture Organization—Somalia Water and Land Information Management (FAO-SWALIM) state that the Shabelle (and also the Juba) river faces many challenges including:

a. High risks of flooding in the river basins;
b. Lack of services in many areas due to insecurity;
c. Lack of data, monitoring and information management of the water sector;
d. Lack of sustainable development of the transboundary river basins; and
e. Lack of resources to develop and implement water management plans. (Mourad, 2020).

This is particularly alarming because of how dependent the Somali population is on farming as a type of employment. In 2018, some 80% of employment in Somalia was farming (agricultural and livestock) based (World Bank, 2018) contributing to over 90% of the country's total exports and 75% of its GDP (World Bank/FAO, 2018b). In 2015, in the Shabelle river basin the annual water demands of agriculture and livestock were some 68% of all extracted water needs. Annual overall demands in 2015 required some 37% of river flow. Models, assuming a medium growth scenario and accounting for proposed upstream developments in Ethiopia, predict that this agricultural and livestock proportion may rise to 74% annually, but more strikingly annual overall demands may exceed river flow some by 23%, by 2035 (Michalscheck et al, 2016, p. 1884). Simply put, agriculture and livestock water needs are by far the greatest draws on river flow on the Shabelle and those needs are due to rise significantly, while river flow may dwindle due to increasing population, farming production, livestock numbers and upstream extraction.

Furthermore, the Shabelle is the predominant waterway not only in Somalia, but also Ethiopia, where the river originates. Ethiopia plans significant irrigation and hydropower projects that will abstract significant volumes of water from the river. After full implementation of these development plans, it is calculated that the upstream abstractions from the Shabelle River could surpass the available river flow on the Somali side by over 30% (Michalscheck et al, 2016, p.1888). This is regardless of any climate effects.

However, national rainfall itself has been previously forecast to increase annually by some 3% by 2050, compared to the period 1981-2000, although less so in central and southern Somalia (Federal Government of Somalia, 2013, p.30). The IPCC models suggest in East Africa 'less severe droughts in October–November–December and March–April–May, a reversal of recent historical trends' (FAO, 2016).

All of the above matters because our research, and previous studies, indicate that conflict in the area is predominantly linked to agricultural and livestock issues intertwined with the water resource needs of the land required for these farming activities. This is further explored in the section below.

The clan and conflict

The clan structure in Somalia demands that clan members reside in a geographically defined area. This is often due to the predominant mode of agriculturalist employment, defined by agriculture and its resource needs, not least water. The clan structure in Somalia demands that clan members reside in a geographically defined area. This is often due to the predominant mode of agriculturalist employment, defined by agriculture and its resource needs, not least water. The ownership of the wells, *berkado*[6], lakes, water springs, rivers and pastures is communal according to an unwritten traditional land tenure system. This system tends to decree that if water points are owned by different clans that surround a grazing area, it is considered common to those clans, and there is prevailing tradition of giving free access to water and pasture to all non-hostile clans. Non-rival pastoralist clans enjoy free movement and access to pastures and water, as long as resources exceed demand (Unruh, 1995: Lewis, 1999). During the Said Barre regime, there was an attempt at nationalisation, but clan mechanisms have prevailed. However, it has been speculated and observed in recent years, however, that these informal agreements are breaking down and resulting in violence.

Eklow and Krampe (2019) conducted a study through documentary research and interviews exploring conflict drivers in Somalia. In their text, they describe in some detail the shape and form that conflicts generally take, emphasising the important role of clan, and sometimes natural resources:

> *Locally, conflicts in Somalia are often manifested through low-level communal violence, and are intimately linked to resources and clan affiliation. Communal violence has frequently spilled over to the national level and was part of the outbreak of the civil war in the 1990s. After a peak of fatalities in the civil war of the early 1990s, violent conflict among different clans continued on the communal level. These conflicts were—and still are—closely linked to access and control over natural resources, especially land, livestock, fisheries and water. The ownership of resources is linked to livelihood styles* (Pathway 1)[7]*, which often signifies clan association, for example in conflicts between powerful clan-based nomadic herder groups and often marginalized settled communities. Access to natural resources often defines power relations in and among communities on the local level. The implications of communal tensions frequently spill over to the national level, as clan identities increasingly become politicized* (Pathway 4)*. (Ibid. p4)*

These regular communal clashes over natural resources are, in the study, placed in the context of scarcity due to climate change or variability and point to the dynamic relationship between pastoralists and agriculturalists, or herder and farmer.

> *Although herder and farmer clashes have always occurred* (Pathway 2)*, they are now harder to solve. The traditional approach to dispute resolution in Somalia, xeer, has survived colonization and state collapse, but it has no single authority and is applied ad hoc between two disputing parties, with a third party deciding the outcome and compensation. This customary legal*

6 *Berkad* is a Somali term for a cement-lined water reservoir used for rainwater harvesting during the rainy season to benefit drought times. Its plural form is *berkado*.
7 Notification of **pathways** added.

> *mechanism to resolve and prevent these conflicts has been weakened or replaced. This is partly because of the civil war, but also because of conflict and weather-related migration of traditional mediators, such as elders and local experts of customary law. In territories controlled by al-Shabaab, Somalia's traditional xeer law is typically replaced by Sharia law replaced by Sharia law. As such, there are few lasting measures for conflict resolution and reconciliation for communal conflicts over territory, livestock or natural resources. This limits the prospects for local trust and reconciliation and instead contributes to existing intergroup grievances that link to domestic political, clan and ethnic tensions. (Ibid. p19)*

Further, the study points to territorial issues, notably in the Shabelle basin, in relation to resources often affected by climate change.

> *Land tenure rights—or the lack of them—is a sensitive issue in Somalia. Climate change impacts are accelerating these dynamics. Increasingly severe flooding has affected the Shabelle area, which is inhabited by settled groups and nomads. The same pattern has led to recurring violence, marginalization and permanent displacement of minority groups who cultivated land in the larger Shabelle river basin area. (Ibid. p22).*

To further elaborate on the above, agriculture and livestock in the Shabelle basin are managed, as in large parts of East Africa, by pastoralists and agriculturalists. Typically, both groups coexist in an interdependent and temporally regulated relationship, which has been the norm for hundreds of years. In the wet season, while agriculturalists grow crops on fertile lands, pastoralists graze their livestock in more barren areas, which provide enough biomass for their herds. After final harvest and into the dry season, pastoralists will migrate, sometimes locally or even over hundreds of kilometres, to agricultural areas to benefit from remaining biomass and, in exchange, provide organic fertilizer for the next growing season. However, the timing of this migration is often affected by precipitation and may be forced forward – an adaptation strategy – if biomass is depleted or other fodder unavailable due to lack of rainfall[8] or an excess of it, through the flooding of grazing lands. The availability of fodder is a critical issue for the livestock trade in Somalia, more so than the actual direct availability of water (FAO, 2017). If grazing animals arrive in agricultural areas before the final harvest, the resulting damaged crops and competition for resources such as water and pasture can raise tensions between the groups (McGuirk & Nunn, 2020). Of note, in Somalia, there are two wet seasons, which adds complexity to this symbiotic relationship.

The potentially fractious nature of this relationship in areas of climate stress is borne out by research indicating that climate-induced conflict risk in sub-Saharan Africa increases by approximately one third specifically in areas where agriculturalists and pastoralists interact, often at the fringe between grazing lands and farmlands (Eberle et al, 2022).

8Temperature may also be a factor in depleting biomass, and has the advantage of being monotonic, i.e. has a single one-way effect, but the effect of rainfall is considered to be six times more influential (McGuirk & Nunn, 2020, p. 3).

The 'rights' of either agriculturalists or pastoralists to own or use land at any given time, especially around the fertile riverbanks and inter-riverine areas of the Juba and Shabelle valleys, have been seen as a major driver of conflict in Somalia over the last three decades, since the start of the civil war in 1991, even called "the war behind the war" (Besteman & Cassanelli, 2003). These land issues, notably around agricultural[9] land, are considered to continue to foment conflict today between clans in the Shabelle basin. In most rural and peri-urban areas, there are no defined land demarcations, meaning that disputes over land boundaries can easily occur, especially where agricultural and pastoralist land overlap (EAJ, 2020). Land or territory, and to a significant degree where agricultural land or water resources were at stake, is cited as a major source of dispute in some two thirds of all non-state conflict years in Africa between 1989-2011, the most frequent conflict issue in the data collection (von Uexkull & Pettersson, 2018). The most valuable land worth fighting over is that which is most fertile and therefore supplied with water through some mechanism (natural rainfall, irrigation, groundwater, etc.), the amount of which is inevitably prone to climate variation.

Gender and Climate-Induced Conflict

No contextual backdrop can be complete without also highlighting gender issues. Somali women have key roles as the primary gatherers of natural resources, not least water. However, women are mostly denied rights of land and property ownership and financial independence and are designated home makers, although there are nuances between the xeer and Shari'a legal approaches. Such gendered discrimination continually disadvantages, even endangers, women during conflict or crisis and can increase their vulnerability to climate impacts. Further, Somali women are generally excluded from conflict resolution mechanisms. This is despite women suffering the brunt of climatic shocks and resulting conflict.

Figure 5: A tweet identified through Albany's digital research that is an example of some of ways in which climate change related water scarcity (albeit not necessarily climate change induced conflict) is affecting Somali women and girls.

Conflict, not least climate-induced conflict, also affects women and men differently. For example, climate-conflict is often the predominant driver of migration and women are often disproportionately affected by displacement, forced or otherwise. In these circumstances,

9 Agricultural land is defined as the land area that is either arable, under permanent crops, or under permanent pastures.

there are unequal opportunities and possibilities available to women and men. Most significantly, women's limited access to financial resources can constrain their ability and autonomy to migrate. The impacts of climate-driven conflict, such as displacement, urbanisation and forced settlement can intensify vulnerabilities and gender inequality. Displaced women and girls have even more restrictions access and benefitting from education, healthcare, and employment opportunities.

Intersectionality is worthy of discussion as well in the context of gender and climate-driven conflict. Gender intersects with other social markers, women from marginalised clans, and others who may be disadvantaged by virtue of cultural, linguistic, or economic backgrounds and characteristics are doubly oppressed and impacted by conflict induced by climate stresses. Women and girls living with disabilities are made even more vulnerable to climatic shocks and conflict.

Climate change and climate conflict also affects men in unique ways. As agriculture suffers significantly under climate-induced shocks, especially drought, men are increasingly unable to secure income for their families. Domestic violence is often an outcome of this situation. Idle men turn to chewing qat, as loss of male honour as women take on the role of breadwinner all contribute to increased levels of violence within the home. Divorce rates are reported to have risen during these periods of stress and single-parent (female) households have become more common. Other forms of gender-based violence, such as rape, increase during such periods. Women report feeling more vulnerable than men at water points, grazing areas and on roads to markets and in their homes.

Communities have developed a variety of coping mechanisms to mitigate the gendered effects of climate-driven conflict. To avoid sexual violence and rape, women and girls travel in groups, vary their schedules and routes, and carry sticks and torches, while elderly women increasingly collect water or firewood.

3. Emerging Findings

Key Finding 1: Increase in communal conflict during times of extreme climate stress – both dry and wet (up to a point)

One of the key findings from the General Literature Review (Annex A) and the Qualitative Analysis (Annex D) is that both short, unusually dry periods and long, unusually wet periods seem to contribute to the heightened risk of communal conflict events. So, when it comes to water, both extremes can act as significant actors in conflict risk. Indeed, De Bruin (2022) refers to research that indicates small-scale conflict increases under conditions of extreme rainfall variability – too much as well as too little (Ibid. p396). This is also supported by the correlation between increased flooding and drought and increased conflict between pastoralists and agriculturalists discussed in Key Findings 2 and 3. And, notably, from the Qualitative Analysis (Annex D), a number of participants in the KIIs and FGDs conducted during our field research contended that climate change sparks sub/clan conflicts in Mata-baan and Deefoow more than any other factor. They noted that these conflicts are rooted in drought-induced disputes, and the resulting building of *berkado* to provide water in times of scarcity. This being, it is important to keep in mind that one of the limitations of our field research was the tight timeframe that meant we were primarily discussing the dry period,

whereas longer-term research would allow us to explore longer-term dynamics/relationships as well.

However, notably, in Deefoow and Matabaan, conflicts have been curtailed since late 2021. From the Qualitative Analysis (Annex D), most informants put this down to the recurrent drought, which has forced clans to focus on survival of individuals and families. This being said, informants also agreed that though severe drought might stop clans from fighting, some conflicts are rooted in drought-induced disputes. It appears there is a tipping point at which the relationship between the opportunity cost of conflict and value of scarce resources inverts.

Indeed, the General Literature Review (Annex A) brought forth several discussions of conflict risk being increased due to tactical considerations, better fighting conditions and higher opportunity cost of conflict during times of water abundance, in rainy seasons. This did not appear in any other strands of our research but may have been due to the time frame only covering the dry season. However, climate-induced shocks can have a dampening effect as conflict actors refrain from fighting in order to deal directly with the impact of these shocks. This appears at the local level and also in wider civil conflict – Al-Shabaab's operations significantly reduced during the 2010-11 and 2017 droughts. This is effectively indicative of the obverse of Pathway 3, whereby climate-induced shocks influence tactical considerations and, in this case, prevent conflict. It appears there is a tipping point at which the relationship between the opportunity cost of conflict and value of scarce resources inverts and thus the correlation between conflict and climate no longer holds.

Key Finding 2: Correlation between the existence of water sources and increased conflict (up to a point)

Our Desktop Quantitative Analysis (Annex C) found, perhaps surprisingly, that there is a correlation between water sources – namely *berkado* constructed on disputed land – and non-state-based conflict. Conventional wisdom might lead one to assume that the presence of water would decrease the likelihood of conflict, but as we detail below, when there is no agreed political settlement to govern society and its use of and access to natural resources, our research suggests otherwise.

Through the Desktop Quantitative Analysis (Annex C) we found a positive relationship between conflict and waterpoints in Somalia. This means that according to the research, waterpoints and conflict are likely to occur in the same areas and this relationship holds at a 95% confidence interval.[10]

In examining water scarcity, or drought, the analysis shows different effects on conflict in areas close to waterpoints compared to areas without waterpoints. There appears an increased likelihood for conflicts, notably state-based, in areas with waterpoints during drought. It is worth noting that increases in the levels of drought do not correlate consistently with increases in conflict around waterpoints (this may be due to the temporal cycle of drought-related violence as discussed below, with the perception that conflict increases while *berkado* are built and decreases during extreme drought conditions, when survival, not conflict, becomes paramount).

10 Details of statistical calculations and their relevance are found in Desktop Quantitative Analysis Report (Annex C)

Further, non-state conflicts have a stronger relationship with waterpoints than other types of conflict. The effect is just slightly higher for conflict between formally organised groups than communal violence. However, given the total numbers of communal conflicts, there are proportionately more communal conflicts centred around waterpoints. Of note, the available literature on climate change and conflict focuses on communal violence.

The Qualitative Analysis (Annex D) further supports a positive correlation between waterpoints and conflict. As mentioned in the methodology, field research was carried out in two locations, one of which was Matabaan, inhabited largely by the Hawadle and Habargidir sub-clans. Through KIIs and FGDs, many stories were shared of instances where conflict has broken out between the clans, triggered by the construction of waterpoints/*berkado*. For example, five years ago, near the village of Hees, the building of a *berkad* by a Hawadle sub-clan on what had been traditionally considered common grazing land shared between themselves and a Habargidir sub-clan has sparked a round of conflict. Concerned about Hawadle sub-clan expansionism and land control, the Habargidir sub-clan destroyed the newly built *berkad*. The Hawadle sub-clan then retaliated.

In 2021, more Hawadle sub-clan members were killed by Habargidir sub-clan men while building a *berkad* at Maxad-maroodi, although elders have agreed compensation and outright conflict has been prevented.

KII and FGD participants from both sub-clans claimed that construction of *berkado* has increased because of recurring droughts. Research sponsored by the Internal Displacement Monitoring Centre argues that in Somalia, the increase of drought has forced nomadic communities into urban and peri-urban settlements (Ferrández 2020:5) and digging *berkado* is one way of establishing a permanent peri-urban settlement.

As discussed in Key Finding 4, the views of the respondents, captured in the Qualitative Analysis (Annex D), indicate that al- Shabaab has demonstrated that it also views *berkado* as potential threats to stability, as opposed to providing vital succour in times of water scarcity. However, it is to be stressed that such conflicts are generated when clans, not necessarily external agencies, embark on water source development.

Desktop Quantitative Analysis (Annex C), also shows that the type of waterpoint does not reflect the likelihood of conflict but does attract certain types of conflict. Non-state conflicts are the dominant feature occurring around boreholes, dug wells and dams in comparison to other types of waterpoints.

Whilst a positive correlation has been observed between conflict and waterpoints in Somalia in the Desktop Quantitative Analysis (Annex C), it is important to note that it does not account for several factors that could also affect the observed relationship between water and conflict, such as population, political economy and power relations. In addition to this, the available waterpoint data (SWALIM) is missing precise (i.e. date) temporal information defining when waterpoints were originally created, meaning that it cannot be determined whether a waterpoint or a conflict occurred first. It is therefore not possible to determine a causality, or relation between cause and effect, to the positive correlation observed from this desk research alone.

This correlation between the presence of waterpoints and conflict is also supported by many sources examined in the General literature review (Annex A). A prevailing theory

emerges suggesting that, where water resources are limited, such waterpoints and the lands surrounding them become more valuable as an asset and groups will use violence to secure access to scarce water resources. Violence close to waterpoints suggests there is scarcity in other places, driving conflict actors, such as pastoralists and agriculturalists, into closer proximity near to water sources **(Pathway 2)**.

A second suggested theory proposes that levels of violence increase around waterpoints because of the leverage that control of those water points could provide to armed groups or clans **(Pathway 4)**.

It is important to note that while the Desktop Quantitative Analysis (Annex C) shows an increase in conflict around waterpoints during times of drought, continued drought can be perceived to decrease conflict as well, as mentioned in Key Finding 1 and covered in the General Literature Review (Annex A). Most of the participants in the KIIs and FGDs conducted during our Qualitative Analysis (Annex D) that contended that sub/clan conflicts in Matabaan and Deefoow are drought-induced disputes (following the building of a *berkad* to provide water in times of scarcity), also stated that the continuation of the drought put an end to the conflict in late 2021, as it forced clans to focus on the day-to-day survival of individuals and families, including the option of migrating, rather than fighting **(Pathway 3)**.

As mentioned in Key finding 1, it appears there is a point beyond which the correlation between conflict and climate no longer holds due to to extreme climactic conditions.

Key Finding 3: Conflict between pastoralists and agriculturalists over trespass of land

Our research has also illuminated how the migration of pastoralists onto agriculturalist land due to climate change events causes tensions that can often lead to or contribute to triggering conflict. This was notable from the General Literature Review (Annex A), especially when concerning Sub-Saharan Africa and the Horn of Africa.

In *Section 2. Context,* we explained that pastoralists and agriculturalists typically coexist in a temporally regulated relationship. In the wet season, while agriculturalists grow crops on fertile lands, pastoralists graze their livestock in more barren areas that has enough flora to feed their livestock. After the final harvest and into the dry season, pastoralists will migrate to agricultural areas to benefit from remaining biomass and, in exchange, provide organic fertilizer for the next growing season. The timing of this migration is often affected by levels of precipitation. Migration may be encouraged earlier – an adaptation strategy – if biomass or other fodder is unavailable due to lack of rainfall[11], or is lost due to an excess of rainfall, through the flooding of grazing lands. Whilst this relationship or phenomenon has been in practice for hundreds of years, it can be disrupted if animal numbers increase, either by grazing animals arriving or existing flocks expanding, in agricultural areas before the final harvest. This is because this normally results in damaged crops and competition for resources such as water and pasture, which can raise tensions between the groups (McGuirk & Nunn, 2020).

11 Temperature may also be a factor in depleting biomass, and has the advantage of being monotonic i.e. has a single one-way effect, but the effect of rainfall is considered to be six times more influential (McGuirk & Nunn, 2020, p. 3)

The timing and duration of floodings, as well as prevalence and duration of droughts, are becoming more severe, and research links this severity to climate change. This has meant that over the past few decades the symbiotic relationship between pastoralists and agriculturalists has increasingly been affected in ways that are resulting in tensions and conflict. As a reminder, this was one of Eklow and Krampe's findings from their study:

> *Increasingly severe flooding has affected the Shabelle area, which is inhabited by settled groups and nomads. The same pattern has led to recurring violence, marginalization and permanent displacement of minority groups who cultivated land in the larger Shabelle river basin area. (Ibid p22).* [12]

We can also find evidence of this kind of trespass as a result of drought by looking at the Digital Discourse Analysis Report (Annex E), which identified the tweet to the right. Notably, the digital analysis found that far more online content focused on the relationship between drought and displacement than the relationship between drought and conflict.

However, this trespass phenomenon was further explored through Qualitative Analysis (Annex D).

Deefoow is an agriculturally rich town on the Shabelle river. The Eastern side of Deefoow town is predominantly populated by the pastoralist Hawadle of Hawiye and the agriculturalist Fiqi Umar sub-clan of Surre – Dirr. On the Western side are the agriculturalist Makanne sub-clan Somalized Pantu and pastoralist Jajele subclan of Hawiye.

12 While Elkow's and Krampe's study focuses on the issue of pastoralist mobility, and its attendant ability to cause conflict, it does not specifically focus on migration (pathway 2). Although other research covering Somalia often claims narratives of migration due to drought, migration appears to be more a result of ongoing conflict and legacy of past violence, mainly driven by armed conflict itself (all of which may be linked to drought and flooding, given that some of our findings show a correlation between drought and flooding on one hand and conflict on the other), and less directly caused by water scarcity or other environmental factors.

According to the Qualitative Analysis (Annex D) conflicts between these populations have been historically rare. However, since 2013, after the drought of 2011, conflicts between agriculturalists and pastoralists have become more frequent. For example, in 2013, a Hawadle herder trespassed onto the farm of Fiqi Umar farmer for his livestock to graze after watering his livestock from the river. Normally, traditional land rights allowed the herder to access the river, but interview participants stated that encroachments onto farmland had been becoming increasingly frequent, and, this time, the Hawadle herder was attacked and killed. The level of immediate conflict was mitigated through mediation by the local police and compensation was paid to the Hawadle. However, subsequently, a Hawadle clan member murdered a Fiqi Umar man as he was traversing Hawadle territory. Open confrontation ensued, drawing in other sub-clans, occasionally engulfed Deefoow itself and continued sporadically until 2021.

The effects of flooding on farmers and resulting conflict dynamics may be an avenue for research to further explore, not least because Somalia is predicted to receive more rains annually, and therefore potential floods, over time because of climate change.[13]

Key Finding 4: Conflict over the establishment of settlements by clans displaced by drought and/or flood waters

Very closely linked to the above finding about how trespass as a result of flooding or drought can contribute to triggering conflict, is our fourth finding of how the establishment of settlements by clans displaced by flood waters or affected by drought can fuel conflict.

As mentioned above, severe flooding is increasing along the Shabelle, resulting in some clans or sub-clans becoming permanently displaced and, rather than temporarily settling on higher ground, establishing permanent settlements. From the Qualitative Analysis (Annex D), in Deefoow, for example, the conflict dynamics of the Jajele-Makanne are borne directly of climate-related shocks, namely flooding. When the Shabelle river floods, the Makanne clan would move temporarily from their farmlands on the riverbank to higher ground, traditionally populated by the Jajele, to return when waters subsided. Participants from our field research claimed that this practice began in the mid-1990s with little issue. However, after consecutive floods, the Makanne increasingly stayed and established new villages on higher ground, encroaching on lands traditionally grazed by the Jajele and reportedly threatening their livestock. This eventually resulted in serious conflict in 2020. These were not light skirmishes – Makanne villages were burned and one participant reported heavy shelling by the Jajele.

Another example of this is the vicious conflict that erupted in 2020 between two other sub-clans of Hawadle and Habargidir, over one sub-clan moving on to newly settle what had been considered common grazing land. A murder initiated the conflict but quick negotiation by the sub-clan elders managed to stem initial violence, until the new settlers started building several *berkado* (similar to the conflict around building of a *berkad* in Key Finding

13 IPCC models suggest that across East Africa 'less severe droughts in October–November–December and March–April–May, a reversal of recent historical trends' (FAO, 2016). Further, compared to the late 20th century, rainfall in Somalia is expected to increase in Somalia by about 3 per cent annually by 2050 (Federal Government of Somalia, Ministry of National Resources, 2013, p.30). However, temperatures will become a primary issue (see Ogallo et al, 2018, p. 163-5).

2). Violence and death followed until Al-Shabaab intervened, ordering mutual compensation and destroyed the *berkad* An interesting finding is that Al-Shabaab proscribed the creation of any *berkad*o in the area, as they have grown to consider and recognise them as conflict risks . Also interesting is that participants from the field research have viewed Al-Shabaab's banning of *berkad* construction as a successful conflict mitigation measure.

This kind of "encroachment" or settlement is normally problematic due to the fact that land rights are a very contentious issue in Somalia. The clan structure in Somalia demands that clan members reside in a geographically defined area. This is often due to the predominant mode of agriculturalist employment, defined by agriculture and its resource needs, not least water. The ownership of the wells, *berkad*o, lakes, water springs, rivers and pastures is communal according to an unwritten traditional land tenure system. This system tends to decree that if water points are owned by different clans surround a grazing area, it is considered common to those clans, and there is prevailing tradition of giving free access to water and pasture to all non-hostile clans. Non-rival pastoralist clans enjoy free movement and access to pastures and water.

The Qualitative Analysis (Annex D) observed in recent years, however, that these informal agreements are breaking down, with no indication of emerging mechanisms to replace them, and resulting in violence. There are significant climate-induced conflict drivers embedded within this, specifically when that land may provide water or have water storage capabilities built upon it. Especially under conditions of climate stress, a number of factors contribute to the underlying conflict, including: unrecognized and undefined land rights of pastoralist communities, the breakdown of legislative controls governing use and access to natural resources, and the increasing inadequacy of xeer law and its implementation mechanisms related to use and access to land and water (Tempra, 2018, p. 14).

The General Literature Review (Annex A) indicates that good governance is key to reducing conflict generally, and group competition over resources largely occurs alongside dysfunctional governance. It is no surprise then that improved service provision, even marginal efforts, has been linked with a lowered risk of communal violence. Of not, communal conflicts have been found to occur where new legal systems override existing, often informal but long-standing and trust-based, land use practices. Customary institutions, such as local elder groups or religious organisations, are recognised to be key players in resolving communal conflict. Significant research suggests local community and religious organisations can be more successful when mediating as they have often higher trust among local groups.

Key Finding 5: Finding a single unidirectional link between climate change and conflict is complicated by other factors

As can be seen by looking at the different theories and examples outlined in the previous key findings, confirming a single unidirectional link between climate change and conflict is complicated by external and contextual factors.

As can be seen in Key Findings 1 and 2, they only hold up to a point, which seems to be dictated by the opportunity cost of conflict. Simply put, notably during extreme drought, the correlation between conflict and climate breaks down as survival appears to be the driving factor, suppressing any conflict driver.

There is evidence that supports the finding that there is increased risk for conflict near waterpoints and during times of heavy rainfall or flooding, but these types of conflict are steeped in deep-rooted, often historical, socio-cultural and political complexities. They include non-state communal conflicts in between clans or sub-clans, and can be extensive, engulfing entire towns and drawing in several clans or sub-clans, brutal, involving many fatalities, and possibly involving heavy weapons, as reported in the Qualitative Analysis (Annex D). These conflicts are sustained more often than not by clan dynamics built upon the principles of honour and revenge (can be seen in examples included in Key Findings 3 and 4), far removed from any climate-induced effects. Further, there is an argument that, although climate-induced shocks can trigger conflict, the resulting conflicts are rather more concerned with territorial control (can be seen in examples in Key Finding 4). The activities of Al-Shabaab further complicate the communal conflict circumstances. In the Digital Discourse Analysis Report (Annex E), there were indications of Al-Shabaab reacting to drought conditions negatively through evictions (see tweet above) but also that they were supporting drought-affected communities. The veracity of such comments was not confirmed.

This being said, whilst conflict research, confirmed by the Qualitative Analysis (Annex D), points to underlying grievances (such as honour and revenge) being central to conflict, it also increasingly notes that, as a single trigger, grievances alone have limited causal effect and rather are contributary. Literature also points to climate-driven conflict being more common in areas in which conflict already exists, in particular on existing armed conflicts where there exists ethnic marginalisation and particular reliance of different groups upon agriculture.

Given this, from the General Literature Review (Annex A), there is a growing consensus that climate-related shocks are most likely to lead to conflict in circumstances where both grievances and opportunity for collective action occur simultaneously. For example, McGuirk and Burke (2017) provide compelling empirical evidence on the prominent role played by the opportunity cost of fighting. This lends itself to tactical considerations **(Pathway 3)** whereby the wet season may increase levels of violence because of the assumed profits that water abundance will provide or conditions on the ground are more amenable to carrying out attacks or raids, and, conversely in the dry season conflict risk is lower as there is less to fight over.

As such, climate shocks, notably when water resources are limited, which exacerbate existing grievances or extant conflict, such as worsening livelihoods, including marginalization and inequality **(Pathway 1)**, politically fomented fissures **(Pathway 4)**, territorial rights, and physical inaccessibility to resources **(Pathway 2)**, may contribute to levels of conflict risk.

However, is worthwhile considering that the General Literature Review (Annex A) indicates that in cases of climate-induced disputes, centred around resources, the results may be actually collaboration and cooperation, rather than conflict. The Gender Literature

Review (Annex B) introduced further complexity by highlighting, not only the impact of climate-induced conflict upon women but the unique roles that women can play in not only responding to such conflict, but more importantly, mitigating and preventing such conflict. Indeed, this includes women's influence in collaborative responses. From the Digital Discourse Analysis Report (Annex E), although discussion on women and climate change, less so conflict, was an emergent theme, albeit from international organisations not Somali voices, there appeared no discussion around the gendered elements of the climate-conflict nexus itself, and thus little on women's role in it.

The efficacy of collaborative mechanisms, not least involving women, in mitigating or preventing conflict-induced conflict, specifically in the Somali context, may be a fruitful avenue for further research.

4. Summary of Key findings

As detailed in *Section 1.3 Research Methodology*, Albany and its partners completed four strands of research, all of which worked towards examining the nature and effect of the contemporary linkage between conflict and water-related climate change impacts in the Shabelle watershed. This section outlines and examines the key findings from these four strands of research.

As a reminder, our analysis of our findings was guided by four theoretical pathways (van Baalen & Mobjörk, 2016) from climate change effects, or variability, to conflict. We found that three of the four pathways were relevant to the communal conflicts in the Shabelle watershed that we specifically examined, with contextual factors noted below:

Pathway 1: Worsening livelihood conditions can, under certain circumstances, increase the risk of people joining armed groups and of resource competition turning violent **(Note: the recruitment into armed groups was not observed within the field evidence so this is more related to resource competition turning violent)**

Pathway 2: Populations confronted by increasing resource scarcity often respond by moving to areas where resources are available or by varying existing mobility patterns, notably in the case of pastoralists **(Note: flooding mostly affects agriculturalists and migration is not necessarily to seek resources but rather safety).**

Pathway 3: Climactic conditions have an impact on tactical considerations of armed groups (mainly livestock raiders) regarding when to attack **(Note: this appeared to apply to clan conflicts not just simple livestock raiding and had the effect of reducing correlation between conflict and climate in extreme circumstances).**

Using these pathways to guide us, we found that our research presented five core findings in relation to water-related climate change and the impact it might have on conflict:

1. An increase in conflict during times of extreme climate variability – both dry and wet (up to a point).

2. A correlation between the existence of water sources – namely *berkad*o constructed on disputed land – and non-state-based conflict, especially during drought (up to a point)

   NOTE: During extreme drought, conditions the correlation between conflict and climate cited in Key Findings 1 and 2 no longer holds past a certain, undefined point.

3. Conflict between pastoralists and agriculturalists over trespass of the former, with their livestock, on to the land of the latter. Such instances are also observed across Sub-Saharan Africa.

4. Conflict over the establishment of settlements of clans displaced by flood waters. Migration, particularly at a local level, as opposed to long range, can enflame already deep-seated animosities.[14]

5. An inability to confirm a single unidirectional link between climate change and conflict. Whilst conflicts are reported and seem to be more frequent in times of climate-induced water stress, these conflicts are the product of a complex interplay of factors, such as history, culture and politics. And are also dependent upon conditions on the ground during extreme drought.

5. Conclusions

Our findings have highlighted the role that extreme flooding as well as drought (linked to climate change) play as contributing factors in triggering or increasing the risk for clashes and conflict in two regions in Hirshabelle State: Deefoow (in the Beledwayne District) and Matabaan. This research shows that extreme dry and wet periods caused by climate change are linked to conflict. In particular, it demonstrates increased conflict around waterpoints (constructed in times of drought), citing a number of examples from field research concerning the building of *berkado* in particular. It also highlights increased tensions and violence between clans engaged in livestock and agriculture -- pastoralists and agriculturalists – as a result of changing views of the traditional right of pastoralists to "trespass" on the land of agriculturalists to water or graze their livestock. It also points to conflict correlated with the resettlement of displaced populations during times of flooding.

However, these findings are caveated by the fact that: correlations between climate and conflict fail after a certain point at which conflict abates as survival becomes a priority. Despite correlation up to this point, no direct causality between climate stress and conflict can be inferred. Conflict dynamics are very complex, influenced by historic, political, social and economic factors, with climate variability only being one of many possible contributing factors.

14 Due to the timing of the research, i.e., in the dry season, the impact of flooding on conflict was not focused upon. Studies examining the direct relationship between flooding (excess water) and violence often point to migration as the causal factor. However, some studies have shown an association between flooding and increased political unrest and resulting violence.

Our findings also discuss the need for good governance and conflict resolution mechanisms at the local level to resolve these conflicts. Notably such mechanisms should centre around land tenure and property rights, alongside arrangement to secure them. As such, key to mitigating conflict as a result of climate-change water variability or scarcity will be examining how to make the agricultural sector more manageable, resilient and productive in the face of climate change, including by focusing on local solutions to diffusing conflict.

6. Recommendations

The requirements for and access to land and resources, notably for the agricultural sector, are made more critical during climate stress, and are central to mitigating the risk of climate-induced conflict. There have been studies and policy recommendations from other sources looking into the question of agricultural resilience, which we do not wish to replicate. Rather, building on the proposed interventions put forward by Dr. Hussein Haji and Dr. Mohamed Farah Shirdon for the Heritage Institute for Policy Studies, City University of Mogadishu (2020), our research intends to complement these locally led solutions.

Likewise, we do not approach the wider socio-cultural, political and historical influences that lead to conflict in Somalia nor wish to replicate practical hydrological recommendations already forwarded by UNEP-DHI (2022) or wider Somali climate adaptation strategies in response to the growing impact of climate change (Federal Government of Somalia, Ministry of National Resources, 2013). Nor do we wish to unnecessarily repeat recommendations relevant to the land/conflict nexus, as relayed in UNHabitat's report on the subject in Jubaland (Tempra, 2018).

Rather, this report's proposed recommendations take into consideration the narrowly-focused climate related security risks for this specific context and look to prevent or mitigate climate-related conflicts specifically and directly in the defined locations.

This research did not examine the responsibilities, authority and capabilities of government ministries, international organisations and other major stakeholders to enact specific recommendations. Notably, but perhaps unsurprisingly given the nature of the platforms, considerable criticism of the Somali government and international agencies was seen online, noted in the Digital Discourse Analysis Report (Annex E). However, following are a number of recommendations for policy makers and donors in Somalia, as is in their relevant gift, ability and remit, to address these issues:

1.Invest in early warning of local responses to climate threats: Key Findings 1-4 demonstrate key indicators, both temporal and spatial. Strengthen and enhance the local governance system's capacity to monitor and respond to climate induced conflict risks, through ***monitoring*** and ***investigating***:

a. Local narratives, dialogue and discussion around forthcoming, real or perceived, climate-related conflict triggers via regular, ongoing and timely focus groups, simple public consultations, surveys and forums.

b. Short term economic indicators of proxy prices, such as livestock or feed which, as climate stress is forecast, may also reflect actual real-time value of land and resources, notably water. See Maystadt and Ecker (2014) for details on livestock price indicators related to conflict. The opportunity cost of conflict decreases as the value of climate-sensitive resources increases.
c. Establishment of new water sources, such as *berkado*, notably by local entities.
d. Long-term economic indicators, such as changes to market supply, and notably changes in the diversity and of food produce, which are indicators of changes in land use possibly due to climate-related conditions.
e. The establishment of human (as opposed to animal) security mechanisms around water sources to guard against human interference.
f. Changes to irrigation systems, potentially affecting downstream supplies
g. Food security protests.
h. Land degradation of previously fertile grazing lands potentially encouraging trespass of pastoralists onto farmlands.
i. Long-term long range and short-term local mobility patterns of pastoralists (responding to drought) and agriculturalists (responding to recurrent flooding).
j. Potential impacts of transborder water projects.

2. Invest in locally-driven development programmes: Key Findings 2-3 indicate the very local nature of potential climate-induced triggers. Devise development projects and development infrastructure to address the effects of climate-induced conflict which is rooted within the needs of the community, in particular women, marginalised groups and impacted communities. Developing bespoke programmes for women and other community members that are uniquely impacted by climate-induced conflicts is not only important for sensitive and socially inclusive programming, but could also help create opportunities for women to play a role in conflict mediation and resolution. This would be particularly beneficial given their vested interest and knowledge in areas of natural resource sourcing, as well as the important roles they can play in fomenting or mitigating conflict more generally.

3. Strengthen local mechanisms with regards to territory and resources, notably water: Key Findings 2-4 indicate the importance of local authority over land and resources to addressing climate-induced conflicts. In the context of Somalia, there are a number of informal and local mechanisms and structures in place to address a multiplicity of issues and priorities. However, many suffer through clan biases and power-play, not least those devised to manage territory and resources, notably water. As mentioned in the research, the xeer system was traditionally an important tool for conflict resolution but has become increasingly inadequate as a way to manage access to water and land. And conflict research shows that a lack of strong governance increases the risk for violence and inter-communal conflict. At times of climates stress, this lack of adequate management or tenure system provides, almost literally, a tinder box for conflict. Given this, it is recommended to identify existing cultural structures and mechanisms that can be used or strengthened to develop a system for water management that is aligned with the localised context. These local mechanisms need to be locally driven and owned by the community members who are best placed to speak of the localised impact of climate to contextualise

their issues and the adaptation measures applied. In the case of Somalia, for example, significant research suggests local community and religious organisations can be more successful in mediating as they have often higher trust among local groups.

4. Conduct deeper research of local knowledge and understanding of, and response to, climate stress and resulting conflicts. Key Finding 5 highlights the complexity of the conflict-climate-water nexus, while Key Findings 2-3 indicate the very local nature of potential climate-induced triggers. It is acknowledged that there is vast community experience in handling of climate change. Indeed, many responses are of collaboration not conflict and thus have much to offer in terms of solutions. The understanding of the potential and actual role of women in designing and enabling such solutions should be strongly encouraged. Future research should build a methodology that is bottom up driven and understanding of indigenous solutions, cooperation and adaptation. To do this, further studies need to be conducted that should examine the relationship between waterpoints and conflict that are evidence-based and assessed over a longer duration of time (as opposed to our research which only covered part of the dry season). This should also include other sources of water such as groundwater. Security risk indicators should be expanded beyond conflict to include local protest, disagreements and even cooperation. Urban areas should also be considered for examination. And further research should also be conducted to better understand land tenure systems given how sensitive access to and settlement of land (such as via *berkado*) is in Somalia.

Examples of potential recommended future research are as follows:

a. Mapping of local displacement in flood risk areas and its impact on climate-induced conflict risk.
b. Analysis of agricultural cycles against climate-conflict indicators.
c. Public understanding of the climate-conflict nexus (i.e. deeper qualitative examination of public understanding of climate impact on conflict risk).
d. Understanding of local interventions to reduce climate-induced conflict risk and mapping of collaborative conflict reduction in areas of climate impact.
e. Impact of climate-induced conflict on urban areas.
f. Women's potential roles in climate-conflict prevention and mitigation.
g. Relationship between land, water use and conflict in Shabelle and Juba basins (this has been done in Jubaland (Tempra, 2019)).
h. Modelling of transborder water project impacts on specific areas with high conflict risk, or 'hotspots', notably on the Shabelle river.
i. Analysis of the reality and capability of new indicators that could be included in UNEP's Stata project.
j. Cross-reference sites of climate-induced conflict with anticipatory actions as defined by SPARC studies.[15]
k. Analysis of regular climate influences, such as the Deyr season, on conflict.
l. Analysis of applicability of Nature Based Solutions (NBS) in various resource sensitive conflict settings.

15 See https://www.sparc-knowledge.org/resources/obstacles-and-opportunities-anticipatory-action-somalia

5.Encourage security and Rule of Law programmes. Key Findings 2-4 indicate the importance of local authority over land and resources to address climate-induced conflicts. Just as many nations declare major infrastructure as national security assets, and accordingly legally and practically protect them, locally-based Rule of Law programmes, resonant with local custom, should be established in cases of local water resource projects. Al-Shabaab have chosen to prevent water resource projects (berkado) as a conflict-prevention measure. However, whether such projects are constructed by locals or by external entities, local government security forces, or multi-clan arrangements, could, under a locally supported and legally recognised system, secure such projects for peaceful communal use. Of note, however, is that the overt 'militarisation' of the climate-conflict issue is countenanced against. And once again, the role of women in such processes should be assured.

Further, existing Rule of Law or Justice programmes could include the examination and impact of climate issues within their purview. This would include relevant efforts to enshrine land and property rights within law, sympathetic to local custom, as these factors appear to be central to conflict dynamics during periods of climate stress.

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Annexes

A General Literature Review

B Gender Literature Review

C Desktop Quantitative Analysis Report

D Qualitative Analysis Report

E Digital Discourse Analysis Report

Annex A: General Literature review

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Table of contents

1. Introduction 3

2. Research on Somalia 3

3. Literature on climate change and conflict 5

3.1 Suggested theoretical mechanisms in the literature for climate change generally and conflict 5

3.2 Suggested mechanisms for water stress and conflict 7

4. Empirical findings 8

4.1 Communal Violence 8
4.2 Water Stress & Conflict 9
4.3 Groundwater Focus 10

5. Conclusion 11

6. Recommendations based on research 12

Bibliography 13

1. Introduction

In this document we provide a brief review of academic literature with the most common theoretical arguments and general empirical findings on the links between conflict and access to natural resources, especially those related to water more generally as well as groundwater. We further provide insights from reviewing literature on conflict in Somalia. Unless specified otherwise, we use the term conflict to refer to armed disputes involving the use of violence. Here the focus is on communal violence, which occurs between non-state groups that are informally organized along ethnic, clan, livelihood, or other collective identity lines. We also mention violent protest as well as armed conflict involving state actors (i.e., government forces or government-affiliated militia) or formally organized non-state actors (e.g., rebel groups). This is in accordance with providers of conflict databases (e.g., ACLED, UCDP, SCAD).

2. Research on Somalia[1]

Somalia is situated within the Horn of Africa, considered globally amongst the most affected regions by climate change and armed conflict (Busby et al 2012, O'Loughlin et al 2012, Menkhaus 2014, Ayana et al 2016, van Baalen & Mobjörk 2018, Solomon et al 2018). Decades of armed conflict have taken their toll on local governance and livelihoods.

Food security has been significantly hampered by the general security situation, but also crucially through destruction and non-maintenance of water management infrastructure like irrigation. This can especially be witnessed in the Juba and Shabelle river basins which have been described in pre-war times as the breadbasket of Somalia. Armed conflict had made nearly all irrigation systems inoperable, which also means there is a large potential to improve food security in connection to this river basin (Basnyat 2007, Mohamed 2013). Generally, several authors argue that the lacking management on natural resources (water, crops, forests, fisheries) have led to unsustainable use and environmental degradation of such resources (Farah, Hussein & Lind 2002, Menkhaus 2014, Ali 2015, Webersik & Crawford 2015, Thalheimer & Webersik 2020).

Disputes over natural resources have been identified as one key aspect of armed conflict, both for Somalia and in the Horn of Africa at large. Armed conflict in Somalia involves several different groups with varying organizational levels. Distinguishing informally and formally organized armed groups is important analytically even if at times individuals in such groups might overlap and there can be cooperation or integration involving different types of groups. On the one hand, communal conflict actors, like pastoralist or agro-pastoralist groups, are more engaged in conflict over livestock raiding, pasture, water access, or general passage rights. On the other hand, armed conflict also occurs over a range of natural resources and other issues (e.g., taxation, governance), here violent

1 For this section we used search algorithms to summarize findings regarding Somalia. The summary builds on convenience samples of the most cited literature on topic accessible through Google Scholar. We used the search phrase: Somali* AND (drought* OR natural resource* OR water*) AND (Conflict OR Violen* OR dispute*). Sorted by the Google scholar algorithm for relevancy, we used the first 100 entries (excl. citation-only hits). The search was done on April 22, 2022. Findings from studies focusing on areas outside Somalia were excluded unless they included empirical references to socio-economic processes in Somalia. For instance, several articles not considered focused on the Somali region in Ethiopia or on Somali refugees in Kenya.

disputes rather involve more formally organized groups like militias and rebel groups. For the latter, armed groups engage in fighting over the control of the production or trade in connection to fisheries, charcoal, and bananas (Webersik & Crawford 2015). The same resources have however also been argued to represent major sources of non-war income that can help Somalia's economy and the peacebuilding process more generally (ibid., Muringai et al 2021, Thalheimer & Webersik 2020). In addition, more participatory civil society organization has been argued to be key to mitigating environmental degradation (Jama et al 2020) as well as for the resolution of communal disputes (Elfversson & Nilsson, 2021).

With an average yearly daytime temperature of around 27 Celsius, Somalia is considered one of the warmest countries on earth (Musei et al 2021). Somalia has been divided into two climatic zones: semi-arid and arid zones (Menkhaus 2014, Musei et al 2021). The semiarid areas in the northwest, northern mountains and southwest allow for farming due to moderate levels of precipitation (ibid.). The remaining areas in the center and north feature arid conditions, characterized by low rainfall and those regions are home to pastoralists. Overall, drought conditions seem to have been more severe over the last decades. Recent studies find decreasing rain period and an increase in drought duration (Musei et al 2021, Said, Cetin & Yurtal 2019).

Groundwater represents a major buffer for drought-affected communities. In fact, dug wells and boreholes together represent significant sources of freshwater supply for most of Somalia. Both urban and rural households depend on groundwater for everyday use as well as for agriculture like for livestock or small-scale irrigation (Basnyat 2007). While shallow wells are the most common way to extract groundwater, they often do not satisfy demand as they are prone to contamination and a significant amount of them run dry during long drought periods. Deeper wells and boreholes therefore represent the sole year-around water supply for many communities (ibid).

More than 50 percent the Somali population are either pastoralists or agro-pastoralists. This means a substantial number of Somali livelihoods depend on subsistence farming, livestock rearing or other incomes from agriculture. Research shows that food insecurity remains highest in areas dominated by pastoralism, which have seen repeated instances of food insecurity (Ali 2015, Anderson et al 2021). Particularly Somali children face increased burden due to cumulative issues related to the consequences of poverty, malnutrition, illness, disruptions of family systems, and displacement (Kinyoki et al 2017, Oberg et al 2021). It is crucial to note that problems with food insecurity are not primarily driven by drought, but rather by armed conflict. Other research suggests that livestock markets are the primary pathway linking drought conditions and violent disputes (Maystadt & Ecker, 2014). Areas within Somalia have been identified as one of few areas with high food crisis while simultaneously experiencing drought and armed conflict (Anderson et al 2021, Maxwell & Fitzpatrick 2012, O'Loughlin et al 2012). Increases in drought intensity and length have been linked with a substantially higher likelihood of violence (Maystadt & Ecker, 2014). Continued fighting also aggravates food crisis as aid and relief work is severely hampered by rebel groups such as Al-Shabaab.

For reports covering Somalia, it is common to come across narratives of migration due to drought or conflict, however, empirically there is little evidence to support this. Ongoing

conflict and legacy of past violence impact how actors react to droughts, especially regarding voluntary and forced migration (Farah, Hussein & Lind 2002, Lindley 2014, Thalheimer, L., & Webersik). Migration appears to be mainly driven by armed conflict, and less by water scarcity or other environmental factors. Repeated and prolonged droughts have challenged pastoralist livelihoods. Coping with scarce resources, like access to pasture and water, often entails moving longer distances, including crossing into Ethiopia or Kenya. Clearly, migration is an inherent feature of pastoralism. Even with pastoralists avoiding land conflict, increased migration can be burdensome and potentially create disputes elsewhere.

3. Literature on climate change and conflict

The link between climate change and conflict has gained prominence in recent years, with climate change being framed increasingly as a national and international security issue (Sakaguchi et al. 2017). The impact of climate change is extensive, and with increased environmental securitization and linking of climate to vulnerability, there is growing concern that climate change increases the probability of armed conflict.

The literature on climate change and conflict suggests that environmental change can impact conflict levels in diverse ways, for example through its effect on livelihoods, scarce resources, food insecurity and access to water (Theisen et al. 2021). However, whilst the link between climate change and conflict has been discussed extensively in the last decade, findings remain inconclusive. There is widespread agreement that climate change leads to conflict under certain conditions and specific pathways. This review will focus on the possible links between climate change and conflict, with an emphasis on access to water resources. In the following sections of this literature review, we briefly review some of the most prevailing theories that attempt to explain the relationship between climate and conflict, in particular water stress and conflict.

3.1 Suggested theoretical mechanisms[2] in the literature for climate change generally and conflict

One suggested mechanism in the literature that aims to explain the link between climate change and conflict centers on the impact of climatic variability on agricultural income and how this can result in conflict. The mechanism proposes that climatic variability and extreme weather events that result in reduced agricultural outputs could result in a loss of agricultural income. This is because agricultural produce is heavily dependent on weather conditions, where higher temperatures, lower precipitation, or extreme weather events, lower output (Burke et al. 2015, Dell et al. 2014, Dal Bó & Dal Bó 2011). The expectation assumes lower agriculture income, due to climatic factors, could trigger conflict onset

2 Here we understand a mechanism as a concept that explains how and why a hypothesized cause, in a given context, contributes to a particular outcome (Falleti & Lynch 2009).. Mechanisms serves a description of the relationships or actions among the units of analysis or in the cases of a study. Mechanisms e.g. cover understanding of: how actors relate, how policies and institutions change.

because to some individuals, joining violent actors can become more viable when regular work opportunities and incomes fall significantly (Koubi 2019).

Relative deprivation theory further explains and supports how a loss in (agricultural) income could result in conflict. This theory suggests that deprivation relative to a reference point, or a discrepancy between expected and actual levels of achievement, is likely to create grievances that could incite conflict (Gurr 1970). Relative deprivation leads to frustration, which could motivate people to participate in different forms of violence to redistribute political and/or economic assets. This is especially the case if climate-driven economic losses exacerbate existing group inequalities in society (Cederman et al. 2013, von Uexkull et al. 2016).

Whilst the above mechanism highlights how climate change can result in grievances that incite conflict, the literature is acknowledging more and more that grievances alone will not necessarily lead to conflict. In fact, researchers have increasingly looked at which contextual factors and conditions are needed for climate-related shocks to lead to conflict. There is a growing consensus that climate-related shocks are most likely to lead to conflict with conditions where both grievances and opportunity for collective action occur simultaneously. For example, there is a growing literature on the effect of rapidly increasing food prices on violent disputes. Here shocks through food price increases provide both a window of opportunity for collective action and increasing grievances in the population (see e.g., Smith 2014, Hendrix and Haggard 2015, Rudolfsen 2021, Jones et al. 2017, Raleigh et al. 2015).

According to Theisen (2017), there is largely a consensus in the literature that four additional contextual factors must be in place for climate shocks to lead to conflict. These include (1) high levels of poverty and livelihoods with renewable resource dependence, (2) the degree to which state institutions can handle resource shortages peacefully, (3) the level and importance of identity cleavages in society, and (4) level of state capacity to hinder violence erupting due to resource shocks (see e.g., Homer-Dixon 1999, Kahl 2006, Linke et al. 2017).

For example, (1) livelihood loss and falling incomes decrease the opportunity costs of engaging in illicit action, including participating in organized violence (Grossman 1991; Collier and Hoeffler 2004). With fewer legal job opportunities, it might become more advantageous to join rebel groups or engage in illegal business activity. Functioning state institutions (2) can be crucial for resources management, for example through property rights protection, subsidies for food products or insurances for farmers affected by lost harvest. Inter-group cleavages (3) can become more salient in areas affected by conflict and generally through socioeconomic and political inequality (Stewart 2008; Østby 2008). Marginalized groups are also more prone to be affected by environmental scarcity, for example created by drought or flooding. These factors can be utilized by armed groups to support their recruitment efforts. Furthermore, marginalization can also be facilitated through state actors, as such governments can be biased towards certain groups (e.g., based on ethnicity, religion, geography). This is also visible when governments (4) choose to refrain from using police or mediators to conflicts, or when such state involvement is biased towards certain actors (Elfversson 2015, Brosché 2022; Elfversson & Nilsson, 2021). Furthermore, climate-related shocks can increase migration flows, which is suggested to increase the risk of violence due to factors such as tensions between host communities

and migrants over scarce resources (Bhavnani and Lacina 2015, Reuveny 2007). For example, group cleavages can occur between host and migrant populations. This can relate to job opportunities, food supplies and general resource sharing. The arrival of migrants might also worsen existing cleavages and tensions, e.g., between ethnic groups or overlapping farmer and herder identities (Reuveny 2007; Koubi et al. 2018).

Looking at the different theories outlined above about grievances and opportunity, we can summarize the following: general literature and existing studies on climate change and conflict suggest that environmental shocks could intensify competition for scarce resources such as food, water, and land, increase relative deprivation and fuel opposition to other groups and the state, as well as further undermining capacity in weak states. There are also ongoing debates about how dynamics of migration dynamics could increase conflict in host communities (Ide 2017).

3.2 Suggested mechanisms for water stress and conflict

Concerns have been raised over the social impact of a range of scarcities caused by environmental degradation. For example, increasing water scarcity has been seen as a potential trigger for future "water wars" (Ward 2002, Katz 2011). As with the literature on climate change and conflict in general, the relationship between water stress and conflict builds on arguments of grievance and opportunity. Some literature focuses solely on grievance, or solely on opportunity, but there are also arguments and studies that explore how grievances and opportunity-based links are complementary. However, this is also actor- or conflict type-dependent. This means that violence involving informally organized actors (like farmer-herder conflict) can have different underlying mechanism than armed conflict with more organized rebel groups. When it comes to theories based on grievance, water stress is assumed to increase grievances that could be a potential motivation for violence. For example, it is argued that water scarcity can affect livelihoods and power dynamics for example through crop failures or land use rights. Similarly, grievances also occur when access to water points becomes scarce and disputes are not solved peacefully. This is in line with more general arguments as discussed above. Other theoretical approaches that focus on opportunity, however, emphasize when violence is most likely to occur due to strategic and tactical concerns (Raleigh & Vik Bakken 2017). For example, variations in foliage determine tactical considerations of armed groups and their ability to use camouflage or move forces and material (van Baalen & Mobjörk 2018, Witsenburg and Adano 2009). Research, for instance, shows how cattle theft occurs during the wet season when tracks are more likely to be washed away by rain. Similarly, rebel groups or other actors can use thick vegetation to hide before or after attacks.

Whether violence or conflict occurs due to water scarcity can also be influenced depending on the type of actor we are looking at. For example, recruitment to rebel groups has been found to be more common when inter-ethnic grievances are more salient, which is more likely during drought episodes and lower levels of subsistence as groups compete for limited resources (Homer-Dixon 1994, Raleigh and Kniveton 2012, Koubi 2019). This contrasts with groups active in communal violence, especially those engaged in cattle raiding. Here, several findings point to fewer disputes during dry seasons, with conflict instead occurring more often during the rainy season (Butler & Gates 2012, Greiner 2013, McCabe 2010, van Baalen & Mobjörk 2018). This is because livestock is generally in better condition (food and water supplies are available) and, therefore, also easier to transport.

Thick vegetation and repeated rainfall enable various tactical advantages for raiders who can hide their traces (Witsenburg and Adano 2009).

In sum, the literature argues when water resources are limited, groups will use violence to secure access to scarce water resources. Thus, it is expected that more profound water shortages will lead to an increased level of conflict. The second theoretical arguments assumes that there will be less conflict when there are lower levels of rainfall as there is less to fight over. The third suggested mechanism proposes periods with relatively more rainfall will increase levels of violence because of the assumed profits that water abundance will provide to armed groups.

4. Empirical findings

In this section we briefly consider general findings for climate-conflict literature with a focus on water resources. Several recent review articles and meta- analyses have provided insights to how climatic dynamics could link to armed conflict (e.g., Dell, Jones & Olken 2014; Seter 2016; Koubi 2019; Vesco et al 2020). Most researchers agree that there is very little evidence for climate-conflict between countries. Yet, at the subnational level, there are indications that climate change impacts the use of violence. As a result, more focus is placed on different types of intra-state conflict, including civil war-related violence, social unrest, or communal violence. The latter is discussed in more detail below. A key insight from the literature is that climate-change might not directly impact the onset of armed conflict, but rather interacts with other underlying factors. This means climate-driven conflict is more common in areas that are most likely to see armed conflict in the first place, i.e, in regions with low economic performance, low levels of democracy, and discriminatory regimes (Theisen 2017, Buhaug & von Uexkull 2021). Impact on existing armed conflicts through climate change are especially visible with ethnic group exclusion and where several communities depend on agricultural outputs for their income (von Uexkull et al 2016; Vesco et al 2021).

4.1 Communal Violence

Groups engaged in communal conflicts differ from active parties in civil war (rebel groups, governments). It has therefore been argued that these kinds of conflict should be analyzed separately (Brosché & Elfversson 2012). Much of the literature understands communal conflict as violent disputes between non-state groups that are informally organized along ethnic, clan, livelihood, or other collective identity lines (ibid.). As such, communal fighting occurs mostly between local groups over access to natural resources or local politics (Benjaminsen & Ba 2009, Boone 2014, Detges 2017, Krause 2018).

Water scarcity and other natural resources have been linked to conflict through concerns with formal and informal governance, which most scholars view as key factors that mitigate communal conflicts. Areas with strong governance both prevent conflict escalation but also help solve conflict and underlying issues. For example, escalation to violent conflict is less likely where natural resource sharing is facilitated through institutions. Similarly, conflict is less frequent where land use is regulated, monitored, and enforced. In this way,

communal disputes often combine prevailing issues, such as grievances, land tenure and environmental scarcity. There are also theorized links to migration, an inherent feature of pastoralism.

Research finds group competition over resources is largely occurring with dysfunctional governance as well as when some groups are marginalized politically and economically (Benjaminsen et al 2012; Fjelde & von Uexkull 2012; Detges 2014, Papaioannou 2016; Linke et al 2017; Nordkvelle, Rustad & Salmivalli 2017; van Weezel 2019; Vestby 2019; Linke & Tollefsen 2021). Marginalization has been tied to communal conflict particularly where there is a large income inequality (Fjelde & Østby 2014; Detges 2016, 2017; Hillesund 2017). This is also visible in the water sector, where improved service provision has been linked with a lowered risk of communal violence. For instance, Cao et al (2020) suggest even comparatively small investments in water and sanitation can make communities more resilient to drought-induced disputes.

Governance, informal or formal, is crucial for communal conflict dynamics more generally, for example in preventing conflict escalation (Eck 2014; De Juan 2015; Wig & Tollefsen 2016). This includes property rights management which is directly linked to water use as actors require land access to reach surface or groundwater (Katusiime & Schütt 2020). More generally, communal conflicts have been found to occur where new legal systems overrule existing (in)formal over land use practices (Benjaminsen et al. 2009; Boone 2014). This suggests legal reforms should pay close attention to existing local practice. This can also be linked to elites taking sides in inter-communal disputes. Biases can either worsen conflict, but also potentially mediate in violent disputes (Elfversson 2015, Krause 2018, Brosché 2022). Particularly, customary institutions, such as local elder groups or religious organizations, have argued to be key to the resolution of communal conflict (Brosché & Elfversson 2012, Higazi 2016; Wig & Kromrey 2018, Elfversson 2019, Petrova 2022). This line of research also suggests local community and religious organizations can be more successful when mediating as they have often higher trust among local groups (De Juan 2015; Cao et al 2018; Krause 2018; Mustasilta 2019, 2021).

4.2 Water Stress & Conflict

While policymakers and the popular media tend to point to water scarcity as a potential for conflict, robust empirical evidence of a direct relationship between water and conflict is generally lacking. When it comes to conflict between states, there is no empirical evidence of armed conflicts over water between countries; instead, the literature suggests water diplomacy to more often prevents such escalation (Bernauer and Böhmelt 2020). Both case-based and cross-case statistical studies suggest that cooperation, not conflict, is the prevailing result of both domestic and international water management issues (Ide and Detges 2018, Döring 2020b). For actors involved in communal violence (incl. pastoralist disputes), most recent research suggests cooperation over water, rather than fighting, is the norm. For water wells in Northern Kenya, for instance, Dietz and coauthors (2015) observe local property regimes to solve conflict even in a situation with several different groups relying on a few water holes. This is in line with findings by Bogale & Korf (2009), who suggest that resource sharing allows asset-poor households to stabilize and improves their wellbeing during droughts, thereby shaping incentives for cooperative rather than

conflicting interactions with intruding pastoralists. To conclude, water cooperation is the norm which, however, does not mean violent conflict is absent.

Studies focusing on violence in Africa using disaggregated data find that precipitation affects conflict, but in different ways. Some find that unusually wet periods increase the risk of communal violence (Raleigh and Kniveton 2012) and that wetter years increase both the intensity and frequency of conflict in developing countries (see e.g. Salehyan and Hendrix 2014), while some find that unusually dry periods increase the risk of communal conflict (Fjelde and von Uexkull 2012). These findings are supported by Vestby, Rustad and Salmivalli (2017) whose research has found that both short, unusually dry periods and long, unusually wet periods increase the risk of communal conflict events.

In relation to the literature on drought, there exists relatively little systematic research on flood occurrence and armed conflict. A study looking at more general types of armed conflict finds large flooding can increase the intensity of ongoing conflicts, but such events do not explain the onset of violence (Ghimire, Ferreira and Dorfman, 2015). Similarly, Petrova (2021) shows flooding in combination with asset loss leads to internal migration, however, this does not affect political unrest. Another study (Ide, Kristensen and Bartusevičius 2021) finds flood-specific protest likely in places with marginalized ethnic groups, but here population size, the state of democracy and the impact of flooding are other crucial factors. There is also even less research on communal violence and flooding. One notable exception is a recent study by Petrova (2022). This research shows flooding to be associated with communal conflict solely in areas with high distrust in local state institutions. The analysis further suggests highly trusted institutions mitigate the risk of violence following flood disasters (ibid.).

4.3 Groundwater Focus

Geographically, most literature on water access and communal conflict focuses on Sub-Saharan Africa (including East Africa), and most previous studies uses drought measures and rainfall patterns to proxy for water scarcity. In contrast, there is far less research using groundwater or soil moisture as well as local data on water services. However, when assessing the effect of water on conflict, it is crucial to understand that meteorological drought conditions do not necessarily correlate with groundwater scarcity. More generally, groundwater levels do not vary with local rainfall. In many areas heavy rainfall, following even long streaks of drought, can fully replenish groundwater levels, enabling water use throughout the year. However, there are some caveats. For instance, sporadic rain can increase groundwater contamination, and sustained heavy rainfall has even been linked to groundwater decrease (Scanlon et al 2005; Taylor et al 2013).

There are several distinct differences between the availability of groundwater and other water sources. Most types of surface water (wetlands, lakes, or rivers) are naturally limited to specific geographic locations, but the spatial distribution of groundwater can be far greater, often providing underground water access to larger areas away from rivers (Giordano 2009). Another difference is the immediate access. While fetching water from rivers or lakes for small-scale use requires only basic technology, modes of groundwater extraction vary greatly by geology. Seasonal handdug wells in riverbeds require far less equipment than 450-meter-deep boreholes through solid rock formation. Furthermore,

pollution is a problem for both groundwater and surface water. Yet, underground aquifer recharge occurs through filtrating water which makes groundwater more important for drinking water and other household uses (Giordano 2009).

Groundwater represents an important buffer for dry seasons. Even for areas with rainfed agriculture, groundwater access ensures supply during critical growth stages as the sole perennial water supply (Calow et al 2010, Sekhri 2011, Taylor et al 2013). This is even more important with changing rainfall patterns and diverse crop use. For many parts of Africa, groundwater still represents an under-utilized resource groundwater (Bonsor et al 2018, Cuthbert et al 2019, Kolusu et al 2019).

Studies on groundwater conflict suggest usage policies can be key to prevent over-extraction and pollution, thereby allowing for more sustainable groundwater use and higher efficiency for irrigation (Sekhri 2011, Nazari et al 2020). Research on India finds better groundwater access to decrease both poverty and the likelihood of conflict over water access (Sekhri 2014). For Northern Kenya, Detges (2014) shows pastoralist fighting to be more likely in proximity to well sites and in locations with higher rainfall, suggesting that favorable conditions for livestock raiding influence the level of violence. Another study combines measures for groundwater, surface water and precipitation to assess the effect of water scarcity on communal violence (Döring 2020a). Across subnational units in Africa, the study finds lower groundwater access increases the incidence of violent communal conflict. Further, the results also suggest that state presence and better implementation of property rights decrease the effect of groundwater scarcity on conflict.

5. Conclusion

Despite vast scholarly attention on the issue of climate change and conflict, there remain some open questions. The most important insight from both qualitative and quantitative research on the relationship between climate and conflict is that the two phenomena are not connected in a simple and direct manner (Buhaug 2015; von Uexkull & Buhaug 2021). In sum, the literature does not provide robust empirical evidence for environmental scarcity-induced outbreak of violent conflict. One reason for less general evidence for such onsets could be the larger role of case-specific factors that ultimately lead to conflict escalation. However, in situations of ongoing armed conflict, water scarcity and other extreme weather conditions can negatively impact the conflict dynamics. This is also the case for incidence of communal violence. Here pre-existing disputes can be refueled through climate change related events, such as water scarcity and possibly flooding. Much of the existing literature considered climatic conditions for conflict dynamics without properly distinguishing different types of water source. There is far less research on groundwater use, even if it has been widely acknowledged that groundwater provides an important water supply in drought times and throughout the year. This is valid for East Africa, but especially considering Somalia. Likewise, the links between flooding and disputes are still largely understudied.

6. Recommendations based on research

- Reforming legal processes requires to pay close attention to existing traditional conventions. Here, local institutions for conflict resolution mechanisms and land rights management should be strengthened, but also integrated into national institutions.
- Improving socio-economic conditions for marginalized groups, including migrants, requires long-term planning and integration to avert recurring conflicts.
- Data on water, agriculture, land use, etc. needs to be made available and easily accessible to civil society and other groups.

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Annex B: Gender Literature Review

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Table of contents

1. Executive Summary 3

2. Key Themes and Findings 5

Key Theme 1: Gendering Climate Change and Conflict 5
Key Theme 2: Women's Agency and Action 6
Key Theme 3: Intersectionality, Climate Change and Conflict 7

3. Gender-Climate Change-Conflict Nexus in Somalia 7

Key Theme 1: Gendering Climate Change and Conflict/Insecurity 10
1a) Livelihood Insecurity and its Gendered Implications 11
1b) Migration, Forced Displacement, and Forced Settlement and their Gendered Implications: 12
1c) Gendered Nature of Climate Change and Armed Groups Exploitation 14

Key Theme 2: Women's Agency and Action 14

Key Theme 3: Intersectionality 15

4. Research Implications and Ways Forward 15

Bibliography 17

1. Executive Summary

This multidisciplinary research project aims to explore Somali-specific links between community conflict/inter-clan conflict and access to natural resources (such as water points). This literature review focuses on the links between gender, climate change, and conflict/insecurity and examines the main issues that are relevant for the Somali case. The review provides an overview of key debates, appropriate methodologies, and considerations for gender- sensitive policy recommendations.

Recent conceptual developments in research on climate change and conflict have resulted in a growing recognition of the robust linkages between the two. Within policy and academic circles, climate change has been aptly described as threat "multiplier".[1] Bearing in mind the distinct experiences of fragile societies, climate change is a threat multiplier because it has been known to aggravate underlying political, social, and economic conditions that can, in turn, threaten the acceleration or renewal of conflicts. This 'cycle' presents a dilemma: climate change may intensify contest over already stressed/disputed resources such as water and grazing land. This can deepen pre-existing livelihood and food insecurities and lead to an inevitable exacerbation of local tensions in ways that render local peace and security extremely fragile.

Within growing debates around the climate-conflict nexus, gender is a traditionally under-researched dimension in scholarship. However, as recent research has noted, it is a variable that cannot be ignored as it shapes how different groups of individuals are affected by climate-related security risks.[2] Gendered norms and power structures can also increase or mitigate the likelihood of climate-related security risks. There is a consensus in the literature that for women as well as men, gender influences risks and agency related to the impacts of climate change and conflict. These impacts—both immediate and long-term—and the ways in which they are gendered, will be explored in this report.

Overly simplistic depictions of gender, conflict and women's relationships to the environment are replete. For instance, women are often depicted as victims of conflict and climate change. The tendency to reduce women's range of experiences in relation to the environment and resource management to a singular narrative can be seen as "essentialising" women. In much of the literature on climate change and conflict, women are still seen primarily through the lens of victimhood. In other words, women are vulnerable to twin threats of climate change and conflict. While such representation can be stubborn, women often play complex and multiple roles vis-à-vis climate change and conflict. In many communities, women are uniquely positioned to contribute to sustainable natural resource management, support their communities to be climate-resilient and strengthen peace and security. One obvious takeaway from this is that the increased participation of women in various climate change adaptation and conflict reduction strategies may be the key to achieving broader climate and peacebuilding goals while creating opportunities to address women's persistent exclusion and gender inequality.

1 Pearse, Rebecca. "Gender and climate change." Wiley Interdisciplinary Reviews: Climate Change 8, no. 2 (2017): e451.
2 Kaijser, Anna, and Annica Kronsell. "Climate change through the lens of intersectionality." Environmental politics 23, no. 3 (2014): 417-433.

A greater appreciation of these complex gendered realities entails acceptance of the ways in which gender "intersects" with other identities and shaping how individuals and communities experience climate change and conflict. Individuals experiencing gender inequalities can be further impacted in different ways due to overlapping forms of marginalization related to identity, including clan, class, age, ethnicity, disability, sexual orientation, or religion. This is known as intersectionality.[3] Where gender-sensitive research is still limited in climate-conflict nexus, studies that account for these intersecting factors are even more scant: this review finds that focusing on gender as well as intersectionality will enrich current understanding of the impacts of conflict and climate change.

A cursory gender analysis of access and influence over the environment and resource management may suggests that Somali women often play key roles as the primary gatherers and suppliers of natural resources such as fresh water. Access to natural resources is a critical source of sustenance and income for their families and communities. Despite such roles, women often lack equal rights of ownership and (importantly) control over land, property, among other assets such as financial capital. In societies already living with legacies of war, conflict and communal strife, these gendered disparities, coupled with discriminatory norms, can put women at a disadvantage in situations of conflict or crisis and can increase their vulnerability to climate impacts. It can be deduced from this analysis that the climate change-conflict "cycle" is a recognizably gendered one.

To date, knowledge on the role(s) of women in natural resource management and inclusion in climate-related challenges has been limited. This gap in research agenda and in policy interventions focused on climate change adaptation and conflict resolution is even more apparent where fragile conflict-affected societies are concerned. There are still limitations in having access to reliable data (that is disaggregated by sex as well as other identity markers like age, minority status, etc.). Other challenges stem from structural factors and inequalities (such as harmful policies and norms) that can make women disproportionately vulnerable to climate change can also exclude them from processes, platforms, and discussions surrounding natural resource management and peacebuilding. Women in many fragile and conflict affected states, such as Somalia, have been excluded from male-dominated decision-making arenas and sidelined from conflict resolution mechanisms. This is despite women being on the frontlines of climatic shocks and local conflict.

Advocates and researchers concerned with gender and social inclusion issues are optimistic about recent global approaches to climate change. A "new turn" in climate research is cognizant of human diversity and the myriad ways in which different people – of all genders—relate to and experience climate change. There is a body of academic and policy studies that is creating positive norms around climate justice, action, and inclusion.[4] More and more, researchers and activists view efforts to respond to climate change and conflict as opportunities to also address underlying gender inequality and other forms of social exclusion. Therefore, durable and gender-sensitive approaches will require special attention to women's needs while increasing their representation in decision-making processes related to climate change and conflict resolution.

3 Intersectionality is as relevant as gender in explaining the impacts on climate-conflict nexus on societies. The impacts of climate change on women can be further exacerbated at the intersection of gender with class, race, and ethnicity, thereby impacting the lives of Indigenous and other marginalized women differently.

4 Terry, Geraldine. "No climate justice without gender justice: an overview of the issues." Gender & Development 17, no. 1 (2009): 5-18.

2. Key Themes and Findings

The Horn of Africa—and particularly Somalia—is increasingly cited as a hotspot of climate change and conflict. In such challenging contexts, the gendered dimensions of the climate–conflict nexus is of even bigger implications not only for understanding and navigating climate change in the region, but also for managing conflict and putting women at the centre of inclusive adaptation strategies, and climate-conflict mediation approaches.

Gender issues, climate change, and security problems are interconnected in complex and powerful ways. This document provides a brief snapshot of emerging themes from a literature review conducted on the linkages between gender, climate change and conflict, with attention dedicated to the particularities of Somalia, and specifically Hirshabelle State.

The method used to conduct the literature review consists primarily of tracing secondary sources such as academic journal articles, practitioner reports and existing policy. In addition to these sources, key relevant UN publications enriched our understanding of the dynamics captured in the literature, as did databases that provide statistics on gender and climate change trends. These databases also allow us to take stock of[5] existing knowledge of the Somali case, including Hirshabelle State. Two valuable resources have been the new Somali Health and Demographic Survey Report (2020) and the Hirshabelle Health and Demographic Survey Report (2021).

While these two reports provide important information related to gender, one limitation of this report is that it exclusively focuses on English-language publications at this stage. This deficiency stems from the limited available sources on these topics in the Somali language and additional inaccessibility presented by short project length and the current security situation in Hirshabelle's capital.

Although there is growing research and policy interest in gender, climate change and conflict, these are still informed by a very limited amount of academic research. This report and the upcoming field research are dedicated to filling this gap.

Three key themes that emerge from this review are outlined below:

2.1 Key Theme 1: Gendering Climate Change and Conflict

- **There are four identifiable ways in which communities experience climate insecurity—commonly known as "pathways"—all of which are gendered. Three out of four are relevant to discussions on Somalia and are examined in this review.**

  In currently available English-language literature, there are four main pathways of climate insecurity that are repeatedly discussed. These are a) worsening livelihood conditions; b) increasing migration and –especially relevant for the Somali context—changing pastoral mobility patterns and an acceleration of urbanization (and forced settlement among traditionally pastoralist communities); c) in fragile contexts, armed groups' (in the context of Somalia Al-Shabaab) exploitation of local populations; d) elite instrumentalisation of local grievances (both historic and contemporary). The first three are relevant to the current debate on conflict and

5 These are statistics/data gleaned from the latest the Somali Health and Demographic Survey.

climate change in Somalia. Increasingly, research reveals that these pathways are all gendered processes. This review, however, finds that an important fifth pathway of climate insecurity is missing: the disruption of established gendered relations, norms, and expectations.

- **There are differences between women and men's attitudes towards climate change and conflict which further affect their experiences of and behaviour towards climate change and conflict.**

  It is central to compare the differences in women and men's attitudes towards climate change and conflict, and how this can result in differences in behaviour. In the Somali context, for example, women were typically shunned out of deliberation processes related to water resource management in the community. This is despite women often being tasked with sourcing and managing water use at the household level. Such differences will have an impact on how different groups experience the effects of climate change and conflict, as these differences in attitude are as crucial as gender in determining experiences, vulnerabilities, and access to any adaptation strategies.

2.2 Key Theme 2: Women's Agency and Action

- **Pre-existing inequalities and norms can deepen inequities and leave some groups – such as women – disproportionately vulnerable.**

  Climate change is often viewed as a "threat multiplier", suggesting that the relationship between climate-related risks and conflict are complex and often intersect with existing political, social, economic, and demographic factors. Specifically, the climate-conflict nexus exacerbates gendered dynamics and relations of power. Further exploring the literature in this area underscores the importance of understanding pre-existing inequalities that drive changes in gender roles, expectations, and norms that are ignited by conflict around resource scarcity and climate change. For example, women and some minorities in Somalia have historically been excluded from equitable access to and use and management of water resources. This "history" determines these groups' experiences in the contemporary period as water resources shrink even more.

- **There are existing challenges and power structures that lead to women being excluded from climate-change related conflict mitigation at a global level.**

  Generally, women tend to be excluded from roles in natural resource management and climate change-related conflict mitigation at all levels, but in particular at the global level. Case studies from around the world successfully demonstrate that at grassroots levels, however, women often participate and lead community resilience as well as other strategies to adapt to climate change. This presents a discernible gap between the experiences of women at the global and local levels. This review will take stock of best practices and provide greater clarification of the challenges and power structures facing women in international and local leadership roles related to climate and conflict.

- **Climate change interventions can provide opportunities for the political and economic empowerment of women.**

  Counter-intuitively, interventions that aim to tackle the climate-conflict nexus may present opportunities for advancing gender equality and women's participation in public roles. This theme considers the ways in which domestic and international strategies to strengthen resilience and adaptation can have transformative social impacts that benefit gender equality. International and domestic interventions around natural resources, environment and climate change provide significant opportunities to empower women politically and economically, and to strengthen their contributions to conflict prevention and peacebuilding in conflict-affected countries. Yet opportunities related to natural resources remain underutilized in peace and development programming.[6] Research strongly suggests that when women are involved in conflict resolution and peacebuilding, the outcomes are more durable and better accepted by the community.[7]

2.3 Key Theme 3: Intersectionality, Climate Change and Conflict

- **Intersecting factors other than just gender, such as clan and age, affect how different people experience the effects of water scarcity and conflict.**

  Though there is a global consensus towards an urgent need to understand the gender differentiated impacts of climate change and conflict, this is incomplete without comprehending the role of gender in relation to other intersecting factors. For example, in numerous contexts we can observe how factors such as age, occupation (in the case of Somalia: pastoralists or agro-pastoralists), displacement histories, geographic location in terms of whether communities are rural, urban, or peri-urban and so on result in different experiences of climate change and conflict-related conflict. This presents us with opportunities to engage more critically with representations of women as an undifferentiated group, rather than continuing to simply disaggregate data/analyses by gender(s).

3. Gender-Climate Change-Conflict Nexus in Somalia

Interest in gender analysis in the study of climate change and conflict in Somalia is on the rise, as it is increasingly accepted the importance of understanding how gender affects experiences of climate change and conflict. As highlighted in the key findings section above, there are four main pathways of climate insecurity – or how climate change and conflict can be experienced – that are discussed in the literature. All four of these pathways are gendered processes. Only three of these four pathways are applicable to Somalia, and these three will be discussed at length in the subsequent section.

6 https://www.unep.org/explore-topics/disasters-conflicts/what-we-do/recovery/women-natural-resources-and-peace
7 Myrttinen, H. (2016). Drowning in Complexity? Preliminary Findings on Gender, Peacebuilding and Climate Change in Honduras. In: Brauch, H., Oswald Spring, Ú., Bennett, J., Serrano Oswald, S. (eds) Addressing Global Environmental Challenges from a Peace Ecology Perspective. The Anthropocene: Politik—Economics—Society—Science, vol 4. Springer, Cham. https://doi.org/10.1007/978-3-319-30990-3_5

Before diving into these four pathways, though, it is important to first discuss a fifth element or aspect to climate insecurity that is prevalent in the literature. This fifth element is the way that climate change and conflict is disrupting established gendered relations, norms, and expectations.

Climate change and climate change-related conflict affects livelihood conditions for women, men, boys and girls in Somalia, including by reshaping gendered livelihood roles and division of labour within diverse communities. Other factors, conflict in particular, has compelled many Somali women to take on the role of primary breadwinner within their households, while men participate less actively as livelihood earners. Other changes to gender dynamics at the household level is supported by additional research that underscores how conflict and diminishing livelihood resources contribute to the inability of men to fulfil their designated role as household providers. Consequently, traditional traits and notions of masculinity which have been defined by the ability to providing for the family, being a good husband and being a respected community member risk being upended.

As gender norms and expectations for Somali men change, further constraints for women can arise, but so can new opportunities for greater involvement in conflict and climate change management and mediation. Factors like conflict, limited economic opportunities, and unreliable state social provisions can make traditional masculine traits increasingly difficult to attain for Somali men living in austere and conflict-prone conditions. These changes impact both men and women, thereby altering the household dynamics. The special vulnerability of men in climate change-driven conflict has also been documented recently in the literature. This emphasizes men as victims of sexual violence. Indeed, some men's vulnerability and exposure to sexual and gender-based violence (SGBV) in conflict can additionally impact their ability to consistently secure decent livelihoods for their families. Risk of forced recruitment by Al-Shabaab (aS), revenge killings and vulnerability in situations where they are displaced from their clan network contribute to trauma and challenge their livelihoods. A recent study from Somalia found that if men could not find employment equivalent to their previous position—and clearly on par with their social status—they may relegate their role as breadwinner to their wives to avoid stigma.[8] The same study indicated that women, on the other hand, were prepared to take on whatever roles necessary to ensure family survival. In contexts like Hirshabelle State, as in the rest of Somalia, climate change and conflict can dramatically and swiftly change gender norms and expectations.

At the time of writing this review, in 2022, there is a concerted international and domestic effort to avoid famine brought on by several seasons of failed rains, disastrous policies, and lack of leadership. Hundreds of thousands of people living across Somalia are being pushed deeper into poverty as climate change events become more extreme and unpredictable. In Somalia, and in FMSs like Hirshabelle State, recurring droughts have been linked to an uptick in clan conflicts. The impacts of climate change also contribute to livelihood insecurity. Increased mobility, migration (or forced displacement) is a feature of climate change as people and communities view migration as one of key coping mechanisms. In Somalia in 2018, more than half a million (nearly 4% of the population) were newly displaced due to extreme weather events –notably droughts and flooding.

8 Gardner, Judith, and Judy El Bushra, eds. Somalia-the untold story: the war through the eyes of Somali women. CIIR, 2004.

As the linkages between conflict and climate change become better understood, Somalia observers are made more aware of the gender dimension of this debate. Climate shocks create resource scarcity and puts stresses on the livelihoods of diverse communities. Implicitly too, climate change can impact cultural norms in Somali society by transforming gender, roles, hierarchies, and relations. Taking the Somali/Somaliland contexts as case studies, Croome and Hussein argued that climate-related shocks and conflict have unmistakable gender dimensions. Gender inequality, which is already rife in Somaliland and Somalia, is measured in terms of women's access (or lack thereof) of participation in economic, educational, and political spheres. Another indicator of the persistent inequality between women and men is rising reports of sexual and gender-based violence. All indicators of women's subordination are assumed to worsen during conflict.

Research in Somalia underscores that livelihood insecurity is sparked by the intersection of climate change and conflict. Again, these forces affect women in distinct ways. The loss of livestock due to drought has resulted in men being unable to secure income – thereby being unable to fulfil such role in society. According to a few Somali language publications, abrupt changes to centuries-old gendered division of labour (labor raises conflict within the household (for example, men's traditional roles as primary providers for the pastoralist family.) Somali women, too, have been impacted by changes to livelihood: for example, Somali women in rural areas continued to trade in goats but they also diversified by becoming street vendors for camps for IDPs or migrated and work in nearby urban localities. While these decisions highlight women's resilience and agency, women's increased participation in the informal economy may stoke uncertainty among their male kin.

Urbanisation is a key coping strategy for communities dealing with dwindling livelihood possibilities brought on climate change. Acceleration of migration patterns such urbanisation and the forced settlement of pastoralist communities (due to severe drought and water shortages) is associated with climate change as well as conflict. These factors also bring about significant changes to existing gender roles and norms. In the context of communities that are uprooted because of adverse effects of climate change, many men are forced to leave their families to improve their economic prospects or –as in the case of Somalia—to escape cycles of clan violence. The absence of male relatives has led to a rise in female-headed households, pushing many women into fulfilling "dual roles". Dual roles, in this context, refers to women's responsibilities within and outside the domestic, private sphere. Women are expected to provide economically for their families while still being responsible for traditional care roles.

This section concludes that climate change can upend established gender norms and expectations though not progressively. In fact, new gender roles can exacerbate the insecurity of women and girls within households. These gender effects are not only limited to households and families, but they also often have wider consequences with lasting impacts on the lives and wellbeing of women and girls across communities. Structural constraints –such as lack of robust state policies and legal mechanisms—add to the subordination and insecurity of women and girls as the effects of climate change are experienced by more people.

3.1 Key Theme 1: Gendering Climate Change and Conflict/ Insecurity

There is growing evidence that the adverse effects of climate change heighten the risk and the severity of violent conflict. The precise nature of climate-driven conflict dynamics is still being explored, but research suggests it is contextual: they are determined by local realities, historical forces, and contemporary social, political, and economic considerations. Inversely, there is growing consensus that climate vulnerability within communities is informed by volatile security situations already present in some fragile and conflict-affected societies. Insecurity and armed conflict can impede local and national capacities to adapt to the spreading effect of climate change. For example, the presence of the militant Islamist group Al-Shabaab (aS) has complicated the development of local and national climate adaptation frameworks. Insecurities that stem from armed groups aside, political impasse associated with state building processes –such as elections and federal Federal Member State (FMS) relationships—are also known to contribute to more climate vulnerabilities in the long run.

Thus, the linkages between climate change and communal violence seem to be even more apparent in regions that have recently experienced conflict and continue to experience political fragility. Climate change impacts such as floods, droughts, and intensified competition over dwindling water resources can exacerbate tensions in already unstable contexts and can undermine peace and security gains in affected communities. The Somali case—which is the focus of this report—presents a classic example of the impact of climate change can have on the reversal of peace and security among still-fragile communities.

When examining the relationship between climate change and conflict, it is important to consider the possible role that gender might play. There is ample evidence from both the literature globally and domestically to cast attention on the effect of climate change on the mounting insecurities felt by women and girls within and outside their homes, as well as how gender norms and inequalities can affect how communities react to conflict and climate change.

As has been introduced in the previous section, there are three “pathways” of climate insecurity relevant to the Somali context, all of which, as this review advances, are deeply gendered. These pathways help to structure discussions on the nexus between climate change and conflict and how those may be gendered. Pathways that are relevant to this report are a) worsening livelihood insecurity, b) acceleration of migration and mobility, c) increased threat posed by armed groups.

The conflict in Somalia has exacerbated unfavorable policies and structures that cannot guarantee women’s safety and wellbeing. Furthermore, women face a range of gender-rooted inequalities – in income, assets, as well as access to structures of power and legal mechanisms. Such inequities have reduced women’s capacities to being resilient in the face of conflict and climate change. Thus, women’s climate vulnerability is not only a product of the environmental hazards themselves, but also a product of the adaptive capacity of affected individuals and communities. The lower adaptive capacitates “means that women have fewer material and social resources to cope with, absorb, and recover from climate shocks.”[9]

9 Smith, Jessica M., Olosky, Lauren, and Jennifer Grosman Fernandez. “The Climate-Gender Conflict Nexus: Amplifying women’s contributions at the grassroots.” Georgetown Institute for Women, Peace and Security (2021): 05-06.

The following sub-sections examine key findings structured along three main "pathways" of (gender), climate change and insecurity.

1a) Livelihood Insecurity and its Gendered Implications

Climate change is known to cause multiple forms of insecurity among women and girls particularly in Somalia. For one, the loss of livelihood and the ability for men to generate income is associated with driving up the numbers of violence against women within the household. Secondly, generalized insecurity is experienced by entire communities as the frequency and intensity of communal (or clan) violence rise. In Somalia, there are often multiple layers of climate and conflict related oppression as this research on Hirshabelle is expected to reveal.

Climate change and conflict affect everyone, but not in equal ways. Often, conflict – induced and perpetuated by climate change – affects women and girls more greatly, as it can escalate violence against women and girls. In conflict affected and fragile contexts, women also face increased gender-based violence from armed groups (in the Somali case, militant Islamist groups like Al-Shabaab). As had been the case in Somalia, conflict and prolonged civil war also erode access to essential services such as justice systems, education, and healthcare – all affecting state-provided services and protections.

As has been discussed widely, conflict and situations of instability tend to exacerbate pre-existing vulnerabilities and patterns of discrimination and inequities against women and girls. And just as these effects of conflict impact women differently, climate-induced conflict also risks having differential gendered impacts. For example, to explain how gender operates within discussion about climate-drivenclimate change exacerbates an already uneven and gendered distribution of labour. In fragile and conflict affected societies, where climate change hits hardest, women are often responsible for collecting water and sourcing fuel for heating and cooking. (This gendered division of labour can also be observed in Hirshabelle State where women and girls are primarily responsible for fetching water and sourcing firewood.) Such dependence on natural resources makes women more "vulnerable to changes" of resources such as water because of climate change. Specifically, dwindling water reserves forces Somali women and girls to travel farther to collect water; this increases burdens on their time, health, and safety. This also heightens their risk of gender-based violence, which has been documented in Somalia and Somaliland.[10]

Although Somali women are as dependent on natural resources as men for sustenance and income, they are often disadvantaged in terms of equitable access to the resources and decisions about management of such resources. In traditional agro-pastoralist communities in Somalia, women are not considered agricultural landholders and are discouraged from exercising power over decisions related to farmland. Legal mechanisms are not gender progressive. If land ownership disputes involve women, customary and formal justice and conflict resolution mechanisms systematically undermine women's claims.

10 Croome, Amy, and Muna Hussein. "Climate crisis, gender inequalities and local response in Somalia/Somaliland." Forced Migration Review 64 (2020): 25-28.

Climate change is also a direct shaper of livelihood – strategies for both men and women. However, climate change is understood to deepen livelihood vulnerabilities. Usual gender disparities in education, urbanization/migration, security, land and asset ownership, access to financial capital and resources and even health all affects the livelihood security of women and their families.

Whereas water scarcity and conflict affect all genders, women are especially vulnerable. This is because women's "adaptation capacities" tend to be weak or under-developed. In other means, alternative (and dignified) income-generating opportunities become more limited for women, there is greater risk of climate change consequences to further fan communal strife and conflict—which increases the livelihood of VAGW. Due to uneven opportunities and access to education, employment and financial capital, women are far less likely to withstand the impact on livelihood.

1b) Migration, Forced Displacement, and Forced Settlement and their Gendered Implications:

The gendered impacts of climate change extend to displacement and migration. Women are differently impacted by the forced displacement and other migration and mobility patterns—including the forced settlement of pastoralist communities—that result from climate change and natural disasters.

First a brief distinction between migration and forced migration. Many academics are reluctant to argue that there are sharp distinctions between voluntary and involuntary migration.[11] (This is a complex debate.) However, they share a consensus that refugees—especially those fleeing imminent conflict situations and/or persecution—are entitled to a set of protections that are governed by a body of international legal frameworks.[12] While climate change has not historically constituted imminent threat or persecution, advocates have called for a need to broaden its scope to accommodate for "climate refugees". This debate aside, individuals contemplate mobility as a result of climate change and as an adaptation strategy.

Migration can be a positive and effective adaptation strategy for people to better their lives and livelihoods that have worsened due to climate change and conflict. Migration signifies both agency and resilience. However, not everyone can benefit equally from migration as a strategy to curb against climate change. Put in gender terms, there are unequal opportunities and possibilities for women and men. Women's limited access to wealth and resources can inhibit their ability and autonomy to migrate.[13] Furthermore, women don't usually have the same access as men to vital social structures like the Somali kinship systems which are known to facilitate safe and dignified migration. A phenomenon, known as "feminization", has been observed among communities who are affected by higher levels of male migration (who leave in search of greater and more diversified forms of income). One impact of increasing "feminized" rural communities is the additional burden placed on

11 (1991): 39-62.; Zetter, Roger. "More labels, fewer refugees: Remaking the refugee label in an era of globalization." Journal of refugee studies 20, no. 2 (2007): 172-192.
12 Weis, Paul. "The international protection of refugees." American Journal of International Law 48, no. 2 (1954): 193-221.; Biermann, Frank, and Ingrid Boas. "Protecting climate refugees: the case for a global protocol." Environment: Science and Policy for Sustainable Development. 50, no. 6 (2008): 8-17.
13 McLean, Heather. "Gender and power-structures in refugee camps: social changes following refugee movements." (1999).

women who become the de facto heads of households in charge of both care work as well as generating income. (See the notion of 'double roles' explained above.)

In contrast to migration, forced displacement (or forced settlement) of people are understood to be drastically different from the sort of agentic migration decisions discussed above. Forced displacement (or settlement) can be brought on by a slow process or a very sudden onset of climate change. In the case of pastoralist Somalia, "forced settlement" refers to a permanent or temporary decision undertaken by pastoralist nomads to abandon search for water and grazing lands due to severe and recurring droughts and limited water and grazing lands forcing them to settle in peri-urban towns or refugee camps in order to access basic assistance. All forms of displacement (including forced settlement) are expected to rise. Climate change related forced displacement is expected to increase. A 2018 World Bank report anticipates that sub-Saharan Africa, South Asia, and Latin America could see more than 140 million people forcibly displaced by slow-onset climate change impacts.[14]

Women are often disproportionately affected by climate-related forced displacement. For example, displaced women and girls face an increased risk of gender-based violence and have less access to humanitarian assistance. Climate change impacts such as displacement, urbanization and forced settlement can amplify vulnerabilities and gender inequality. Displaced women and girls have even more restrictions access and benefitting from education, healthcare, and employment opportunities.

Traditional gender roles still hold when communities are afflicted by climate change. Confronted doubly by climate change and displacement, some studies have suggested that women and girls fare even worse when carrying out these traditional roles. In Bidi Bidi refugee camps in Uganda, for example, where hundreds of thousands of people settled to flee famine and civil war in South Sudan, women and girls still have the primary responsibility of gathering water and firewood. Ecological deterioration such as deforestation and scare water supplies increases conflict within the camps and between camps and surrounding host communities. Women and girls are put at heightened risk of SGBV on the increasingly lengthy journeys to obtain these resources. In camps like the Ugandan Bidi Bidi camp, they are also at increased risk of exploitation. Female-headed households moreover tend to be at higher risk in the wake of disaster. Their capacities to mitigate the worsening effects of climate change and to build resilience are under-developed as women are traditionally restricted from accessing capital, resources, and social relationships necessary to recover from crises.

The literature suggests that local vulnerabilities and adaptation capacities can determine individuals and communities' experiences of livelihood deterioration. Migration and mobility offer a possibility of exploring new livelihood and income generating activities. For those who can migrate (not everyone can) migration and mobility are the hallmark of resilience and adaptive strategizing. Women, because of vastly uneven and gender differentiated access to education, financial resources, the market, do not have migration as an option.

14 "World Bank. 2017. Forcibly Displaced: Toward a Development Approach Supporting Refugees, the Internally Displaced, and Their Hosts. Washington, DC: World Bank. © World Bank. https://openknowledge.worldbank.org/handle/10986/25016 License: CC BY 3.0 IGO."

On the flip side, conflict, and climate related displacement (or forced settlement, in the case of pastoralists affected by climate change) can exacerbate vulnerabilities. In Western Africa, studies have explored that communities with high dependence on natural resources are more vulnerable to conflict and more likely to experience displacement (or sedentarisation policies) than groups with broader, diverse, and alternative sources of income. Research on climate change and violent conflict found that migration can escalate resources conflicts when different groups, lack conflict resolution mechanisms are forced to live together. Somalis have appropriate, locally- rooted conflict resolution mechanisms—known as the xeer—to mediate sub-clans' conflicts over water and grazing rights. Still, low intensity and localized conflict still flare up from time to time, and those put women and girls at increased risk of sexual violence.

1c) Gendered Nature of Climate Change and Armed Groups Exploitation

Climate change presents an entry point for armed group exploitation and adds to general insecurity in fragile and conflict affected states. Militant and armed groups take advantage of environmental degradation and weak governance, and these kinds of insecure contexts have considerable and adverse effects on women and girls.

Al-Shabaab (aS) is a good example to study in this context. It allows for an examination of the interaction between armed groups and local communities in contexts of drought, famine, and extreme water scarcity. In the Horn of Africa, particularly Somalia, there will be escalating competition between pastoralist sub-clans over water and grazing land; patterns of migration and mobility used by some as coping mechanisms forces some to settle bringing into new groups into contest over limited resources in the area. This again adds to precarity and conflict which in turn will have gendered consequences and is likely experienced differently by historically marginalized communities.

3.2 Key Theme 2: Women's Agency and Action

The wider literature is centrally focused on the negative effects of climate change impacts on women. However, there is ample evidence that demonstrate women's leadership roles and contribute to building resilience and adaptation to climate change and conflicts in their community. These efforts must be highlighted and celebrated. For example, a notable environment non-governmental organization (NGO) in the Horn was founded by a Somali woman advocate and has been assisting Somali communities build resilience while reducing violence. Furthermore, domestic, regional, and international interventions that aim to promote climate change adaptation resiliency and peacebuilding may be uniquely positioned to address issues of women's subordination, gender inequality and social exclusion.

Given their dependence and proximity to natural resources, women at the local level are "not only well suited to find solutions to prevent environmental degradation and adapt to a changing climate, but they also have a vested interest in doing so." Women play a critical role in their local communities as they mobilize to adapt to climate change and preserve natural resources. There is ample evidence that suggests this leads to better outcomes in terms of conservation and sustainability. In India and Nepal, for example, the presence of

women in community forest management – and the application of their in-depth knowledge of forest species – leads to "significantly greater improvements" in regeneration and conservation.

In Somalia, a gender-focused climate justice agenda has not been fully articulated but it is sorely needed. As the focus in Somalia/Somaliland thus far and for good reason has been on responding to humanitarian needs created by the climate crisis, there is not a large climate justice movement in the country. Local organizations currently do not have the capacity to mobilize and advocate for national or global policy changes, focusing instead on responding to the effects of climate crisis and the urgent needs of communities.[15] But there is a lot of potential for local actors, and international agencies and local government, to build a coherent narrative around the climate crisis and to connect with global movements to reduce climate crisis effects. In countries like Somalia/Somaliland large numbers of people are being displaced by the climate crisis, despite not bearing the greatest responsibility for the emissions that contribute to climate change. The international community needs to make progress in providing new funds to help poorer countries support men and women affected by drought and other climate shocks, taking gender fully into consideration.

3.3 Key Theme 3: Intersectionality

The limited empirical evidence on gender-conflict-climate change in Somalia tends to focus on women and girls implying that the impacts are evenly experienced by all women and girls. However, as gender overlaps with other social markers, women from marginalized clans, and others who may be disadvantaged by virtue of cultural, linguistic, or economic backgrounds and characteristics are doubly oppressed and impacted by climate change impacts. Women and girls living with disabilities are made even more vulnerable to climatic shocks and conflict. Considering the importance of intersectionality in how we understand gender in discussions of climate and conflict, this review encourages to pay close attention to intersecting factors in the design of the field research. This will pave the way for a timely and rich contribution to literature.

4. Research Implications and Ways Forward

The aim of this literature review was to identify key debates and developments on gender, climate change, conflict and, where possible, gaps that are particularly resonant for the Somali case.

The literature review has shown the different ways in which climate change-specifically water resource management- and conflict are gendered. Based on the gender-specific

15 On the international level, climate/environmental justice and action has been channeled through the rights of indigenous communities particularly in the Global North. Recent and interesting writing on the intersection between indigenous rights and environmental /climate justice includes: Libby Porter, Lauren Rickards, Blanche Verlie, Karyn Bosomworth, Susie Moloney, Bronwyn Lay, Ben Latham, Isabelle Anguelovski & David Pellow (2020) Climate Justice in a Climate Changed World, Planning Theory & Practice, 21:2, 293-321

findings in this report, which will be strengthened by ongoing Somalia-specific research, it is imperative that all strategies and approaches take into account the diverse needs of Somali women. Involving women in conflict resolution mechanisms and processes (both informal and formal) will be key as will be ensuring that women have a greater say in resource management. Additionally support to Somali women-led NGOs (e.g., WROs currently operating in Somaliland) to combat issues related to climate change and gender inequality will be paramount.

These findings are also relevant for the field research. They will ensure that the research: a) meets current standards of gender-sensitive and inclusive research and b) contribute empirically and conceptually to the growing body of work on climate change-gender-conflict nexus. Specifically, the review will assist in the process of field research design by:

- Identifying blind spots in the current understanding of the Somali empirical case – and specifically the state of knowledge of climate change-gender-conflict nexus in Beledweyne and Mataban.
- Informing the process of field research design in ways that are consistent with gender realities /research methodologies.
- Adding to conceptual debates about the gendered dimensions and impacts of climate change and conflict with insights from an African and post conflict contexts.

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Annex C: Desktop Quantitative Analysis Report

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Table of contents

1. Introduction 3

2. Summary of findings 4

3. Future research recommendations 4

4. Part I:

    4.1 Conflict Data 5
    4.2 Waterpoint Data 7

5. Part II: Linking the conflict and waterpoint data 8

6. Part III: Analyses 12

    6.1 Cross-sectional 13
    6.2 Descriptive analyses 13
    6.3 Regression analyses 15
    6.4 Non-state conflicts 18
    6.5 Temporal patterns 22
    6.6 Context 26

7. Conclusion 31

Bibliography 34

1.Introduction

This desktop study is part if the larger project on *Research on climate-water-conflict nexus and appropriate responses UNEP Somalia*. The aim of this desktop research report is to explore the statistical relationship between waterpoints and conflict in Somalia. The report is based on data about the geographical location of both conflict events and waterpoints across the country. We used GIS software and linked geo-coded data on conflict with data on various types of geo-coded water points. Further, we used both GIS software and statistical software to identify patterns related to conflict surrounding waterpoints.

However, it is important to note that this desk study has some limitations. As the waterpoint data used and available for this research has limited information about when the waterpoints were created or how long they have been operating, the analysis in this report cannot run analyses taking fully into time into consideration. This means that we are not able to distinguish whether a conflict occurred before or after the waterpoint was established, or if it was still in use when the conflict happened. As a consequence of this the desk study presented here can at most establish if there is a correlation between waterpoints and conflict, and cannot reveal if there is a casual relation or direction between the two. However, as this desk study is part of a larger project, other parts of the project will be exploring the causality.

The desk-top report consists of three main parts:

1. The first part presents geo-coded data on conflict and water points;
2. The second part presents the mapping of waterpoint and conflict point data, and how we further link these two data sources in order to be able to run further analysis;
3. The third part consists of the analysis. We look at three different levels on analysis, within all of them we include both descriptive data analysis as well as regression analysis.
    a. Cross sectional analysis – looking at whether conflict and waterpoints occur in the same areas (grid-cells), not taking time into consideration.
    b. Temporal analysis – Including time variation on the conflict variable
    c. Contextual analysis – Testing whether drought (as a proxy for climate change) affects the relationship between waterpoints and conflict.

2. Summary of findings

The main finding in this report is that we find a positive relationship between conflict and waterpoints. What this means in practice is that waterpoints and conflict are likely to occur in the same areas (grid cells). In a simple bivariate analysis this relationship holds at a 95% confidence interval (Model 1, Table 5).

Further, we find that in particular that non-state conflicts (i.e. conflicts between non-state actors, such as Al-Shabaab and IS or clan conflicts) have a stronger relationship with waterpoints than other types of conflict. Further, the effect is slightly higher for conflict between formally organised groups than communal violence. This might be slightly surprising as much of the available literature on climate change and conflict focuses on communal violence.

In general, we find that type of waterpoint does not seem to affect the likelihood of conflict, but what it does seem to affect is the type of conflict present. For example, we see a larger share of non-state conflicts occurring in cells with boreholes, dug wells and dams in comparison to other types of waterpoints.

To measure the effect of climate change is statistically challenging. Thus, explore how climate change might affect conflict we have included a set of analyses examining the effect of drought. While this does not directly measure climate change it is a proxy for weather variability which could be a symptom of climate change. We find that drought have different effects on conflict in areas close to waterpoints compared to areas without waterpoints. There seems to be an increased likelihood for conflicts in areas with waterpoints during drought, particularly when it comes to statebased conflicts.[1] We also find that non-state conflicts seem to be prevalent near waterpoints, but that levels of drought do not seem to affect this relationship. This suggests that that non-state conflict events near waterpoints might be driven by factors other than drought.

This desktop study does not directly examine the effect of climate change. Instead we focus on how an intermediate variable such as access of water can affect conflict when it is put under constraints by the effects of climate change (such as drought) but rather the effect of access to water.

3. Future research recommendations

- To further explore the relationship between waterpoints and conflict better data on waterpoints are need. More information on when it was established, time of operation and how many it serves would be useful
- Other sources of water such as groundwater resources should also be explored
- Better data on when waterpoints where used data would also allow us to explore more fine grained drought data.

1 Our research has grouped conflict events according to three categories: statebased, non-state, and one-side conflict. Please refer to section Part 1: Data for definitions of all three.

- Further research could also extend this study to not only look at conflict but also protests.
- Include other proxy variables for climate change besides drought to see if we find a different effect or if our results are specific to drought.

4. Part I: Data

4.1 Conflict Data

In the first part of this report – and as a first step of our desktop research and analysis – we needed to determine whether conflict has occurred in Somalia between 1989-2019, and if so what kind of conflict. In order to do this, we use geo-coded data from the UCDP Georeferenced Event Dataset (GED) (Petterson et al 2021). This data codes the specific location of conflict events using longitude and latitude coordinates, thus we know exactly where the conflict event has taken place. The data includes conflict events that reach the threshold of at least 25 battle deaths within one calendar year. The GED data also records the year these conflict events took place, the actors involved, and how many (if any) of these were killed.

As mentioned above, we also needed to determine the kind of conflict taking place. We were also able to determine this by using the GED data set as it categorises conflict according to three types of violence:

1. *Statebased conflict,* conflict where a state is at least one of the actors (i.e. civil conflicts or international conflicts);
2. *Non-state conflicts,* conflicts where neither of the actors are the state; and
3. *One-side violence,* events where either a state or a non-state actor kill civilians.

State-based conflicts include events of the type of violence that we commonly think about as conflict, such as the conflict in the conflict between the Government in Afghanistan and Taliban. Non-state conflicts, consists of a large variety of conflicts or political violence. It ranges from communal violence between herders and nomads or clan conflicts in Eastern Africa, to violence between cartels in Mexico. Nonetheless, while there is great variation within this category, both statebased and non-statebased conflicts have more traditional conflict patters (two parties fighting each other). The third category, one-sided violence, on the other hand, is a bit different, and includes even more divers forms of violence than the two other categories. On one hand, it includes events like the Rwandan genocide, on the other hand, it also includes events related to police brutality, which is a bit different than the conflict events described above.

Figure 1 shows the breakdown of conflicts by types and events in Somalia. The stacked graph indicates the number of conflict by category for each year, while the lines indicates the number of events by category. Thus, one conflict, defined as a compatibility between two distinct actors can consist of several events reaching cumulative at least 25 battle deaths. Also one actor can be in conflict with more than one actors, thus be include in more than one conflict. For example, Al-Shabaab is in conflict both with the Somalian

government and a number of non-state actors. The graph indicates that Somalia has between one to three state-based conflicts each year in the period 1989 to 2019. In 2019, Somalia registered three conflicts these were between the Somalian government and respectively Al-Shabaab, Republic of Somaliland and IS. The non-state conflicts is by far the largest category and range between 0 to 11 non-state conflicts each year. The period between 1999 and 2005 saw a spike in these types of conflicts. In 2019 there was seven non-state conflict. These were mainly two types, conflicts between Al-Shabaab and other non-state actors or clan conflicts.[2] Finally, we see that the number of actors conducting one-sided violence varies between one and five. In 2019, only the Government of Somalia and Al-Shabaab were recorded to have conducted one-sided violence (reaching more than 25 civilians killed).

However, while we see that non-state conflicts are the most common type of conflicts, we see also note that the number of events linked to state-based conflicts is much higher than the other two categories, in particular after 2006. The map below (Figure 2) indicates the location of the different types of conflict events in Somalia between 1989-2019.

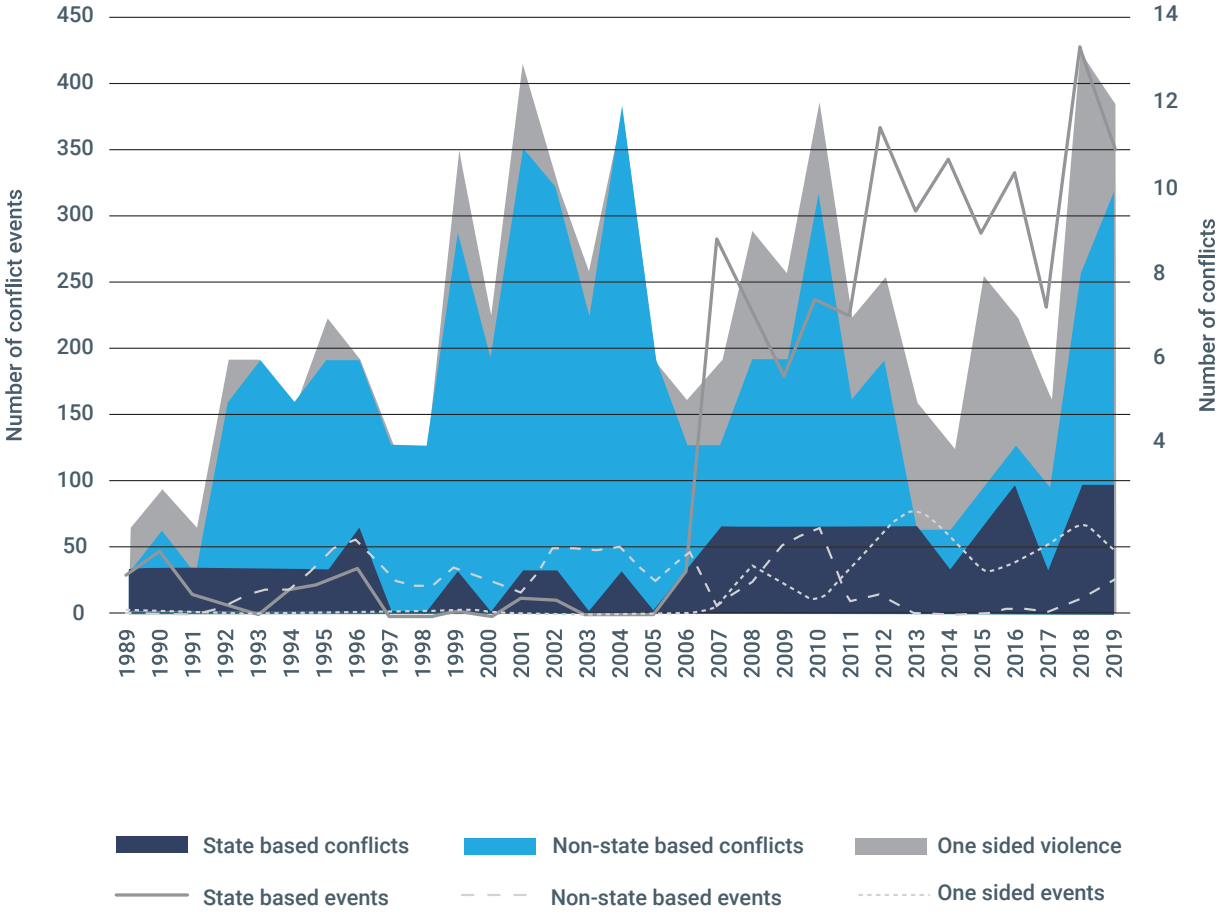


Figure 1: Number of conflicts and conflict events by type of violence between 1989 and 2019 in Somalia

2 Non-state conflict dyads in 2019: Al-Shabaab – IS, Al-Shabaab - Aaro Aaro, Al-Shabaab - Ma'awisley, Dir clan - Sa'ad subclan of Habar Gidir clan (Hawiye), Habar Gidir clan (Hawiye) - Xawaadle clan (Hawiye), Biide subclan of Habar Jeclo (Isaaq) - Sa'ad subclan of Habar Yonis (Isaaq) and Khatumo administration - Republic of Somaliland

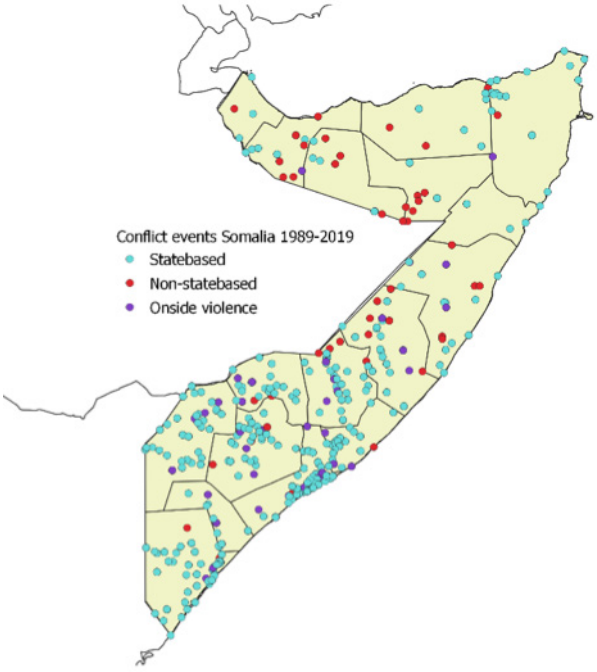


Figure 2: Conflict events in Somalia between 1989-2019 by type of violence

In the current analysis we use a cross-sectional conflict dataset, meaning that at this stage we do not take into account when a conflict happened between 1989-2019, only where. This allows us as a first step to simply determine and measure how many events occurred and how many deaths resulted from these conflicts. The map in Figure 1 shows the location of conflict events broken down and colour coded by type of violence. A more thorough description of how each of these measures are coded is given in section 2.

4.2 Waterpoint data

As was the case with the conflict data, when it came to waterpoint data, as a first step we simply measured the location of waterpoints in Somalia. We did this by using the Somalia Strategic Water Source Database (SWALIM) (FAO/SWALIM 2018).[3] The dataset contains the most common types of water source in Somalia classified into six categories:

1. **Boreholes** (1000) – is a narrow shaft bored in the ground for extracting water.
2. **Dug wells** (1840) – holes in the ground dug by shovel or backhoe below groundwater table.
3. **Dams** (1602) – is a structure built across a river or stream to hold back water.
4. **Springs** (343) – occur when water pressure causes a natural flow of groundwater onto the earth's surface.
5. **Berkads** (206) – water reservoir used in arid areas to collect water during the wet season for use in the dry season.
6. **Other category** (98).

3 https://spatial.faoswalim.org/layers/geonode:SOM_Strategic_Water_Sources_Feb2018#/

The database is updated by field surveys carried out by FAO/SWALIM through government and NGO partners. The six maps below in Figure 3 indicate the distribution of the different types of water points.

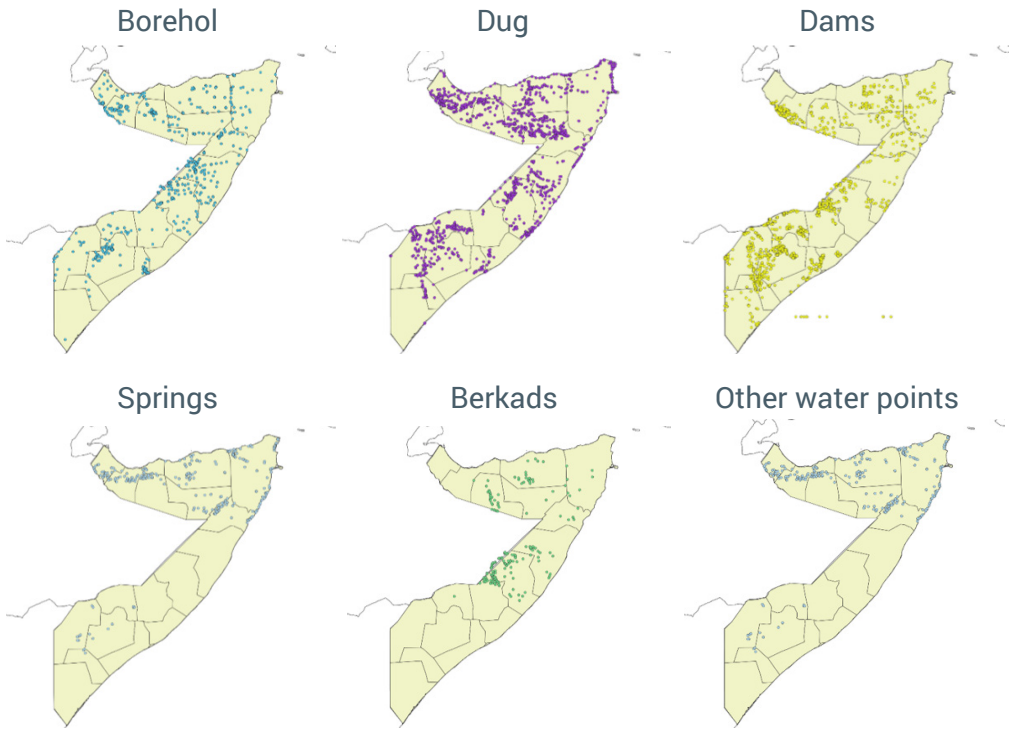


Figure 3: Distribution of waterpoints in Somalia by type of water point

5. Part II – Linking the conflict and waterpoint data

To link the conflict and waterpoint data we use a tool called the PRIO-GRID. PRIO-GRID is a vector grid network with a resolution of 0.5 x 0.5 decimal degrees, covering all terrestrial areas of the world (which represents grid cells of about 50km x 50km at equator). This is of course still a large area, and ideally we would have liked to use a smaller resolution. However, this is currently what is available. Nonetheless, it is a great improvement from country level analysis. We also need to take into account that spatial coded data is not always accurate and that by using smaller grid-cells we might end up with flawed estimates as we might code the wrong grid-cell. Further, in the conflict literature there is a move towards using buffer zones of 50km when measuring the effect of conflict, arguing that this is for example a reasonable distance to walk (Bendavid et al., 2021; Kotsadam & Østby, 2019; Østby et al., 2018; Østby et al., 2021.) Gridded data comprises inherently apolitical entities; the grid cells are fixed in time and space, they are insensitive to political boundaries and developments, and they are completely exogenous to likely features of interest, such as conflict outbreak, ethnic settlement patterns, extreme weather events, or the spatial distribution of wealth. Moreover, unlike other disaggregated approaches, gridded data may be scaled up or down in a consistent manner by varying the resolution of the grid. Figure 4 shows how the PRIO-GRID looks like when overlaying Somalia. A total of 241 grid-cells cover Somalia.

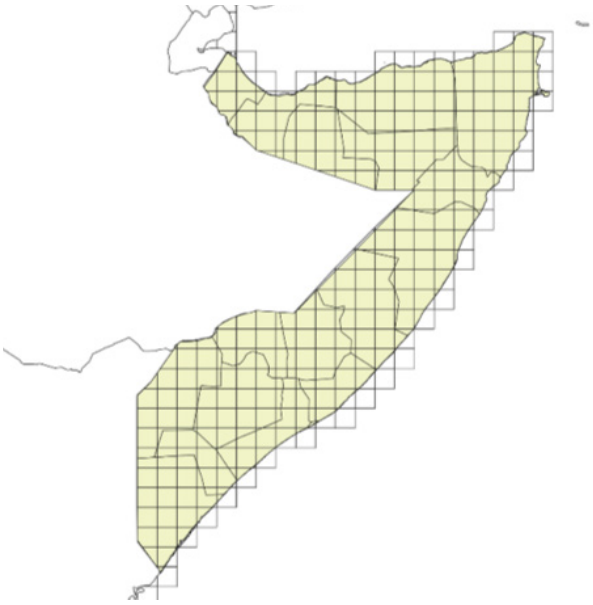


Figure 4: PRIO-GRID overlayed Somalia

In the analyses presented in section 3 we use PRIO-GRID cells as our unit of analysis.

Once the PRIO-GRID is overlayed across Somalia, GIS-software allows us to associate both the conflict data and the SWALIM waterpoint data within the PRIO-GRID. The information for each of the data points, either conflict or waterpoint, is summarised and then linked with the PRIO-GRID cell that the datapoint falls within. This process is visually depicted in Figures 5 & 6 below.

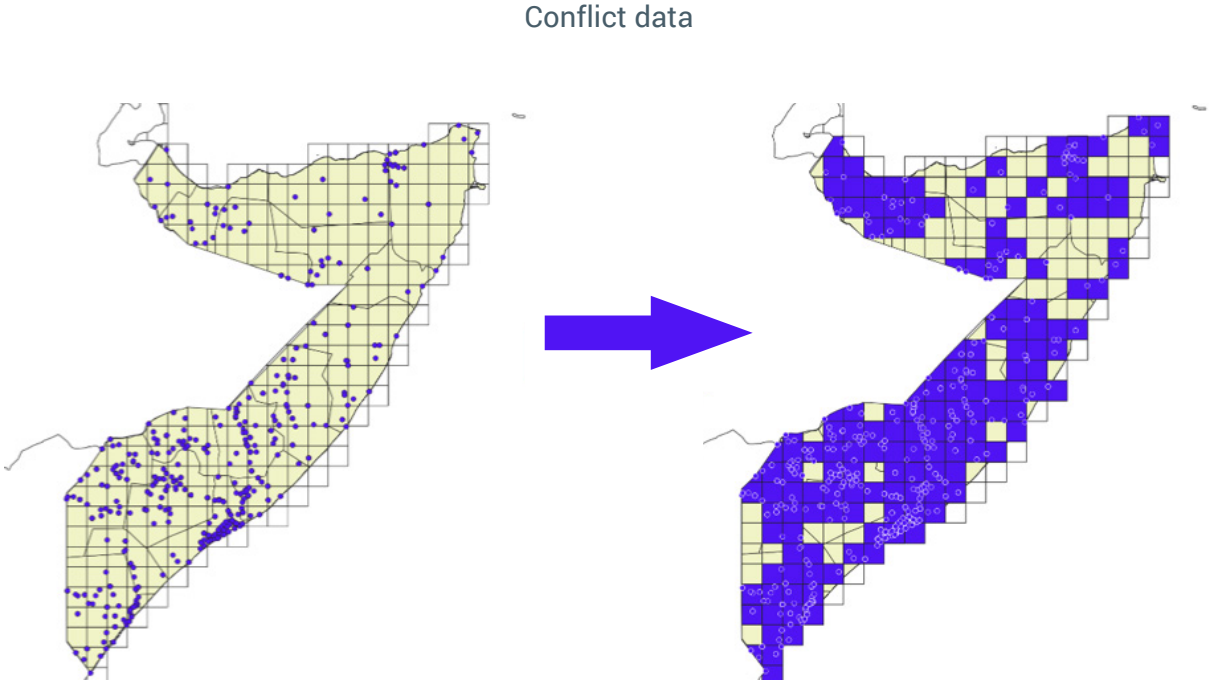


Figure 5: The conflict data captured in Figure 5 is associated with the PRIO-GRID overlayed on Somalia.

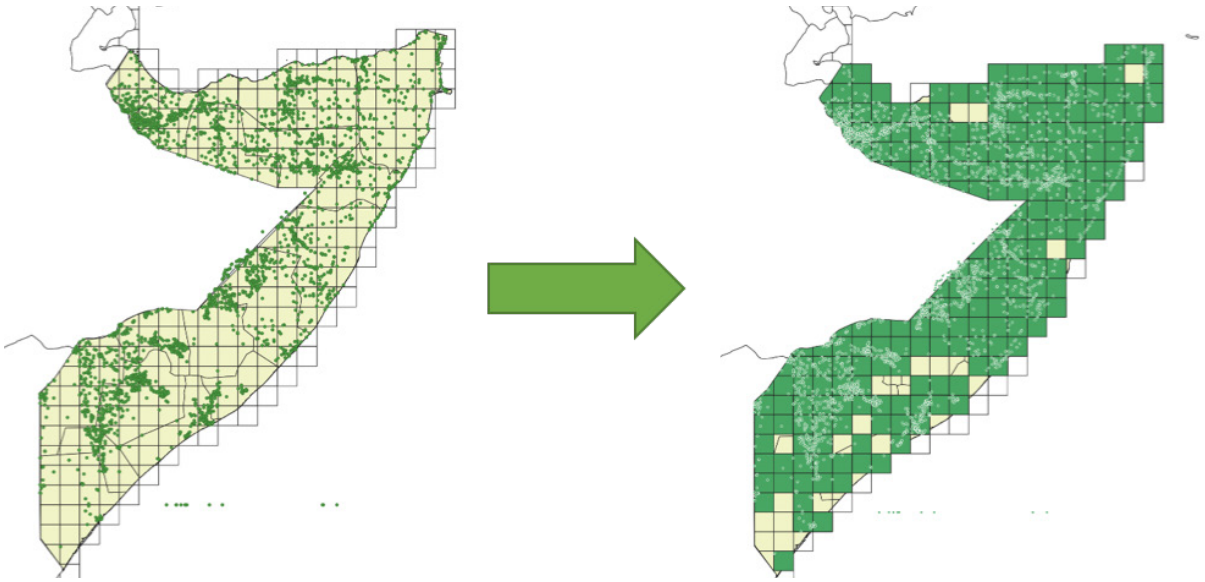


Figure 6: The waterpoint data captured in Figure 6 is associated with the PRIO-GRID overlayed on Somalia.

For the conflict data, we have recorded and indicated the following variables:

- *Conflict dummy* – whether the grid-cell has experienced conflict (1) or not (0) between 1989-1990. 145 out of 241 cells has experienced conflict. In Figure 4B, the cells that are coloured blue reflects cells that are coded 1, and those that are not coloured reflects cells that are coded 0.
- *Number of conflict events* – measures how many events occurred in the grid-cell between 1989-2019. We do not expect the relationship between waterholes and number of events to be a linear, i.e. assuming that an increase from 1 to 2 events, is the same as an increase from 340 to 341events. We assume that the increase of one conflict event will have a stronger effect on relationship between waterpoints and conflict when there are few conflict events compared to when there are many. Thus, to avoid that cells with very high numbers of conflict events drive the results, we log transform the variable, meaning we transform the data to have a near normal distribution. We also measure this separately for state-based, non-state and one-sided violence (also log-transformed). Table 1 shows the descriptive data for these variables.

Table 1: Descriptive conflict data

Variables	Obs	Mean	Std. dev	Min	Max
Conflict events	241	21.884	150.536	0	2299
State-based conflict events	241	16.568	121.770	0	1866
Non-state based events	241	2.925	11.800	0	152
One-sided events	241	2.390	18.367	0	281

For the waterpoint data, we recorded for each specific grid cell the following variables:

- *Waterpoint dummy* – whether the grid-cell had a water point (1) or not (0). We also broke this down by type of waterpoint.[4] Thus, a single grid-cell can have several types of waterpoints. 208 of the 241 grid cells had some kind of waterpoint. When we break it down by type, there were a total of:
    - 130 cells with boreholes,
    - 164 cells with dug wells,
    - 135 with dams,
    - 66 with springs,
    - 47 with berkad and
    - 47 with other types.
- *Number of waterpoints* – a count variable indicating the total number of waterpoints a cell can include. As the descriptive data in Table 2 indicates, the highest number of waterpoints in one cell is 183 (max), while there are also some that have no waterpoints. The average is 19.859 waterpoints in each grid cell. This is also broken down by waterpoint type. Table 2 shows the descriptive data for these variables.

4 It is important to note that waterpoint type variables are not mutually exclusive. This means that a grid cell can have several types of waterholes and hence the same grid cell can be "double counted" when cells are broken down by type of water source.

Table 2: Descriptive waterpoint data

Variables	Obs	Mean	Std. dev	Min	Max
Number of waterpoints	241	19.859	26.927	0	183
Boreholes	241	4.058	8.995	0	71
Dug wells	241	7.564	11.529	0	77
Dams	241	5.734	10.958	0	116
Spring	241	1.390	3.899	0	39
Berkad	241	0.768	2.777	0	25
Other	241	0.386	1.027	0	8

6. Part III: Analyses

This section includes three set of analyses: cross-sectional, temporal and contextual. There are a few findings that are worth highlight from the analyses section.

- The descriptive cross-sectional analysis suggests that there is a substantial overlap between grid cells with conflict and waterpoints, and this is particularly true for non-state conflict. The cross-sectional regression shows there is a positive correlation between conflict and waterpoints, as well. Whilst these different analyses all show some kind of positive relationship between conflict and waterpoints, based on the available data in this desk study, we cannot draw any conclusions about causality because the data does not allow us to determine whether the conflict occurred before or after the water point as established. However, the larger project consists of several other research tracks that will be able further explore the causality between conflict and waterpoints.
- Both the descriptive and regression analyses that look specifically into non-state conflicts suggest there is a positive correlation between non-state conflicts and waterpoints. Further, it seems that formalized organised non-state conflicts are more likely in cells with waterpoints than non-state communal conflicts.
- The temporal analysis indicates the same patterns, but with a slightly weaker relationship which is as expected as we are looking at conflict yearly and not cross-sectional.
- Finally, we look into the relationship between conflict and waterpoints in cases of drought. Our analyses indicate that the likelihood of conflict increases in cells with waterpoints when there are higher levels of drought.

6.1 Cross-sectional

6.2 Descriptive analyses

As part of our cross-sectional analysis, we started off by looking at how many cells have both waterpoints and recorded conflict events. This was done in order to determine if conflict events occur more frequently in cells that also contain waterpoints, and if so, if certain kinds of conflict are occur more frequently depending on waterpoint present within a cell. It is important to note that in this analysis we did not take into account whether there was only one or several conflict events and waterpoints within a single cell. This means that we are not able to test for conflict intensity, i.e. of there was many or few conflict events close to the water point. However, in the regression analysis present below (Table 5) we use count measure for both conflict and waterpoints.

Table 3 below indicates the number and percentage of cells that have waterpoints that are also associated with conflict, meaning that we observe both conflict and waterpoints in the same cell. We see that approximately 61% of all cells that have at least one waterpoint also have recorded incidents of conflict. Furthermore, we see that boreholes, dug wells and dams have a slightly higher prevalence of conflict compared to other water types. For example, 64-65% of grid cells with boreholes, dams or dug wells also had recorded incidents of conflict. Springs, on the other hand, had significantly lower levels of conflict prevalence, with only 52% of grid cells with springs also having recorded conflict events.

Table 3: Share if cells with both waterpoints and conflict, by type of waterholes

Type of waterhole	Number of cells with conflict and waterpoint by type (out of 241cells)	Percentage of cells with conflict and waterpoint by type
All types of waterpoints	127	61%
Borehole	84	65%
Dug wells	105	64%
Dams	88	65%
Spring	34	52%
Berkads	29	62%
Other	30	64%

In Table 4a and 4b, we explore if there are any differences between the type of conflict that occurs close to waterpoints. The two tables are based on the same 2x2 comparison, whether a grid cell has conflict, and whether the grid cell has a waterpoint, thus the absolute numbers in the table are the same. The difference between the two tables is how we summarize it. In Table 4a we summarise according to waterpoint, whereas in Table 4b

we summarise according to conflict. The reason we do this is to see first of all of whether the share of conflict/water point cells deviate from the total number of cells. Second, we summarize this both for conflict and waterpoints, to get an idea of whether it is more common with conflict in waterpoint cells, or if waterpoints in conflict cells. This can then tell us something about the causality.

In Table 4a, we look at the percentage of cells of the total number of cells with or without waterpoints. Thus, in the first table we show that 127 cells had both conflict and waterpoints, which is 61% of all cells that have water points (as a reminder, 208 cells have waterpoints). In comparison, only 81 cells (or 39%) with waterpoints did not have conflict.

The bottom row of Table 4a shows the share of cells with conflict out of the total number of cells. We see that in total 60% of all cells (regardless of whether it had waterpoints or not) had conflict, and 40% of the cells did not. Thus, there is a slightly higher occurrence of conflict in cells with waterpoints, than in general. When we look at other types of conflict, we see the same trend for statebased conflict and non-statebased conflict, while opposite for one-sided violence. Nonetheless, the differences are so minute, we cannot draw any conclusions.

Table 4a: Share of cells with both waterpoints and conflict, by type of conflict, summarized by waterpoint both in absolute and relative terms

Water points	All conflicts		Statebased conflicts		Non-state conflicts		One-sided violence		Total grid cells
	Yes	No	Yes	No	Yes	No	Yes	No	
Yes	127/61%	81/39%	115/55%	93/45%	81/39%	127/61%	65/31%	143/65%	208
No	18/55%	15/45%	16/48%	17/52%	9/27%	24/73%	11/33%	22/67%	33
Total	145/60%	96/40%	131/54%	110/46%	90/37%	151/63%	76/32%	165/68%	241

In Table 4b we summarize based on conflict rather than waterpoint. As such, the top left cell on the table for all conflict shows that 127 cells (or 88%) of all cells (145) with conflict also had waterpoints. At the far right column we see that total 86% of all grid cells had waterpoints regardless of conflict occurrences. This means that there is a slightly higher occurrences of waterpoint in conflict cells than in general. Again, this is true for statebased conflicts and non-state conflicts. In particular for non-state conflicts we see a 4 percentage point difference compared to the general numbers. There is no difference for one-sided violence.

Table 4b: Share of cells with both waterpoints and conflict, by type of conflict, summarized by conflict type both in absolute and relative terms

Water points	All conflicts		Statebased conflicts		Non-state conflicts		One-sided violence		Total grid cells
	Yes	No	Yes	No	Yes	No	Yes	No	
Yes	127/88%	81/84%	115/88%	93/85%	81/90%	127/84%	65/86%	143/87%	208/86%
No	18/12%	15/16%	16/21%	17/15%	9/10%	24/16%	11/14%	22/13%	33/14%
Total	145	96	131	110	90	151	76	165	241/100%

The numbers in Tables 4a and 4b strengthen the notion that there is an overlap between grid cells with conflict and waterpoints. And in particular for cells with non-state conflict. However, while we see some differences in these descriptive tables, these are too small to be able to draw any valid conclusions based on the relationship between water and conflict.

6.3 Regression analyses

Further, to examine the relationship between water points and conflict, we test the correlation between conflict and waterpoints by running a simple bivariate regression analysis (i.e. no control variables). We use the measures of number of conflict events in a cell (log transformed) as the dependent variable and the number of waterpoints in a cell as independent (log transformed). We run these analysis for all events, as well as on the three different conflict types. Results can be found in Table 5.

How to read and OLS regression tables
When reading a regression table there are two features that are particular important. This is the coefficient and the level of significance.

First, the coefficient is the number that can be read on the same line as the variable name across all the models. In Model 1 in Table 5 this number is 0.204. The coefficient says something about the relationship between the two variables (in our case waterpoints and conflict). If the coefficient is positive this mean that when the independent variable (number of waterpoints) increases there is also an increase in the depend variable (number of conflicts), or both variables decreases. On the other hand if the coefficient is negative, it means that when the independent variable (waterpoints) increases the dependent variable (conflicts) decreases. The actual size of the coefficient says something about how much the dependent variable (conflict) will increase or decrease if the independent variable increases with one unite (i.e. increases with one waterpoint). This is represented with the gradient of the slope of the linear predictions in the graphs in Figure 7. For example in Model 1, an increase of one waterpoint would lead to an increase of 0.204 conflicts. However, since the variables in our analysis are log-transformed these calculation is not straight forward

in our analysis. Thus we will mainly focus on the direction of the coefficient (whether it is negative or positive).

The second important feature of a regression table is the significance level. This indicates how likely it is that the result we got is true. In social science it is common to say that a relationship is significant if the p-value is less than 0.1. This means that it is only 10% chance that the relationship between the variables (i.e. the coefficient) is not true, or that that the result is within a 90% confidence interval. If the p-value is less than 0.05 then it is 5% change that it is not true (a 95% confidence interval). The way we read this in the table is by looking the stars behind the coefficient. If there are no stars the relationship is not significant. If it has * it is significant at a 0.1 level, ** significant at a 0.05 level and *** significant at a 0.01 level. The description of levels of significance could vary from different reports but all regression analysis should have a description of the level of significance under the regression table. In Model 1 we see that the waterpoint variable reports 0.204**, thus there is only a 5% chance that the relationship is not positive.

A third feature is the R2 which is reported at the bottom of the table. This says something about how much of the variation within the dependent variable (conflict) is explained by the model. In Model 1 R2 is 0.03, this means that 3% of the variation is explained. It is difficult to say what a good/bad R2 is as it depends on the matter studies, thus the best is to compare across the models in the same model.

Finally, the regression table also includes the standard error. This is the number in parentheses under the coefficient. This says something about the variation within the sample. However, we do not need to focus on this when we interpret our analysis as this is taken into account in the p-value (i.e level of significance).

Table 5 indicates that the coefficient is positive in all the four models, indicating that the more waterpoints present in a cell, the more likely a cell is to have a higher number of conflict events. However, we see that the regression with one-side violence have substantially lower coefficient than the others, suggesting that the effect of waterpoints on the likelihood of one-side violence (Model 4) is lower than the other types of conflict. We see this relationship is also significant for all the models, but only the regression with non-state conflict has a significance level of 0.01. In addition, we see that the R2 is higher in the regression for non-state conflicts than in the other models, meaning that waterpoints do explain more of the variation in the non-state conflict variable than in the other conflict variables.

Table 5: Regression with number of water points and number of conflict events

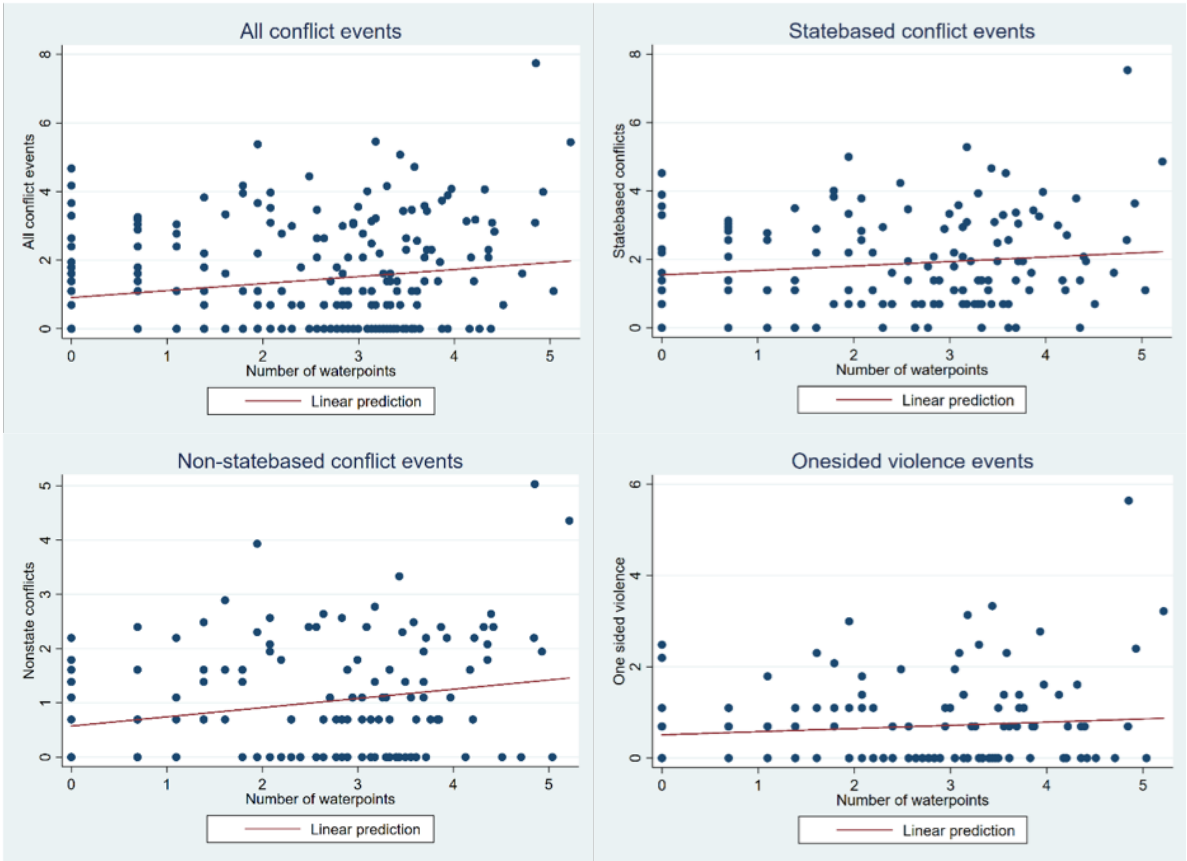
Variables	Model 1 Number of all conflicts	Model 2 Number of state-based conflicts	Model 3 Number of non-state conflicts	Model 4 Number of onesided violence
	Coefficient (Standard error)	Coefficient (Standard error)	Coefficient (Standard error)	Coefficient (Standard error)
Number of water points	0.204**	0.184**	0.162***	0.081**
	(0.070)	(0.066)	(0.232)	(0.037)
Constant	0.909***	0.717***	0.232	0.229**
	(0.187)	(0.175)	(0.117)**	(0.098)
N	241	241	241	241
R2	0.03	0.03	0.05	0.02

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The results are visualized in the graphs in Figure 7 where we have made a scatter plot between the different types conflict and waterpoints. In addition we have added a red regression line (linear prediction) indication how the regressions in Table 5 predicts the development between conflict and waterpoints in the various models. All the lines indicates in increases in conflict as the number of waterpoint increases, suggesting a positive relationship between waterpoints and conflict. However, we also see that the predicted line for one sided violence is flatter than the others, suggestion a weaker relationship (this is also seen by the lower coefficient in Model 4 compared to the other models).

Figure 7: Scatterplots with fitted regression line for Table 5



However, as this is a cross-sectional analysis, and we do not take time into consideration, the analysis in Table 5 is merely an indication that over the 30 years of conflict data that we have access to, there is a positive correlation between conflict and waterpoints. Based on the available data, we cannot say anything about the causality between the two, and we also cannot determine whether the conflict or the waterpoint occurred first. Second, we have no control for any other variables, such as population. Both conflict and waterpoints tend to occur where people are, thus the effect of population and population size could explain the relationship we see in Table 5. Further in our analysis, however, we will consider factors such as time and population. This can be found in Table 9 and its accompanying analysis on page 12 of this report.

6.4 Non-state conflicts

The preliminary analysis above suggests that there is a significant correlation between water points and non-state conflicts. This finding is also in line with the key findings from PRIO's literature review, that argue that water conflicts are more often linked with communal conflicts. As such, in this section we explore this correlation by further breaking down non-state conflicts and examining if there are any patterns between these types of non-state conflict and waterpoints.

As previously mentioned, non-state conflicts are conflicts where the state is not one of the conflict actors. In the cross-sectional analysis above we looked at non-state conflict more

generally as one of three types of conflict events. The UCDP GED data also includes a Non-state conflict dataset that has allowed us to further break down non-state conflict into three sub-categories based on level of organisation of conflict actors (Pettersson 2021):

1. **Formally organised groups:** any non-governmental group of people having announced a name for their group and using armed force against another similarly formally organised group.
2. **Informally organised groups I:** any group without an announced name, but who uses armed force against another similarly organised group.
3. **Informally organised groups II**: there is a clear pattern of violent incidents that are connected and in which both groups use armed force against the other (often referred to as communal violence).

Based on the UCDP GED data, in Somalia we find conflicts that fall into types 1 and 3, but none in type 2. In the period from 1990 to 2019, Somalia experienced 500 formalised non-state conflicts events (Type 1), and 205 communal conflicts events (Type 3). Table 6a and 6b shows how this is broken down by grid-cells and waterpoints, with the same comparisons used in Tables 6a and 6b.

Table 6a shows the number cells with conflict (by type) that occurs in cells with and without waterpoints. We see that 66 cells have both formalized conflict and waterpoints, which is 32% of all cells with waterpoints. The bottom row indicates that 30% of all cells (regardless of whether it has a waterpoint or not) had formalized non-state conflicts. When looking at communal conflicts, there is a slightly higher share of communal conflicts in cells with waterpoints (20%), compared to all cells (19%).

Table 6a: Share of cells with both waterpoints and non-state conflict, by type of non-state conflicts, summarizes by waterpoint both in absolute and relative terms

Water points	Formalized		Communal conflicts		Total grid cells
	Yes	No	Yes	No	
Yes	66/32%	142/68%	41/20%	167/80%	208
No	6/18%	27/82%	5/15%	28/85%	33
Total	72/30%	169/70%	46/19%	195/81%	241

Table 6b compares the same numbers, but it is summarized by number of conflict cells. We see that 66 or 92% of all cells with formalized conflict occurs in cells with water points, and 89% of all cells with communal violence occurred in cells with waterpoint. When we compare this with the total number of water cells out of all grid cells, we see that 86% of all cells had waterpoints. This means that the occurrence of waterpoints is slightly higher in cells with conflict than when we look at all cells. Thus, the descriptive data in Tables 6a and 6b suggests that non-state conflicts seems correlate.

Table 6b: Share of cells with both waterpoints and non-state conflict, by type of non-state conflicts,

Water points	Formalized		Communal conflicts		Total grid cells
	Yes	No	Yes	No	
Yes	66/92%	142/84%	41/89%	167/86%	208/86%
No	6/8%	27/16%	5/11%	28/14%	33/14%
Total	72	169	46	195	241

Table 7 shows the number and the share of cells with both conflict and waterpoints broken down by type. The first two columns (A and B) are summarized by waterpoint type, thus the top left table cell in column A shows how many cells have both formally organized non-state conflicts and boreholes as a share of total number of cells with boreholes (in parentheses). For columns C and D, we summarize by conflict, thus the top left table cell in column C shows how many cells had both formally organized non-state conflicts and boreholes as a share of total number of cells with formalized non-state conflicts (in parentheses).

Table 7: Number and share of cells with conflict and waterpoints by waterpoint and non-state conflict type

	Number and percentage of cells with both conflict and waterpoint as share of total number of type of waterpoint cells		Number and percentage of cells with both conflict and waterpoint as share of total number of conflict cell	
Type of waterhole	Formally organised (column A)	Communal conflict (column B)	Formally organised (column C	Communal conflict (column D)
Borehole	43 / 33% (130)	26 / 20% (130)	43 / 60% (72)	26 / 57% (46)
Dug wells	52 / 32% (164)	35 / 21% (164)	52 / 72% (72)	35 / 76% (46)
Dams	48 / 36% (135)	31 / 23% (135)	48 / 67% (72)	31 / 67% (46)
Spring	22 / 33% (66)	7 / 11% (66)	22 / 31% (72)	7 / 15 % (46)
Berkads	16 / 34% (47)	12 / 26% (47)	16 / 22% (72)	12 / 26% (46)
Other	18 / 38% (47)	10 / 21% (47)	18 / 25% (72)	10 / 22% (46)

In comparing figures in Table 7, we see that there is some variation in frequency of conflict according to water type, but nothing that suggests that one specific type of waterpoint is more likely to be related to conflict than others (column A and B). The only relationship that

stands out is communal violence has a much lower percentage of occurrence in cells with springs than communal violence in cells with other types of waterpoints. However, when we look at the percentage of cells with conflict that occurs in cells with specific types of waterpoints (C and D column), we see that both formally organised conflict and communal conflict seem to occur more often in cells with boreholes, dug wells and dams. This is similar to our findings in the cross-sectional analysis in Table 3.

In Table 8 we run a simple bivariate regression between type of non-state conflicts and number of water points (both variables are log-transformed). We see that both types of non-state conflict have a positive and significant relationship with waterpoints, meaning that when number of waterpoints in a cell increases, the likelihood of conflict increases. However, we see that the results for formally organised conflicts are slightly stronger (higher coefficient) and has a higher level of significance.

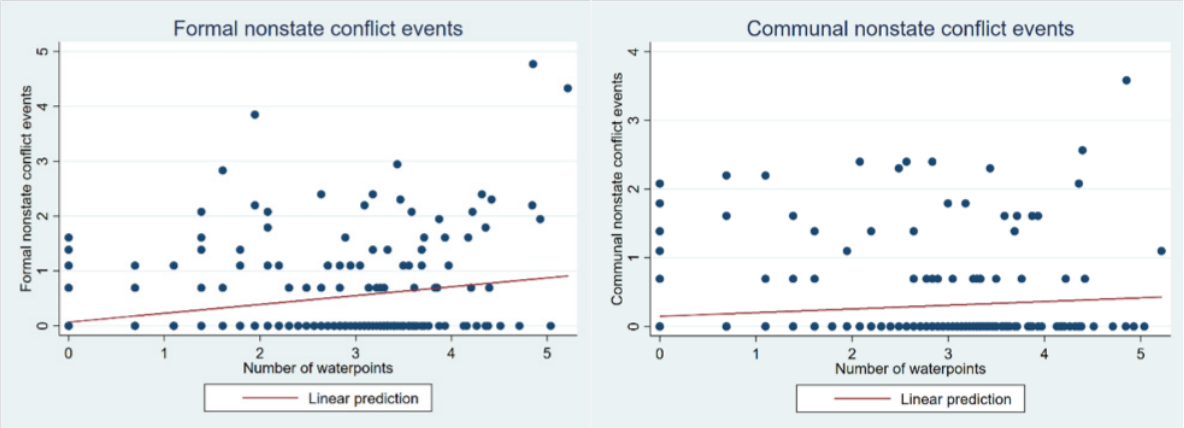
Table 8: Regression with number of waterpoints and number of non-state conflict events

Variables	Model 5 Number of formally organised conflicts	Model 6 Number of communal conflicts
	Coefficient (Standard error)	Coefficient (Standard error)
Number of water points	0.161***	0.054*
	(0.037)	(0.030)
Constant	0.068	1.146*
	(0.099)	(0.080)
N	241	241
R2	0.07	0.07

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The results from Table 8 are visualized in Figure 8. The linear prediction lines indicate a positive relationship for both models. However, the line for formal nonstate conflicts has a steeper gradient than the line for communal nonstate conflicts suggesting a stronger effect for formalized non-state conflicts.

Figure 8: Scatterplots with fitted regression line for Table 8



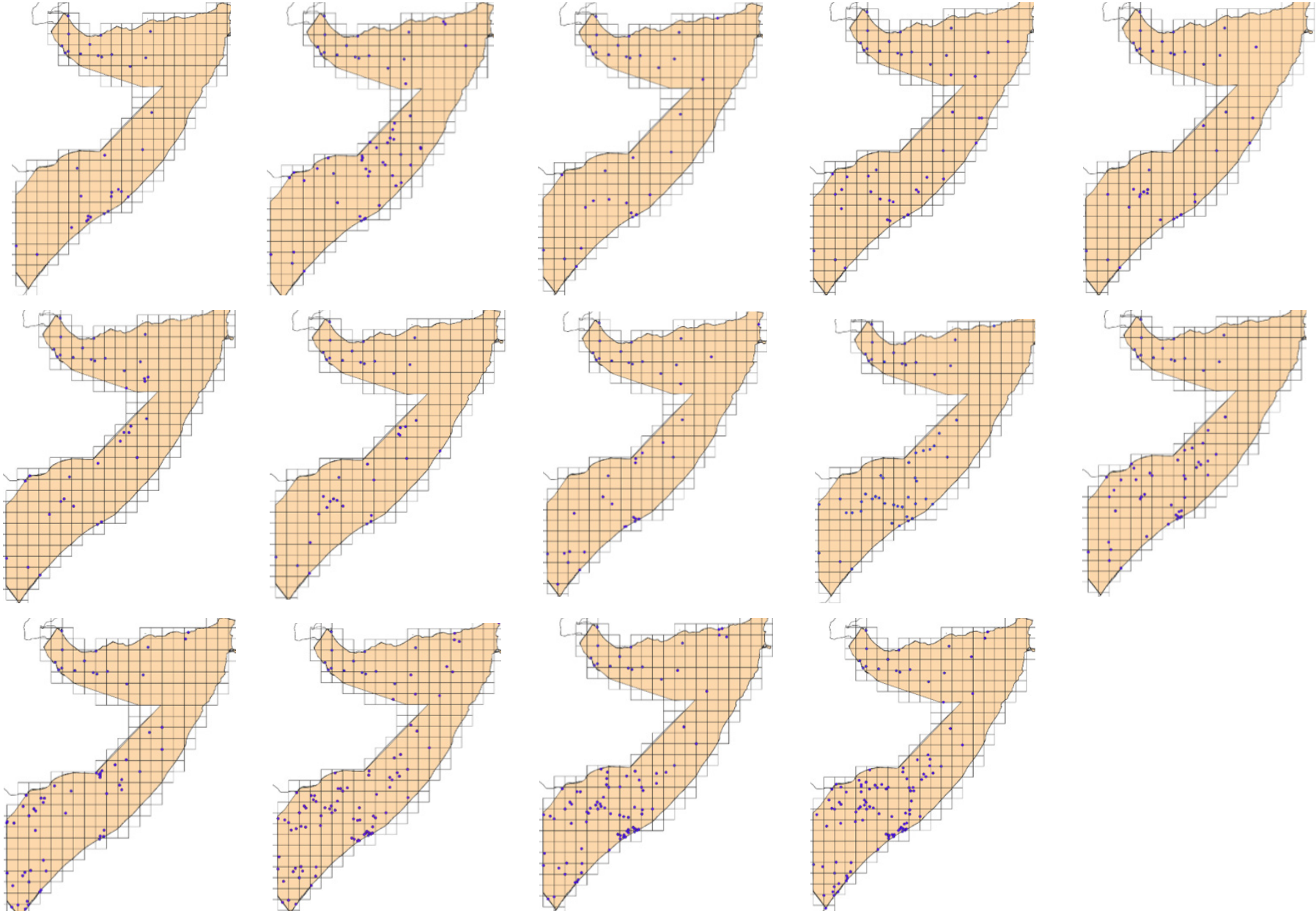
6.5 Temporal patterns

The analysis in the previous sections is based on a cross-sectional relationship, and does not take into account temporal factors. This means that we do not know whether a recorded conflict in a cell happened before or after a present waterpoint was established. Thus, we cannot draw any causal conclusion based on these analyses and cannot argue that waterpoints cause an increase in the likelihood of conflict.

This is due to limitations with the data available as whilst we have very good temporal data for conflict, the SWALIM database has very limited information about when waterpoints where established and for how long they have been operating. Thus, in order to give the analysis a temporal aspect, we have created a grid cell-year dataset between 2000 and 2014, where conflict variables vary in time and waterpoint variables are stable. This means if a cell has a recorded waterpoint, it will be coded as a waterpoint cell for the entire period we are analysing. While this does still not allow us to predict causality, we can give it some temporal aspects by looking at variation within conflict over time. The timespan of the data analyses here is determined by the control variables that are added to the analyses.

The maps in Figure 9 show the development of conflict each year from 2000 until 2014. We see that in general there is an increase in conflict events over this period, and that in particular the conflict intensifies in the southern areas of Somalia.

Figure 9: Conflict events from 2000 to 2014



In addition to the conflict and waterpoint data, in this dataset we have also added a set of control variables that vary over time. In an analysis like this we add controls to make sure that the effect that we find is not due to other variables that are connected to both the dependent (conflict) and the independent variable (waterpoints). In the case of this analysis, we have chosen to include two controls. These are:

- Cell population: we assume that there is more conflict in areas with high populations (the variable is log transformed), as well as more waterpoints in areas with high populations as more water is needed;
- Nightlight emission: this is a proxy measure for development, as we assume the more nightlight visible, the higher levels of development. Previous literature have shown that conflict are more likely to occur in less developed areas (Widemann and Shutte 2017). It is also likely to think that more developed areas have more waterpoints as there might be more resources to build dams and fug wells.

In Table 9 we run a multivariate regression (i.e. a regression analysis with more than one interdepend variable, these are the controls mentioned above) between number of waterpoints and conflict by type. In addition to the control variables of population and nightlight emission, we include fixed effect on years to account for unobserved time trends and cluster on grid cells to control for serial correlation.

Fixed effects
One of the main assumptions when running an regression analysis is that there are no omitted variable bias. This means that all relevant variables to explain the variation in the dependent variable should be included. If not, this could lead to the model attributing the effect of the missing variables to those that were included. In Model 9 we try to deal with this by including population and nightlight emissions as control variables. However, it is nearly impossible to be able to include all relevant variables. One way to improve this is to run a fixed effects model. A fixed effects model refers to a regression model in which the group means are fixed (non-random) as opposed to a random effects model in which the group means are a random sample from a population. This can easily be done by adding a variable coded 1 or 0 (a dummy variable) for each group.

In the regression in Tables 9 and 10 we add fix effects on year (year is then what is referred to as the group above), because we assume that there might be some temporal differences that could affect the results, such as elections, major conflicts starting, level of development ect. Thus, in the analysis a dummy variable for each year between 2000 and 2014 is included in the regression. However, it does not make sense to interpret these variables, hence they are not included in the tables shown here.

In Table 9, all the coefficients are positive, indicating that a higher number of waterpoints increases the likelihood of conflict. However, only the analyses examining statebased conflicts and non-state conflict are significant. We see in these models the coefficient is much lower than in Table 5, thus the gradient of the predicted line would be much

flatter than shown in Figure 7. This is because we are now looking at conflict on a yearly basis. However, since we still find a positive significant result for the statebased and non-statebased conflicts this further strengthen the finding that there is a positive relationship between waterpoints and the occurrence of conflict. We also see the that the R2 is much higher in these models that in the Models in Table 5 suggesting that more of the variation within the conflict variable is explained by these models. This supports our decision to included the control variables and fixed effects.

Table 9: Regression with number of waterpoints and number of non-state conflict events 2000-2014

Variables	Model 7 Number of all conflicts	Model 8 Number of statebased conflicts	Model 9 Number of non-state conflicts	Model 10 Number of onesided violence
	Coefficient (Standard error)	Coefficient (Standard error)		
Number of water points	0.013	0.012*	0.013*	0.004
	(0.008)	(0.007)	(0.007)	(0.003)
Nightlight emission	100.930	79.447	67.410	38.042
	(83.178)	(65.862)	(56.722)	(25.215)
Population	0.023**	0.024**	0.017**	0.008**
	(0.010)	(0.010)	(0.008)	(0.004)
Constant	-2.990	-2.971	-2.450	-1.382
	(2.868)	(2.287)	(1.933)	(0.878)
N	2,651	2,651	2,651	2,651
R2	0.137	0.102	0.067	0.091
Fixed effects on years	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

6.6 Context

Thus far in this desktop report we have looked at the relationship between conflict and waterpoints. However, as the literature review indicates, conflict related to water is often related to climate variability. One mechanism is that when water is scarce it increases the risk of conflict. In order to test this, we have added an interaction between waterpoints and drought.
To measure drought, we use a variable that says something about the share of the year in which a country has experienced severe drought. If a grid cell has experienced three consecutive months of severe drought, the cell will be given a value of 3/12 = 0.25. Thus, the higher the value, the larger the share of the year the cell has experienced drought.[5] To test how drought affect the relationship between waterpoints and conflict we have added an interaction between waterpoints and drought to the analysis. Thus note that to make the interaction easier to interpret, in this analysis we use a waterpoint dummy variable, i.e. a variable coded 1 if the grid-cell has ever had a waterpoint and 0 if not.

Interaction
When we want to study the relationship between three different variables (drought, waterpoints and conflict), we can add an interaction term to the regression model. This allows us to see how two independent variables (drought and waterpoints) affect the dependent variable (conflict) both separately and combined.

In a regression we do this by adding both the independent variables separately as well as an interaction term between the two, meaning that the two independent variables are multiplied. When we add the interaction term the interpretations of the variables becomes slightly different. In Model 10 the variable called Waterpoint dummy indicates cells that have water points but no drought, i.e. a positive result here means that grid cells with no drought but at least one waterpoint are more likely to see conflict. The variable called Drought indicates drought in cells with no waterpoints. A negative result here means that in cells that have drought but no waterpoints the likelihood of conflict decreases. The combined variable Interaction waterpoint*drought indicate cells that have both drought and waterpoints. Thus a positive result means that that the likelihood of conflict increases as drought increases if there is a waterpoint present.

By adding this interaction, we can examine how drought affects the relationship between waterpoints and conflict. In Table 10 we see that the interaction variable is positive in all the four models. This indicates that the likelihood of conflict increases in cells with waterpoints when there are higher levels of drought, and the effect is significant in Model 11 including all types of conflicts and and state-based conflicts in Model 12. Further, the drought variable is negative indicating that there is less conflict in cells with drought and no waterpoints, but it is only significant in Model 11. In Model 13 we see that the waterpoint

5 To measure drought, we use a variable that gives the proportion of months out of 12 months that are part of the longest streak of consecutive months ending in the given year with SPEI1 values below -1.5. For a year where the longest consecutive streak of months below -1.5 is three, the cell will be given a value of 3/12 = 0.25. When the longest streak starts in the previous year, it is only counted and included in the year in which the streak ended. The variable is also time variant. The variable is based on the Standardized Precipitation and Evapotranspiration Index SPEI-1 from the SPEIbase v.2.3. SPEIbase is based on precipitation and potential evapotranspiration from the Climatic Research Unit of University of East Anglia CRU v.3.22. The variable is downloaded from the PRIO GRID and measured at a grid cell level.

dummy is positive and significant, suggesting that the risk of non-state conflicts increases when at least one waterpoint is present and there is no drought.

The literature suggest that we will see less conflict in areas with less water because there is less to fight over and it is harder to organize conflict. However, we cannot use the same logic for drought. Drought has to be seen as a shock. When we see drought, i.e. less access to water in areas where it normally has been water, we are likely to see conflict because the resources are becoming scares, and people in the region is getting less access than they are used to. In addition, if areas close to the waterpoints (but without water points themselves) are also experiencing drought, we might also see an increase of people trying to access the water The reason why we see more statebased conflict during drought might be related to the fact that grievances related to drought and less water access might be directed towards the state, rather than other non-state actors.

Table 10: Regression with number of waterpoints, number of non-state conflict events and drought 2000-2014

Variables	Model 11 Number of all conflicts	Model 12 Number of statebased conflicts	Model 13 Number of non-state conflicts	Model 14 Number of onesided violence
	Coef (SE)	Coef (SE)	Coef (SE)	Coef (SE)
Waterpoint dummy	0.009	0.004	0.028*	0.005
	(0.014)	(0.014)	(0.015)	(0.005)
Drought	-0.179*	-0.141	-0.015	-0.049
	(0.100)	(0.092)	(0.114)	(0.031)
Interaction waterpoint*drought	0.329**	0.244***	0.223	0.036
	(0.137)	(0.093)	(0.182)	(0.033)
Nightlight emission	104.732	83.464	71.022	39.308
	(82.346)	(65.529)	(55.718)	(25.200)
Population	0.024**	0.025**	0.017**	0.009**
	(0.011)	(0.010)	(0.008)	(0.004)
Constant	-3.110	-3.098	-2.567	-1.428
	(2.844)	(2.281)	(1.897)	(0.880)

Variables	Model 11 Number of all conflicts	Model 12 Number of statebased conflicts	Model 13 Number of non-state conflicts	Model 14 Number of onesided violence
N	2,640	2,640	2,640	2,640
R2	0.137	0.100	0.069	0.091
Fixed effects on years	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Predictive margins plots
While we can say something about the average relationship between two variables when looking at a regression table, it is difficult to understand how the relationship changes when we look at different values of the independent variables. This is even more difficult when we have included an interaction term. To make this easier we can use marginal effects. Marginal effects tells us how the dependent variable (conflict) changes when a specific independent variable (waterpoints/drought) changes. Other covariates are assumed to be held constant.

To best explore this we use a predictive margins plot. In the regression in Table 10 we include an interaction between drought and waterpoints. Thus, in the predictive margins plot in Figures 10 we present how drought at different levels affect conflict both in cells that have waterpoints and those than haven't.

Specifically, the y-axis indicate the effect on conflict. The higher number the higher is the risk of conflict. The Y-axis indicates levels of drought, higher numbers means higher levels of drought. The separate red and blue line indicate the effect for cells with (red) and without (blue) waterpoints.

The vertical lines indicate a confidence interval, i.e. within what range can the model predict with confidence that the effect will fall within (Figure 10 indicates a 90% confidence interval). For the differences between cells with and without waterpoints to be statistical significantly differences, the vertical red and blue lines cannot overlap.

In order to better understand the effect of drought on the relationship between waterpoints and conflict we have plotted the effect of the interaction variable in a predictive margins plot. This means that we can evaluate the effect of different levels of drought severity separately for grid-cells with and without waterpoints. In Figure 10 below we have plotted this for all four regression models in Table 10 above. On the y-axis of the graphs in Figure

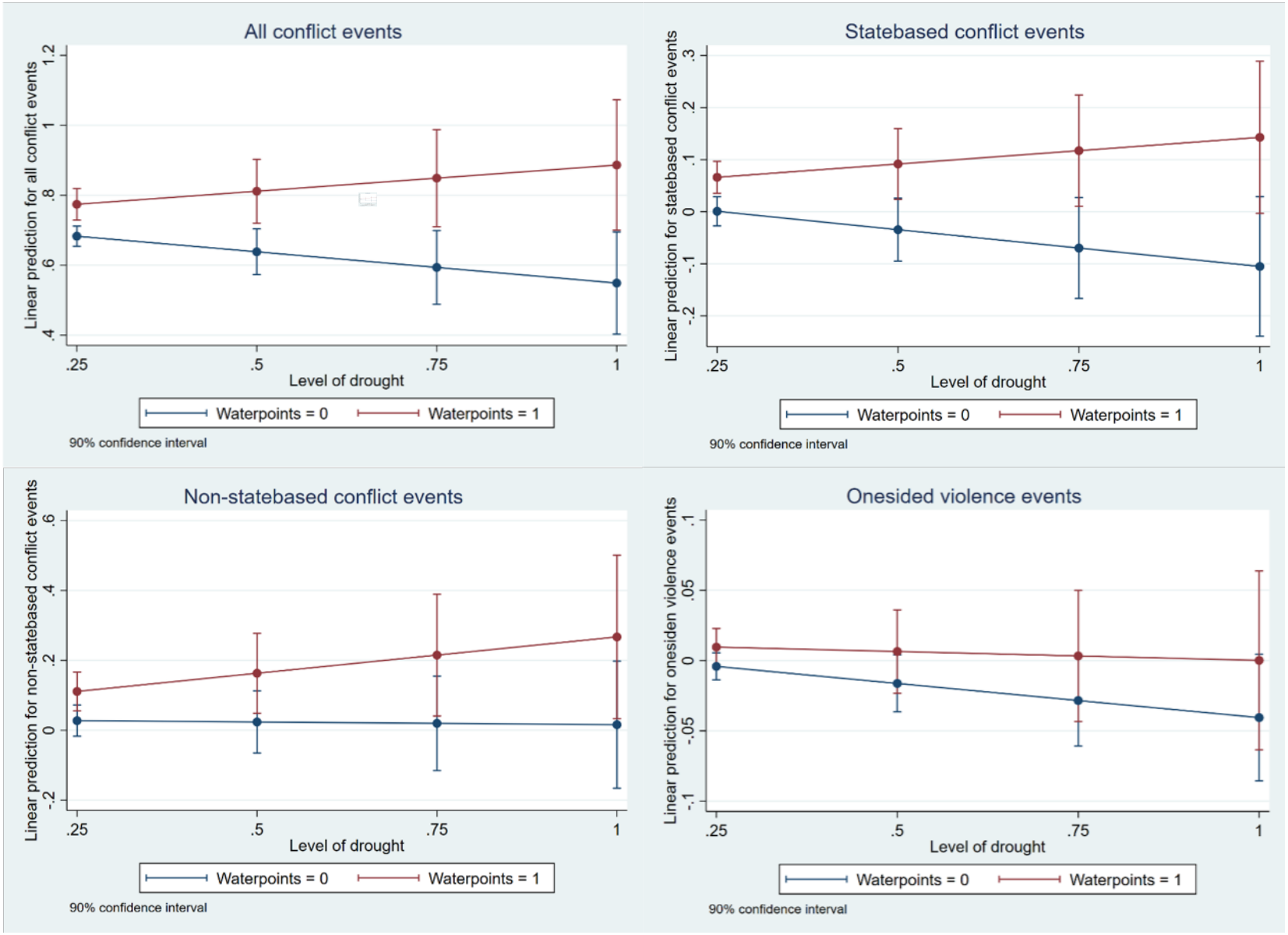
6 is the predicted conflict risk based on the estimates in the models in Table 10 (the higher number the higher risk of conflict), and on the x-axis is the severity of drought (0 means no months of severe drought 1 means sever drought in all 12 months). The two lines in the graph indicate the effect of drought on conflict for cells that have waterpoints (red line) and those that do not (blue line). The vertical lines indicate the confidence interval (90%) for the red and blue lines. This shows whether the relationship is significant at the specific point of severity. If the blue and red vertical lines do not overlap, it is significant. When a relationship is significant it means that the likelihood that this relationship is fact and is true is very high. When it is not significant, we cannot be as sure that the relationship is fact.

We see that for the graphs including all conflict events (Model 11) and statebased conflict events (Model 12), the red line (waterpoint cells) increases with drought severity and the blue (non-waterpoint cells) decreases. This indicate that the effect of drought on conflict (all conflict events and statebased conflict events) increases in cells with waterpoints, but decrease in cells without waterpoints. However, we also see that the vertical lines (confidence intervals) do overlap slightly for the higher levels of severity, meaning that we cannot be sure that there actually is a differences between grid-cells with or without waterpoints at a higher levels of drought. This might be a result of very few cases with high severity of drought, or that when an area experience severe drought the existence of waterpoints become less important in explain the conflict risk.

Further, for non-state conflicts (Model 13) we see that while the red line is increasing, the blue line is straight, suggesting an that the risk of conflict increases as drought increases in cells with waterpoints. However, when looking at the vertical lines we see that there is a large overlap, suggesting that drought might not make a difference. While we previously have found that there is a relationship between waterpoints and non-state conflict, these results might suggest that the relationship between non-state conflict and waterpoints is not driven by drought.

Finally, the plot for one-sided violence shows a decreasing trend for cells both with and without waterpoints, but the relationship is not significant at all. This is not surprising as there are less theoretical arguments for a relationship between this specific type of violence compared to statebased and non-state conflicts.

Figure 10: Marginal plots for interaction variables in Table 10



7. Conclusion

In this study we aimed to test whether there is a relationship between conflict events and waterpoints in Somalia. In the report we have provided three types of analysis. Firstly, we looked at a cross-sectional analysis testing whether there is a higher likelihood of waterpoints and conflict to occur in the same grid cell. We also broke the data down by type of conflict (statebased, non-state and one-sided violence) and type of waterpoint (boreholes, dug wells, dams, springs, berkads and other types). The analyses show that there seems to be a positive and significant correlation between conflict and waterpoints, meaning that conflict seems to be more likely to occur in cells/locations where waterpoints are present. Our analysis seems to further suggest that while there seems to be a positive relationship between conflict and waterpoints in general, non-state conflict – such as clan conflicts – in particular seems to have a slightly higher overlap with waterpoints than other types of conflict (state-based and one-sided conflict).

Whilst a positive correlation has been observed, it is important to note that since this is a cross-sectional analysis, it does not take into account several factors that could also explain or impact the observed relationship between water and conflict, such as population. Additionally, the waterpoint data used and available (SWALIM) is missing temporal information related to when waterpoints were originally created, meaning we cannot say whether a waterpoint or conflict occurred first, and as such cannot determine if there is a causal direction to the positive correlation observed.

Given we are interested in inter-clan conflict in Somalia, and that our cross-sectional analysis suggests a stronger relationship between waterpoints and non-state conflict, we decided to carry out additional analysis by disaggregating conflict data by type of non-state conflicts. This was done in order to further explore the observed relationship between waterpoints and conflict. In Somalia, there are two types of non-state conflict: conflict between formalised groups and communal violence. Our analysis suggests that both types of non-state conflict are related to waterpoints, but that the effect is slightly higher for conflict between formally organised groups than communal violence. This might be slightly surprising as much of the available literature on climate change and conflict focuses on communal violence.

In general, we find that type of waterpoint does not seem to affect the likelihood of conflict, but what it does seem to affect is the type of conflict present. For example, we see a larger share of non-state conflicts occurring in cells with boreholes, dug wells and dams in comparison to other types of waterpoints.

Our second set of analyses tries to incorporate a temporal aspect to the analysis. However, as mentioned, the waterpoint data has limited information about when the waterpoints were established or for how long they have been operating. Given this limitation, we treated waterpoint data as cross-sectional, meaning if a cell has a recorded waterpoint, it is treated as having had that waterpoint for the entire period of our analysis. Conflict data, on the other hand, we then measured according to years active. In addition, we also considered population size and nightlight emission data as other control variables. Due to the control variables, the temporal analyses only lasts from 2000 to 2014.

The results from this analysis confirm the results from the cross-sectional analysis in that there is a positive correlation between waterpoints and conflict. But as expected, the results are not as strong as in the cross-sectional analysis. We find that only the results from statebased and non-state conflicts are significant. The correlation results for one-side violence is much lower than the other types, which is similar to the cross-sectional analyses, but the level of significance is lower.

Finally, we examined how levels of drought affect the relationship between waterpoints and conflict by doing an interaction analysis. We found that the risk of statebased conflicts seems to increase in cells with waterpoints when there is a drought in the cell. On the other hand, we do not find the same effect for non-state conflict. As we have already established that there is relationship between waterpoints and non-state conflict through our earlier analyses, this finding seems to suggest that the relationship between nonstate conflict and waterpoints might be driven by mechanisms or factors other than just drought.

The results in this report might be somewhat surprising as one might expect there to be less conflict in areas with waterpoints. However, there are theoretical arguments that could help explain these findings. For example, where water resources are limited, groups will use violence to secure access to scarce water resources. Thus, it is expected that more profound water shortages will lead to an increased level of conflict (Homer-Dixon 1994). In our case this could mean that violence close to waterpoints suggests there is scarcity in other places (hence pushing populations and conflict actors closer to water).

Further, a second theoretical proposition assumes that there will be less conflict when there are lower levels of rainfall as there is less to fight over, thus we see less fighting in areas without waterpoints (which is the flip side of our analysis). A third suggested mechanism proposes periods with relatively more rainfall will increase levels of violence because of the assumed profits that water abundance will provide to armed groups. As such, this could also be related to waterpoints and help explain our results. For a more detailed explanation of the theoretical perspective, see the literature review.

The analyses in this report have established that there is a relationship between conflict and waterpoints, the relationship being that conflict events are more likely to occur in locations with waterpoints in comparison to locations without any. The analysis also suggests that drought affects this relationship, in particular when it comes to statebased conflicts. However, the data and analyses are not extensive or strong enough to make conclusions on the causal relationship or specific mechanisms behind this observed relationship/correction. This is due to a combination of limitations, including missing temporal information about the waterpoints. In order to address these shortcomings in future iterations we would need better temporal data on waterpoints. For example, we would need to know when the waterpoint was established and when it was operating. If we have this information, we would be able to test whether conflict increased or decreased after the waterpoint was established compared to before. Another possibility would be to use groundwater data to indicate whether the area is water scarce or abundant (Döring 2020).

The larger project that this desktop report is part is exploring the climate-water-conflict nexus. However, this report has mainly focused on the relationship between waterpoints, conflict and drought. Analysing the effect of climate change is challenging, and there few

good ways to measure it statistically, other than using proxy variables such as drought and precipitation. Much of the literature on climate change and conflict is leaning towards examining intermediate variable s between climate change and conflict, rather than studying a direct effect. An example of these types of intermediate effects could be how access to water affect conflict when an area experience drought. Thus, while we can not draw conclusion on the relationship between climate change and conflict from this report, we can say something about how intermediate variables such as water access that is likely to be affected by climate change can further potentially affect conflict.

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Weidmann NB, Schutte S. Using night light emissions for the prediction of local wealth. Journal of Peace Research. 2017;54(2):125-140. doi:10.1177/0022343316630359 Annex D: Field Research / Qualitative Analysis Report

Annex D: Field Research / Qualitative Analysis Report

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Table of contents

Acronyms 3

1. Introduction 4

2. Assessment Methodology 4

2.1 Literature review 4
2.2 Primary Data Collection 5

3. Assessment Findings 7

3.1 The Relevance of Clanship to Climate Change and Associated Conflicts 7
3.2 Climate-Induced Conflicts in Deefoow 8
3.2.1. Hawadle-Dir Conflicts 9
3.2.2 Jajele – Makanne Conflict 11
3.3 Climate-Induced Conflicts in Matabaan Area 12
3.4 Women's lenses in Deefoow and Matabaan Conflict 13

4. Conclusion and recommendations 15

Bibliography 17

Acronyms

AS:	Al-Shabaab
FMS:	Federal Member State
FGD:	Focused Group Discussion
KII:	Key Informant Interview
SRS:	Somali Regional State
FGS	The Federal Government of Somalia

1. Introduction

Environmental degradation is believed to lead to conflict by causing livelihood problems, scarce resources, and migration, which can stimulate competition (Homer-Dixon 1994:6; Barnett 2000:271; Gleditsch 2012:7). However, the probability of environmental degradation causing conflicts depends on other socio-political factors. Some of these factors include how resources are distributed or managed, the cleavages among the concerned stakeholders, the authority's capacity to control the behaviour of its subjects and the overall economic conditions of the stakeholders, particularly whether they have and are aware of other livelihood options available to them.

Primarily governed by the traditional Somali system, Somali pastoralist clans use the environment in a way that suits their lifestyle. For them, "the best protection against unreliable precipitation is access to the extensive territory containing quality forage and water sources" (Unruh 1995:2). Protecting such territory is a primary responsibility for the clan institution. Though conflicts among Somali clans over scarce resources have always been there, disputes over pasture, water and farms have increased in the last decade (Sheikh 2017; Ferrández 2020).

Matabaan and Deefoow areas, both in Hirshabelle Federal Member State (FMS), experienced recurrent conflicts that are, apparently, over territories and the resources attached to them. Various researches found that climate change is a crucial driver of resource competition and conflicts, though others doubt the validity of such findings (Homer-Dixon 1994:6; Barnett 200:271; Gleditsch 2012:7). Yet, none of those researches have focused on Hirshabelle. This study investigates the link between inter/Intra clan conflicts, access to natural resources and how competition over resources interacts with other socio-economic conditions and generates conflict. Furthermore, the study uses climate change-related events such as droughts and floods to explain the link between climate and conflict dynamics.

2. Assessment Methodology

The methodology for conducting this conflict analysis was developed with two assumptions in mind. First, local-level conflicts involving communities and users of natural resources cannot be understood in isolation from the broader conflict at the national and regional levels. Second, while many local conflicts in Matabaan and Deefoow are driven by competition over access to natural resources like land and water, elements of culture, identity and politics are also involved. Therefore, the approach for conducting this conflict analysis was participatory in which a multi-stakeholder process was followed. The methodology utilized comprised of the following components:

2.1 Literature review

A literature review was conducted for this conflict assessment from various national, regional, and international agencies and government departments. Undertaking the literature reviews was crucial for having up-to-date information about the conflict situation

in the area and the humanitarian situation in general. Previous studies on clan conflicts in Deefoow and Matabaan were also reviewed. The desk study findings formed the background against the conflict analysis. A bibliography of all the sources used for the conflict analysis is included in this report.

2.2 Primary Data Collection

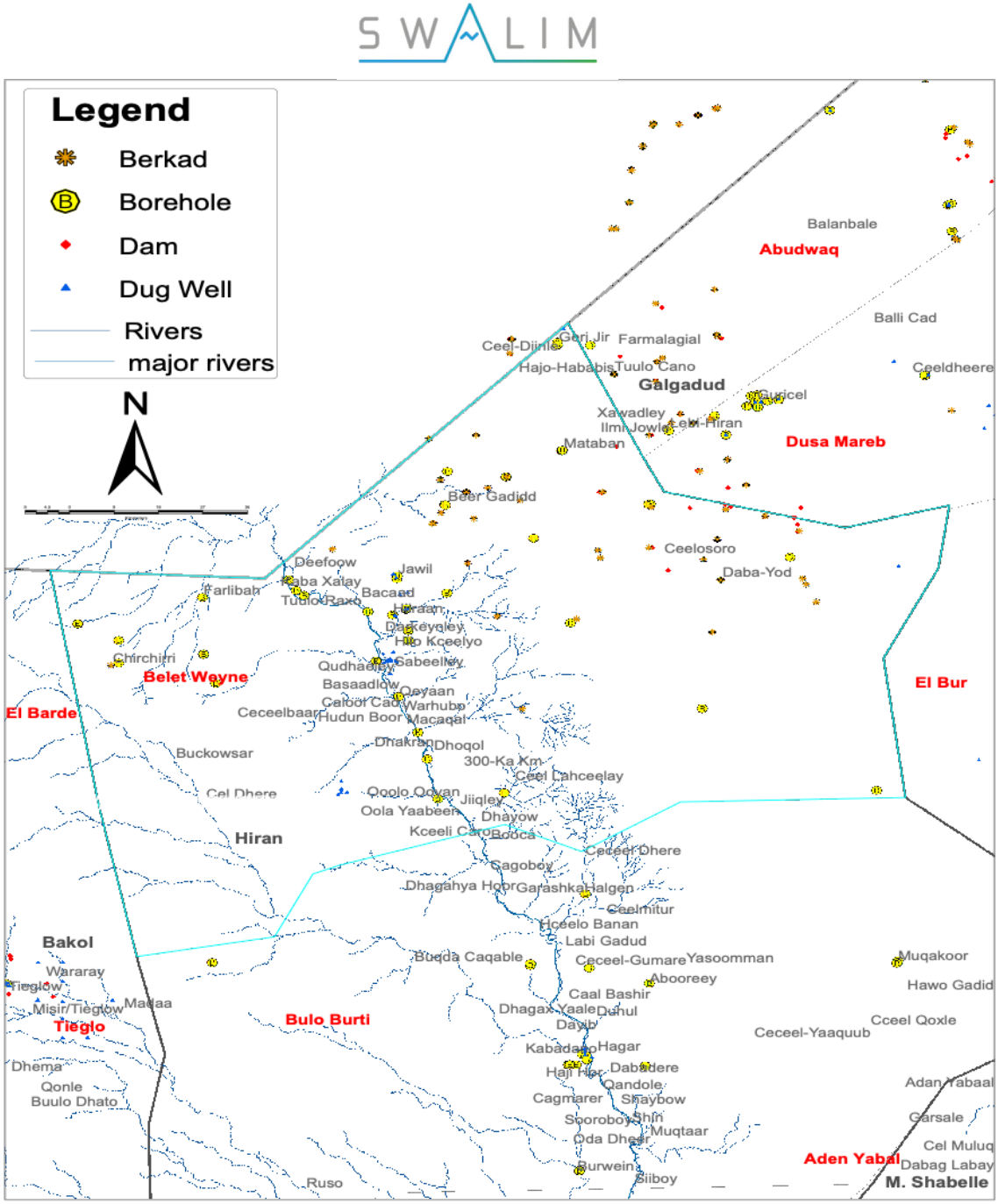
The primary data collection consisted of a mix of tools, including key informant interviews (KIIs) and focus group discussions (FGDs). These tools were developed in consultation with Albany's team. In total, 24 KIIs were conducted with community leaders, local authorities, and community members from Deefoow and Matabaan. In addition, the team conducted two FGDs in each location, with each FGD comprising 10 participants. One FGD was conducted with male members and the other with female community members.

Activity	Matabaan	Deefoow	Total persons Interviewed
Key Informant Interviews	12	12	**24**
FGDs	2	2	**4**

Key informants were strategically selected through purposive sampling, bearing in mind key attributes such as political and social power, age, gender, clan affiliation, occupation, and geographical location. Data collected from participants were triangulated with information from the literature review and background knowledge. Throughout the field visit, researchers faced several challenges, including inaccessibility to Deefoow and Matabaan towns for security reasons. To overcome this, researchers transported the identified participants of FGD and KII from those locations to Baledweyne and Guriceel towns. Another challenge was informants' lack of specificity, who tended to provide general opinions rather than specific facts. However, this was resolved by paraphrasing and narrowing down questions.

Groups	Matabaan	Deefoow	Total persons Interviewed
Women	10	10	**20**
Businessmen	5	5	**10**
Religious Leaders	5	5	**10**
Traditional Elders	10	10	**20**
Local Government	1	1	**2**
Total participants	**32**	**32**	**64**

Figure 1: A map showing the locations of Matabaan and Deefoow and the distribution of water sources



3. Assessment Findings

3.1 The Relevance of Clanship to Climate Change and Associated Conflicts

Somalis form one of the largest homogeneous ethnic groups in the Horn of Africa. Yet, they are sharply divided into clans, subclans, and smaller units, of which the mag-paying group is the most important (Lewis 1999). Though dominant perception suggests that clanship is always based on well-defined patrilineal genealogical structures, it is sometimes based on a contract among the members of various lineages who agreed to coexist and cooperate in a clanship fashion (Seid 2007). Regardless of the bases of its formation, clanship or tolnimo in Somali is a system of life in which members have duties and entitlements. The clan institution influences the conduct and attitudes of its members. It leaves an enormous effect on every significant issue in life, including the use of natural resources – such as water and pasture - and the protection of the clan members. Finally, it's worth mentioning that the formal system is either fragile or has no presence in the locations studied, which has made the reliance of the clan for safety and welfare the optimum choice for individuals (Gundel 2006:7; Sheikh 2017:1).

Understanding how the clan institution governs water, pasture, and land and the stresses related to them is a key to understanding climate change-related clan conflicts. Yet, such understanding will probably be incomplete without understanding how the clan protects its members. The clannish sentiment or principle of "*hiil iyo hoo*", which means protection and grant, instructs members of the same clan to defend and extend a provision of welfare to one another. Thus, the rich have a cultural duty to share with the poor, and the liability incurred by one is equally dispersed among adult clan members (Chottee & Seid 2004; Hagman & Seid 2018).

This strict interdependence necessitates clan members to stay and live close to one another, which explains why most clans or sub-clans have an area they predominantly populate. Moreover, as secure pasture and water are fundamental for the survival of people and livestock, the clan become the optimum institution through which individuals secure territory for pasture and water (Unruh 1995:9). Per the informants, the duration a clan exclusively utilizes an area and/or the establishment of water well/s, Berkad[2] , permanent settlements and farms determines the attribution of such area to that clan. The ownership of the wells, lakes, water springs, rivers and pastures is communal according to the unwritten traditional land tenure system. Usually, the water points are far apart, and in between, there is a grazing area attributed to the clan that owns the water points at the sides. If water points owned by different clans surround the grazing area, it is considered common to the clans of the surrounding water (Lewis, 1998; Lewis 1998). However, due to the harsh terrain characterized by scarce water and pasture and pastoralism's predominant lifestyle, sub-clans move through different locations following water and pasture (Dickerman and Riddell 1986:172). Understandably, every clan's need for such mobility creates interdependence among clans, encouraging free movement among pastoralists and a tendency to share communal water and pasture, except for rival clans.

2 *Berkad* is a Somali term for a cement-lined water reservoir used for rainwater harvesting during the rainy season to benefit drought times. Its plural form is *berkado*

Despite the prevailing tradition of giving free access to water and pasture to all non-hostile clans, ecological deterioration and the resultant resources shrinkage increase competition over access to land for water and pasture (Unruh 1995:9). KII sessions found out that many murder cases have their roots in a tussle over the use of water during the droughts when lakes, berkado even some wells dry and the remaining water points are overpopulated.

Due to the clanship's call for protection to members of the clan or sub-clan, the murder or even a minor dispute between two individuals might foment a full-blown conflict between sub-clans. For instance, most of the informants in this study mentioned the destructive role of the deeply rooted culture of revenge. Per the dictates of "*hiil iyo hoo*", adult male members of the sub-clan have the moral obligation to avenge anyone in their sub-clan victimized by a member of a different sub-clan. As one interlocutor succinctly put it:

> *On top of satisfying the subclan's moral obligation towards the victim and his heir, taking revenge is a show of pride since inaction is seen as a manifestation of weakness, which can compromise the subclan's security.*

When vengeance is taken, counter-revenge and consequently full-blown conflict between sub-clans might follow. Staggeringly, revenge is not necessarily brought on the perpetrator but any adult member of the sub-clan of the perpetrator. Because of this practice, the movement of the entire sub-clan for water and pasture could be disrupted by the violation committed by one of their members. That said, more than one of our informants argued that the practice of revenge could sometimes be an incentive for peaceful settlement of disputes by pushing sub-clan members in fear of revenge to compromise. It also encourages sub-clan members to restrict or monitor their members' behaviour, as they will ultimately pay any liability incurred by one.

3.2 Climate-Induced Conflicts in Deefoow

Deefoow is an agriculturally rich town located about 37km from Beledweyne towards the north and just a few kilometers to the border of Ethiopia's Somali Regional State (SRS) towards the west. Straddling the Shabelle river, the Eastern side of Deefoow town and its outskirts are predominantly populated by Hawadle of Hawiye and Fiqi Umar sub-clan of Surre – Dirr. In contrast, on the Western side, the Makanne sub-clan Somalized Pantu and Jajele subclan of Hawiye predominantly populate. Interestingly, on each side of the river, one of the populating subclans are mainly farmers - i.e., Fiqi Umar in the east and Makanne in the west. In contrast, the other two on the sides are predominantly pastoralist. According to our informants, conflicts have hardly happened among the subclans populating both sides of the river. However, with the recurrence of droughts and floods in the last ten years (Ferrández 2020), conflicts have repeatedly emerged on both sides of the river (Sheikh 2017). For instance, 35 years old female informant from the Makanne subclan said:

> *Throughout my entire life, I used to experience my Makanne subclan and Jajele living side by side peacefully. Apart from minor clashes between individuals, which elders used to sort out, the first conflict between these two subclans happened in late 2020. It was evening; I was in the middle of preparing dinner for my children. I did not expect any bad events. Then suddenly, I heard heavy shelling on our village. The shelling was coming*

from a hilltop above us. First, I did not comprehend what was happening, but I soon learned they were the Jajeeles attacking us.

Likewise, an elderly informant from the Surre subclan said:

Hawadle and Dir did not have any history of conflicts before 2012. Because of the 2011 drought that destroyed much livestock, Hawadle families started farming, and some encroached on areas traditionally cultivated by Surre when it rains. I think this was when our relationship with Hawadle began to sour.

3.2.1. Hawadle-Dir Conflicts

The KIIs and FGDs held in Beledweyne have shown that Hawadle and Surre of Dirr lived peacefully in the Deefoow area for more than a half-century before their first open conflict in November/December 2013.[3] Fiqi Umar of the Surre subclan populates the area adjacent to the river where they have river irrigated farms. Behind the farms is an open field that divides Hawadle and Surre. As the field covers a large area, Surre uses the part on their side for farming whenever it rains, whereas Hawadle uses the other part for grazing. This settlement pattern gave the Surre subclan the advantage of controlling the river access points where nearby Hawadle has to go through Surre of Dir populated area to access water from the river. Yet, according to our interlocutors, this was not a problem before the conflict because the Somali Traditional Tenure System encouraged free water and grazing access.

After more than half a century of peaceful co-existence, a man from the Fiqi Umar subclan of Surre - Dir murdered a Hawadle herder who, after watering his livestock from the river, trespassed on the farm of the Fiqi Umar man for his livestock to graze. An elder informant mentioned that herders are more likely to infringe the farms for livestock grazing during droughts, and this incident was one of such cases.

Participants of the two FGDs in Beledweyne have confirmed that immediately after the incident, the liyu-police of the SRS intervened by summoning elders from both subclans to the Fer-fer district of the SRS for negotiation. After deliberations and through the good office of the liyu-police, the two sides agreed that Dir should pay USD 15000 as blood compensation to Hawadle for the murder of their man. According to three of the informants, though Fiqi Umar has paid the agreed amount of blood compensation to Hawadle, Hawadle subsequently murdered a Fiqi Umar man who was travelling in their territory to revenge the Hawadle man killed by Fiqi Umar. Hawadle's revenge for someone whose blood money is already paid had jeopardized its relationship with Fiqi Umar, stimulating counter-revenge and skirmishes before the two went into an open confrontation in December 2013. Fiqi Muxumed, another sub-clan of Surre that populates the nearby Kabxanley, joined the conflict to support their Surre fellow men. As such, the drought-stimulated incident of trespassing one's farm for grazing led to a bloody conflict between two subclans, which is an excellent example of the interplay between clanship and its underpinning '*hiil iyo hoo*' principle on the one hand, and the ecological factors on the other hand.

3 Informants gave conflicting dates about the first open confrontation between Hawadle and Dir subclans, but most of them mentioned late 2013 specially in November and December

The hostility between the two subclans deprived Hawadle of access to the river, whereas Surre were deprived of access to the Beledweyne market where they used to sell their farm products. In one of the FGDs, a youth discussant from Surre recalls his experience of Hawadle's free access to the water access point before the conflict and how things changed afterwards:

> *I remember Hawadle herders trekking with lots of livestock for watering. They used to access the river through the access point, [hilo, in Somali] on the side of our houses. Our only concern was if some of the cattle moved to our farms. But after the conflict, our subclan men might kill them if they try. They may also kill us if we go to their area.*

After sporadic conflicts that expanded to neighbouring villages, including Kabxanley, Hawadle managed to overrun the town of Deefoow and a few nearby villages and then established new Hawadle settlements in the area. This happened at least twice, the last time being in 2021, according to Surre Dir informants. After this incident, regrouped Surre counter-attacked and wiped out Hawadle from the area. What started as a dispute over the trespass of someone's farm has not only developed into a conflict between two subclans but also raised questions about the ownership of the territory. For instance, Hawadle informants argued that the disputed area belonged to Hawadle, who hosted Surre after they fled drought in Ethiopia. Therefore, they say Surre must vacate the area and return to Ethiopia. On their side, Dir informants mentioned that Hawadle elders, business people and diaspora had a big conference on how to dispel Dir from the area. They argue that Hawadle was implementing the action points of that conference when they burned Dir villages and established their settlements in the area. Various researches have shown when a territory is the subject of a conflict, the question remains whether the conflict is over the territory's resources or the territory itself for some other reason (Gleditsch 1998:385). That said, it is clear from the above case that the dispute over the territory came only after a drought-stimulated incident developed into an open conflict between the two sub-clans.

Currently, there was no conflict between the two sides, even though they are still hostile to one another. Informants gave two explanations for this, namely the recurrent drought and fatigue. Almost every informant argued that herders and farmers prioritize saving people and livestock from the drought over taking revenge or attacking the enemy. Moreover, they said, going to war requires resources which are very scarce during the drought, not to mention that drought makes men busier. Hawadle male informant, for instance, said:

> *There is no pasture because of successive droughts. So, herders are hand-feeding their livestock using locally produced cereals, which has caused cereal prices to rise. Their struggle to save the livestock distracts them from thinking of revenge, let alone launching a war. No doubt, the drought stops people from going to war.*

Some informants believe that fighting wearied both sides as each failed to defeat the other despite the prolonged conflicts and the attendant negative impacts. Surre elder said:

> *At the beginning of the conflict, Hawadle believed that they could eradicate us from Deefoow area as simple as shoveling bits of sand, but they now*

realize it is not as easy. They have suffered from the conflict as we also suffer from it; therefore, Hawadle does not have enthusiasm for the war anymore.

3.2.2 Jajele – Makanne Conflict

The Jajele sub-clan of Hawiye and Makanne of Somalized Bantu populate the western side of the river that divides Deefoow. Like Surre in the east, Makanne has river irrigated farms and inhabits the part adjacent to the river, whereas the Jajele, who are pastoralists/herders, populate nearby hilly areas. A hilly grazing area divides the two subclans. Per the informants, when the river floods in Deefoow area, Makanne farmers used to flee to the hilly grazing area, made makeshift houses there and returned to their farms after the flooding settled down. According to some informants, this practice by Makanne started as early as 1997, even though none of the informants could have specified how many times this happened. However, after consecutive flooding incidents, some Makanne families started not to return from the hilly grazing area, which contributed to the formation of three Makanne villages in the hilly area. Furious with the new Makanne settlements, the Jajele militia attacked and burned the villages in late 2020. Makanne's escape to the hilly area stimulated by the climatic shock of the flooding confronted Jajele's concerns of shrinkage to the grazing area should they allow Makanne to frequent or settle in the area. On this, Jajele herder says:

Our Makanne brothers used to flee towards our territory when the river flooded. We did not have any problem with that. But later on, they started settling there permanently. We cannot allow that. If we do, our livestock will not have pasture over there.

Al-Shabaab (AS) intervened in the conflict, summoned the elders of both sides, and facilitated negotiation between the two. With the sway of AS, the parties have agreed to compensation for the loss each has inflicted on the other, especially blood compensation for anyone killed by the rival. Furthermore, informants from both Jajele and Makanne confirmed that AS burned all settlements in the disputed area and warned against establishing any permanent settlements there, which both sides heeded.

This halted the direct conflict between the sides but did not address the root causes of the problem: the more flooding recurs, and Makanne flees to the hilly area, the likelihood of getting attached to that area, which will inevitably disappoint the Jajele. Furthermore, a loose land tenure system with different versions by herders and farmers and clan institutions' call for revenge and collective security are also contributing factors that AS sanctioned measures did not address. Thus, such measures are palliative, whose effect depends upon AS being effectively active in the area and committed to maintaining that momentum. Even then, it might become challenging for AS to maintain the status quo in case of severe climatic shock, and that underlines the importance of addressing the root causes rather than the symptoms.

3.3 Climate-Induced Conflicts in Matabaan Area

Matabaan is about 75km to Beledweyne towards the north on the Main Road that connects Mogadishu to the eastern and northern parts of Somalia. Administratively, Matabaan is a district of Hiiraan Region head quartered at Beledweyne. Different subclans of Cayr, and Habargidir, predominantly populate the town, while Hawadle subclans populate parts of the surrounding areas. Both Hawadle and Habargidir belong to the Hawiye Clan and are predominantly herders. Different subclans of Habargidir have conflicted with different subclans of Hawadle at various locations in the Matabaan area for more than a century, according to an elderly informant. Though conflicts have multiple triggers and pre-texts, many involve disputes over water, territory or/and grazing.

For instance, Hees is a tiny village with hand-dug wells populated by Ali Madahwayne of Hawadle. On the opposite side, Habar-aji of Ayr – Habargidir populate Qod-qod village. Between the two, there is about 40km of grazing land, which, according to the customary land tenure system, is supposed to be a common grazing area for the subclans on the sides – Habaraji and Ali-Madahwayne in this case. Nevertheless, Ali-Madahwayne men started making Berkad in the middle of the grazing area between the subclans somewhere called Baanyaaleey five years ago. Disappointed with what they saw as Ali-Madahwayne expansionism, Habaraji launched an attack and destroyed the Berkad made by Hawadle, according to two informants. One of the informants stated that:

> *Subclans worry for the pasture and water available for their livestock and people whenever another subclan or individual from another subclan changes a common grazing area into a farm, water point or settlement. That will mean such subclan will control that area and reject any other subclan of access to the water and pasture in that area. It means ownership by such clan.*

Per the informants, Habar-aji did the same to Berkado made by Ali-Madaxwayne in Ceel-jiqood, which is not far from Baanyaaleey.

Another example is the Xajiin Farayare, which saw a bloody conflict between Agoon of Hawadle and Habaraji of Cayr in 2020. Xajiin Farayare is a grazing area 12km from Matabaan toward the south. At about 12km on the west, there is Coomaad populated by Agoon, and on the east, there is Qod-qod occupied by Habaraji. One FGD showed Xajiin Farayere was a grazing area common to both subclans before Agoon families moved to it and settled. Disappointed with the new settlement, Habar-aji men sneaked in and killed an Agoon man. One of the informants recalled that to assuage the tension, Habaraji elders approached the aggrieved Agoon elders informing their readiness for negotiation to settle the tension by addressing both the murder and its antecedent – i.e., Agoon families' settlements in Xajiin Farayare – and the two sides agreed to meet after 3 months. However, unexpectedly, Agoon settlers started digging Berkado in the area before the lapse of the three months. Habar-aji attacked and killed a few of their men in response to this development. AS intervened in the matter, ordered blood compensation for those killed and destroyed the Berkado in Xajiin Faryare.

Moreover, AS proscribed the creation of any Berkad in Xajiin Farayare and prescribed each side's right to live in the area. Pursuantly, Xajiin Farayare, according to a few informants,

developed into a permanent settlement populated by Agoon and Habaraji. Informants added that due to AS's prohibition of any water points in Xajiin Farayare for conflict mitigation, residents go for water to a nearby (about one and a half to 2km) mini lake known as Lamma Lake. Commenting on the status quo, one of the informants said:

> *I think AS's decree for each side's right to live in the settlement was seen as mutually beneficial. None of the two subclans has lost access to the area.*

Likewise, in 2021 two men from Agoon of Xawaadle who were digging Berkad at Maxad-maroodi were killed by men from Ayaanle of Cayr. In revenge for their two men, Agoon killed two men from Ayaanle. At this juncture, religious scholars of Sheekhaal and Ujeeddeen intervened and started mediating the two sides. Hirshabelle and Galmudug Federal Member States and Zam-Zam foundation joined the efforts, successfully stopped the march from each side, and convinced each side to compensate the other side. Since then, no incidents have been reported, even though critical issues that raised the tension in the first place remain unresolved.

All the above examples have in common the digging of Berkad in a common grazing area as a trigger. Informants from Hawadle and Cayr held construction of Berkad has increased with the increase of the recurrent droughts. Research sponsored by Internal Displacement Monitoring Centre argued that in Somalia, the increase of drought had forced nomadic communities into urban and peri-urban settlements (Ferrández 2020:5), and digging berkad is one way of establishing a permanent peri-urban settlement. Digging Berkad in a grazing area has two implications, at least. Firstly, such an area will attract more people and permanent settlements, which presages less pasture for the livestock. So, herders furious with perceived livestock scarcity tend to react to it. Secondly, the newly established Berkad attracts more people from the subclan that owns the Berkad, which changes the area's status from a common grazing area to a subclan-owned permanent settlement. Such subclan will control both the water and fodder in that area.

Another point all examples have in common is the suspension of direct conflicts, without genuine agreement between the parties, for the last eight months. Most informants attributed this to the recurrent drought that forced families and individuals to focus on survival of individuals and families. Yet, informants agreed that though severe drought might stop sub-clans from going to war, some conflicts are rooted in drought-induced disputes. "As an adaptation to ecosystems in which forage and water resources are critical parameters, transhumant herding largely depends on dry season forage within reach of dry season watering points" (Unruh 1995:2). This makes the meagre water points overpopulated, which increases the rise of disputes on how to use between individuals or groups, and that could quickly develop into clan conflict due to the clannish principle of "hiil iyo hoo" and its in-build culture of revenge.

3.4 Women's lenses in Deefoow and Matabaan Conflict

This section focuses on women as a cross-cutting issue in the Matabaan and Deefoow research. Conflict in the Somali community is indiscriminate and affects all people. Women and children are generally the most affected because they are vulnerable and defenceless;

they aren't in a position to defend themselves. Women have distinct social roles in the Patriarchal Somali Society. The Somali customary system that allocates separate roles and responsibilities to men and women is pervasive in the rural areas and smaller towns such as Deefoow, Matabaan and the surrounding areas where the conflicts have occurred. Interlocutors stated that caring for children and older adults is a significant role for women and girls, which does not necessarily require being a mother. For instance, if an adult brother and sister have a brother who is three years old, it is the adult sister rather than the brother who is expected to take care of the younger brother either single-handedly or with the mother. In addition, the adult sister gives special consideration to the adult brothers, such as washing their clothes and dishes, preparing food for them, etc. Women also assume the roles of milking cows and goats, making makeshift houses, wavering, and crafting.

In contrast, men are expected to be the breadwinners, and their roles include herding, farming, and defending the subclan. As such, the number of hours women spend at home is usually more than that of men, which means when a settlement, village or town is attacked in a surprise, the probability of women experiencing that attack usually is higher than that of men. In other words, as such roles restrict women's mobility to the house, it exposes them to greater risk whenever the houses are attacked, similar to what happened to one of our informants from the Deefoow area, where villages were burned several times. Describing how horrible the situation was for her, a female informant from a Makanne village that Jajele has burned said:

> *Due to the horrible experiences I had in the absence of my husband, I could not have the gut to return to the village even when everyone else returned there after the conflict was settled.*

Fetching water from the water points – i.e., from the river in the case of the Deefoow area and Berkad, well, or lake in the case of the Matabaan area – is another role usually assumed by women and girls. Informants highlighted that such water points are outside the village's settlement and might involve long walks, sometimes, through the disputed territory. Moreover, water points are the subject of dispute in some conflicts, which exposes women and girls to more risks. Women are not armed, trained or prepared to defend themselves, making them soft targets. Moreover, the traditional Somali warfare that used to spare women and girls is fragmented, where targeting women as part of the war, sometimes rape as a weapon of war, has been recorded in different parts of Somalia (Sidra 2019). Even though informants have not recalled a single incident in which women were targeted due to clan conflict, female informants argued that fetching water from a distance makes women vulnerable to abuses from the hostile clan. In one of the all-female FGDs, one of the discussants said:

> *I feel scared whenever I walk out to fetch water from the areas close to Cayr territory. I would not feel that if our Hawadle subclan is in good relationship with Cayr.*

Another female participant in a different FGD argued that,

> *When subclans are in a good relationship, they respect each other. In that case, even if some of the youths try to do something bad to a woman, other members of the same subclan will stop them; but this is not the case when there is conflict.*

From all-female FGDs, it was clear that when conflict happens, the role of women expands. For example, they serve male fighters as an emergency worker by treating the wounded and preparing food for the fighters. Another role women and girls assume is encouraging men to show bravery through traditional dancing and singing during the conflicts. In addition, women and girls also assume roles that are otherwise done by men, such as farming, shopping, etc. However, despite their active role in both conflicts and family or community works, as well as being victims of the conflict, women and girls are hardly given a role in peace talks. Though international and local NGOs try to accommodate women and girls, this does not hold in local communities in Deefoow and Matabaan areas, according to the informants from both areas.

4. Conclusion and Recommendations

In any conflict, no matter how small it is, multiple causes mutually reinforce and contribute to the construction of the conflict situation. Primary among factors that fuel conflicts, either as an underlying cause or intervening cause, are the resources (Joeng 2000:87; Partos & Wehr 2000: 30). Most resource conflicts have a vital dimension of territoriality simply because if a resource is worth fighting for, it is most likely attached to the territory. As observed in the above sections, Matabaan and Deefoow conflicts have causes relating to resources attached to territories such as water, farms, and pasture. KII and participants of the FGDs contend that climate change makes such resources continuous and sparks sub/clan conflicts in Deefoow and Matabaan more than any other factor. For instance, escape from the river flood by Makanne forced them to make settlements in grazing areas, which inspired fear of scarcity among the Jajele Herders, and developed into open conflict. Likewise, each of the droughts motivated Hawadle man's trespass to the Surre man's farm and the dramatic increase of Berkad as a strategy for tackling drought has led to clan conflicts.

The study has also found that climate change interlaces with other factors to construct the conflict situation. Among such factors are the weak government system, land tenure system with less clear rules and the clan institution with its inbuilt culture of revenge dictated by the principle of "hill iyo hoo". Though violent conflicts negatively impact all those experiencing it, the study learned that Matabaan and Deefoow conflicts left more effects on women and girls due to their roles and responsibilities in the society dictated by the traditional system.

Finally, the study has found that there have not been clashes for the last eight months in Deefow and Matabaan areas, partly because of the droughts that subjugated subclan members to focus on the survival of their families and their livestock. In addition, some conflicts stagnated because of the intervention of AS, while others stopped after uluma and

elders intervened. Yet, the root causes of the conflict, most of which are ecological, are not addressed, and that portends conflicts to re-appear. Therefore, to avoid the recurrence of the conflicts and to foster peace, we recommend the following measures:

- Support inclusive and consultative community dialogues forums aimed at restructuring the traditional land tenure systems and natural resource utilization in tandem with the prevailing climatic changes.
- To devise development projects to address the effects of climate change and build community adaptability and resilience, including drought monitoring, early warning systems and capacity-building schemes.
- Further research on the Somali traditional land tenure system, its interaction with the notion of clanship and how the two coalesce to contribute to clan conflicts.
- Institutionalization and harmonization of land tenure reforms across neighbouring communities / Districts and States.
- Develop bespoke programmes for women and other community members impacted uniquely by climate-induced conflicts.

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Annex E: Digital Discourse Analysis Report

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Table of contents

Introduction 3

1. Research Approach 3

2. Results 4

Overview 4

2.1 Results Part One 5

2.2 Results Part 2: Posts and articles that did not mention conflict 14

2.3 Summary 18

3. Key Findings and Policy Recommendations 19

3.1 Themes 19

3.2 Reactions 20

3.3 Sentiment 20

3.4 Who is contributing to the conversation? 20

3.5 Policy Recommendations 21

4. Conclusion 22

Glossary of Terms 23

Bibliography 23

Introduction

The digital component of this research examines the ways that conflict and climate change are discussed online in Somalia and whether a link can be observed between the two. We used Pulsar – a social media and online content listening tool – to identify relevant data. The findings of this research are presented below. They address the following: 1) the themes found in online conversations; 2) their sentiment; and 3) who is contributing to online conversations.

This digital report is structured as follows: 1) a brief description of the research approach; 2) presentation of the results; and 3) an overview of key findings, which provides a summary of the results and policy recommendations.

1. Research Approach

This research attempts to identify online discussions around the relationship between conflict and climate change in Somalia. To obtain relevant data, we created a Boolean expression using a set of keywords and phrases related to the climate-conflict nexus in Somalia. This expression (shown in figure 1) aimed to ensure that results retrieved via Pulsar referenced climate change and conflict. As can be inferred from the image of the expression in figure 1, Pulsar returned posts that contained any of the terms in the first bracket (i.e., climate-related terms) *and* any of the terms in the second bracket (i.e., terms related to conflict). Words in the "AND NOT" bracket were excluded because they generated irrelevant results. To guarantee results related to Somalia, we gathered location-specific data and included Somali translations of key words. We pulled data from Twitter, Facebook, and online news sites. Other sites like Reddit and Instagram were excluded due to a lack of relevant data.

BOOLEAN EXPRESSION

("Drought" OR abaar OR "Delayed Rains" OR "Roobka oo daaha" OR "Flooding" OR "floods" OR flooded OR "Daad" OR "daadad" OR "Dry" OR "parched" OR "Qalayl" OR "omas" OR "Locust" OR "Ayax" OR "Damage to crops" OR "Dalagga oo halaaba ama wax yeelooba" OR "Extreme weather" OR "Jawi qalafsan" OR "Disease outbreaks" OR "Xunuun ka dilaacay" OR "Grazing land" OR "Dhul daaqeen" OR "Pasture" OR "Daaq" OR "wells" OR "Ceelal" OR "lake" OR lakes OR "haro" OR "Short rains" OR "autumn" OR "Deyr" OR "Long rains" OR "Spring" OR "gu" OR "Dry season" OR "Jilaal" OR "Climate change" OR "Isbedelka cimilada" OR cimilada OR "Natural resource" OR "kheyraadka dabiiciga ah" OR "WATER SCARCITY" OR shabelle OR livestock OR xoolaha OR "food insecurity" OR famine OR water OR biyaha OR hunger OR gaajo OR disaster) AND ("Conflict" OR "Isku dhac" OR "Displacement" OR "Bara-kac" OR "Violence" OR violent OR "Dibindaabyo" OR "Loss of livelihood" OR "Waayis quutu-daruuri" OR "Refugee" OR "IDPs" OR "Qaxooti" OR "barakacayaasha gudaha" OR "Territorial dispute" OR "Muran deegaameed" OR "Rivalry" OR "Iska soo horjeedis" OR "Internal migration" OR "Ku hayaamid dalka dhexdiisa" OR "Increased poverty" OR "Busaarad korodhay" OR "war" OR "Revenge" OR "Aar-goosi" OR "Asylum" OR "Magan" OR "Blood compensation" OR "Mag" OR gender OR Women OR "Women's" OR child OR haweenka OR ilmahaaga OR dagaal OR peace OR nabad OR "WPS" OR "Women Peace and Security" OR "People with disabilities" OR PWD OR "Youth peace and security" OR combatant OR terrorist OR terrorism OR terrorists OR argagixisada OR argagixiso OR extremist OR extremism OR Extremists OR "Al shabaab" OR "Al shabab" OR insurgent OR insurgents OR insurgency OR separatist OR separatists OR "Somali conflict" OR "Somalian conflict" OR "Somali war" OR "Somalian war" OR dagaal OR fighting OR instability OR rebels OR militias OR militia OR "armed group" OR "armed actors" OR "security risk" OR skirmish OR hirshabelle OR peacebuilding OR geopolitics OR flee OR fleeing) AND NOT (putin OR ukraine OR russia OR ukrainian OR russian OR russians OR afghanistan OR tunisia OR bermuda OR ukranians OR yemen) AND (LOCATION SO)

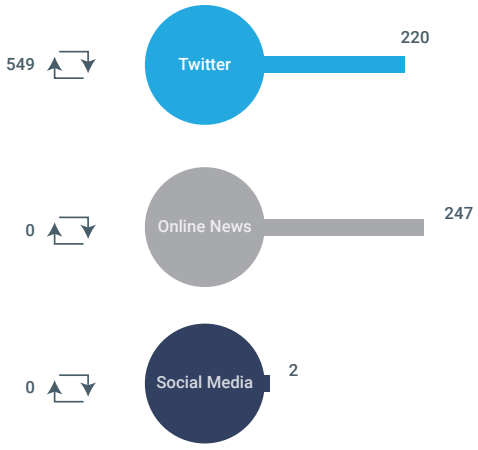
Figure 1: Image of boolean expression used in the analysis (Note: Quotation marks were sometimes automatically added by Pulsar but their presence does not make a difference to the results).

We analysed the results[1] from various perspectives. First, we examined where conversations around conflict and climate change were taking place (i.e., on which websites and social media platforms). We then investigated whether these conversations were taking place in Somali or English. After which, we examined the content of these conversations and identified common themes. We then used Pulsar's sentiment tracker to analyse their sentiment. Finally, we looked at who is contributing to the conversations. Key contributors generally fell into one of the following categories: local news agencies; individuals (twitter accounts belonging to individuals/ private citizens rather than organisations); international organisations (intergovernmental organisations and global charities, such as the UN); local/ grassroots civil society organisations (non-profit citizens' groups working at the local level).

2. Results

Overview

Figure 2: Volume of results by site (@ symbol refers to twitter, lightening bolt refers to online news, and "friends" symbol refers to social media).



Sites: The search produced 1,018 results (results refer to the combined number of tweets, retweets, news articles, and Facebook posts). Most results came from Twitter, with 220 tweets and 549 retweets.[2] News articles followed with 247 results, almost all of which were from local news agencies. Just two results came from Facebook, where international organisations had posted about their activities in Somalia. Our research therefore indicates that Twitter is the most popular platform for discussing climate change in Somalia, closely followed by local news agencies.

Language: Almost all results were in English rather than Somali. Twitter and Facebook did not feature any Somali-language posts. Local news articles were occasionally in Somali.

"Climate-conflict results" versus other results: Of the total 1,018 results, just 92 mentioned conflict and its relationship to climate change in Somalia. The remaining 926 results did not mention conflict. Instead, they focused on the impacts of climate change – especially drought – on displacement and women.[3] In the first part of the digital research presented below, we provide a detailed analysis of the first group of results (i.e., posts and articles that mentioned conflict and its relationship to climate change), while the second part provides an overview the latter group (i.e., posts and articles that did not mention conflict, but instead drew attention to drought, displacement, and women). We decided to divide the results in two and analyse them separately because content that discussed the relationship between conflict and climate change was the most relevant to the overarching research

1 Results were collected for a total of six weeks, from 00:00 on 28/02/22 – 23:59 on 11/04/22.
2 "Retweets" refer to the number of retweets alone. Note that "retweets" does not include comments on tweets.
3 Posts about the impact of climate change on women were primarily created to commemorate International Women's Day, which fell during the search period.

aim of the project: to understand the relationship between conflict and climate change in Somalia. As such, posts and articles that mentioned conflict required in-depth analysis. Posts and articles that did not mention conflict were also captured by Pulsar owing to the nature of the Boolean expression but were seen as less relevant (although connected) to the overarching research aims. As such, we did not view them as requiring an in-depth analysis.

2.1 Results Part One: Posts and articles that mentioned conflict (climate-conflict results)

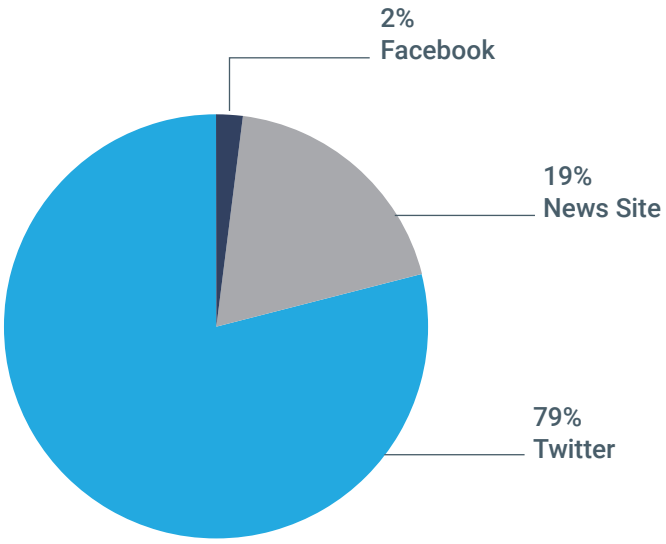


Figure 3: Pie chart showing volume of climate-conflict resluts by site

As discussed above, this section will examine only those posts and articles that mentioned conflict and its relationship to climate change in Somalia. As stated, of the 1,018 results, just 92 mentioned conflict and its relationship to climate change. These comprised 41 Twitter posts, 59 retweets, 9 news articles, and 1 Facebook post. The small number of posts suggests that the connection between armed conflict and climate change in Somalia is not widely discussed online. From here on, these types of results will be referred to as "climate-conflict results." Below, we examine climate-conflict results by examining their themes, reactions (i.e., the types of posts gaining the most interest), their sentiment, and who is contributing to their creation.

2.1.1 Themes in climate-conflict result

Climate-conflict results generally focused on one of three themes: 1) the combined impacts of conflict and drought ("impact" in the figure 4); 2) climate change as a driver of conflict; and 3) criticisms of the Somali Government and international organisations for their inadequate response to the humanitarian crisis resulting from Somalia's climate-conflict nexus.

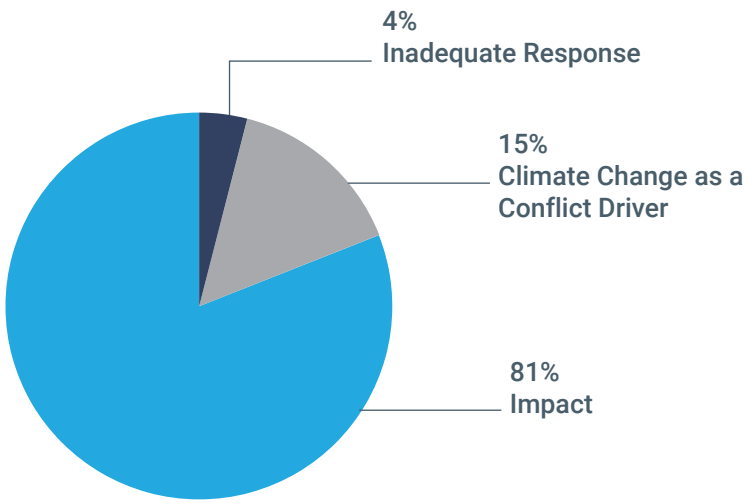


Figure 4: Pie chart showing volume of climate-conflict results by theme

2.1.2 The combined impacts of climate change and conflict

Figure 5: Post highlighting the connections between drought, conflict, and displacement

As shown in figure 4, most climate-conflict results (81% of the 92 results) focused on the combined impacts of conflict and drought (shown as "impact" in figure 4). Many of these articles and posts underscored how drought is exacerbating conflict-related displacement. For instance, UNICEF Africa tweeted about how drought is adding to the total number of people displaced by conflict: "*water is running out in many parts of #Somalia & forcing more families already fleeing conflict out of homes.*" Meanwhile, the government Twitter account representing the Middle Shabelle said that families in Balcad Town have been forcibly displaced by Al-Shabaab and now face scarce resources as they "*flock to the remaining water points of the river Shabelle to collect water.*"

Local news outlets also revealed that conflict is making journeys more dangerous for those fleeing drought; they are forced to cross conflict-affected areas. Hiiraan News interviewed one woman who left her home with her children on a donkey cart to escape drought and had to cross territory fought over by Al-Shabaab and the Government.

Posts and articles that focused on the combined impacts of drought and conflict also revealed that fighting has obstructed aid delivery to drought-affected communities. A local news channel called Allbanaadir said in an article that conflict is making it difficult to deliver aid to some areas of Somalia where it is needed to prevent famine. Wadheer news also noted in an article that humanitarian assistance "will never reach much of the population" because tracts of Somalia are not under government control.

2.1.3 Climate change as a driver of conflict

As shown in figure 4, a small proportion of the climate-conflict discourse in Somalia (15% of the 92 climate-conflict results) focused on climate change as a driver of conflict. These results showed three ways that drought is driving conflict. First, resource competition is causing inter-communal conflict. Mohamed Mohamud, who is a member of local Qoorleeh charity, tweeted that *"most clan conflicts in Somalia…erupt over access [to] pasture and water."* He then questioned whether the Somali government has *"developed [a] strategy to prevent recurrent conflict mainly [among] herders and farmers."*

Posts that highlighted climate change as a driver of conflict also drew attention to resource competition between displaced people and their host communities. According to ACAPs (a global risk analysis organisation), more than 17,000 people were displaced by conflict in Somalia's Bay Region between February and March 2022. Many of those fleeing violence took refuge in the Gedo, Bay, and Banadir regions, where *"both IDP & host pop are facing high levels of #food insecurity due to #drought."* Hiiraan Online also wrote that, *"as displacement increases and natural resources including water and pasture dwindle, conflicts have already begun to occur between different groups."*

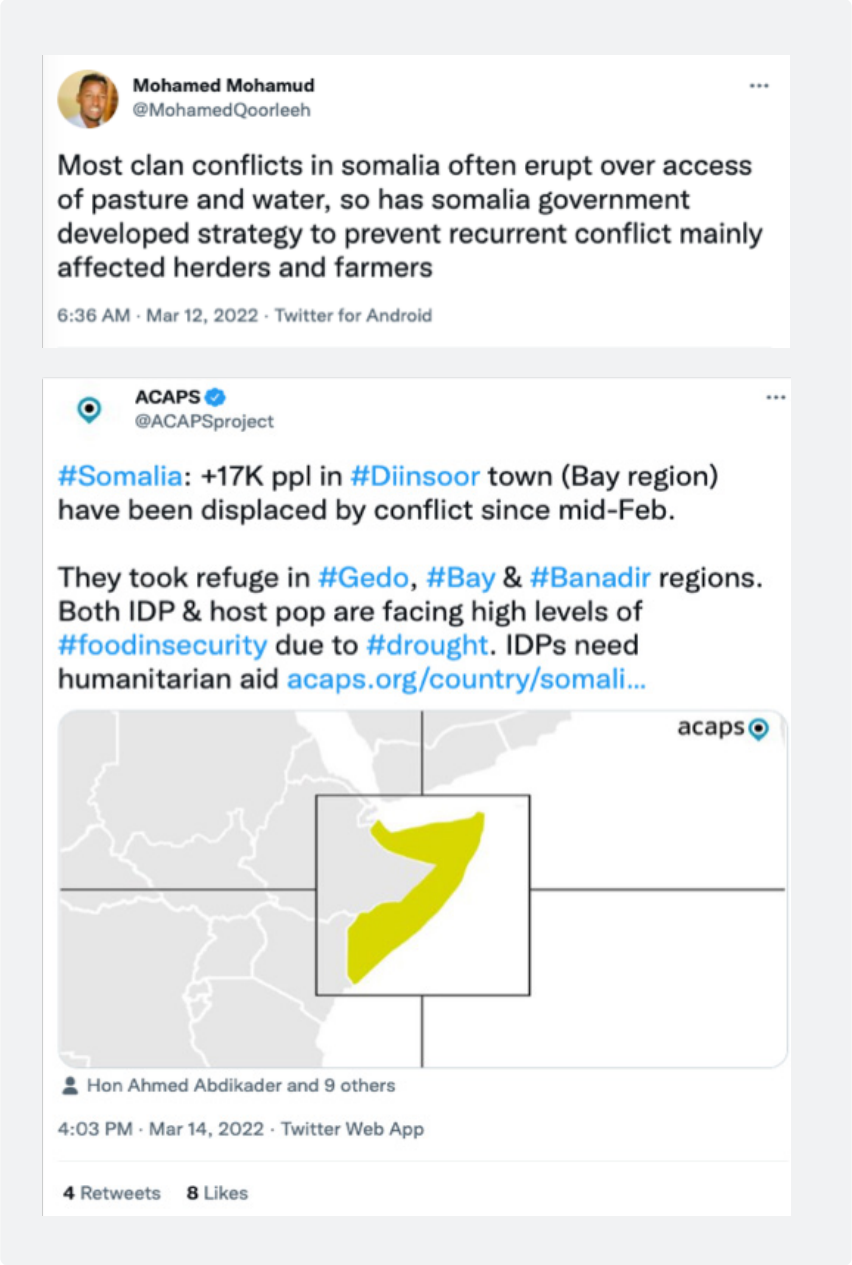


Figure 6: Posts linking resource competition to conflict

Online conversations hinted at another way that climate change is driving conflict in Somalia: armed forces and combatant groups are gaining support by distributing aid to drought-affected populations. Somali news sites like Radio Dalsan and Garowe Online reported that Kenyan Defence Forces (KDF) operating in Somalia had distributed foodstuff, medical supplies, and water to residents in Tabda. In exchange, residents pledged to support the KDF against Al-Shabaab.

Al-Shabaab have been employing similar tactics; the Somali Guardian tweeted that "*Al-Shabaab armed group says it has distributed aid to drought-affected residents in villages near the town of Balad-hawo, Burdhubo, Luq and Dolow in South Somalia's Gedo region*." One user based in Banadir called Rahma Dahiir – who does not have any credentials in their bio but appears to be female – criticised Al-Shabaab's aid delivery. She commented that Al-Shabaab is "*spreading fake news to improve their image*." However, others expressed

anger towards Somalia's government and asserted that Farmaajo, Somalia's president, is in league with Al-Shabaab. For example, a young male user with unknown credentials commented that "*Farmaajo and Al-Shabaab are a mass of corruption.*" A female physician commented that "*Farmaajo needs to be tried for his crimes against the Somali people and his support for alshabaab [sic].*" Responses show anger towards both Al-Shabaab and the government and a belief that they are working together.

Figure 7: Tweet about Al-Shabaab aid delivery and the responses

2.1.4 Inadequate Response

Finally, a small proportion of climate-conflict results (4% of the 92 results) criticised Somalia's government as well as international organisations for failing to address the humanitarian crisis caused by Somalia's climate-conflict nexus. Several users criticised the government for prioritising the 2022 elections over combatting Al-Shabaab. In a now-deleted tweet, one well-known Somali researcher who co-founded the Heritage Institute for Policy Studies said, "*citizens are dying [of] hunger*" and "*Al-Shabaab roam with impunity*" all while "*millions are spent on vote-buying and [the president] deployed troops to Baladweyne & his critics are being murdered there.*" His tweet concludes "*this man [the president] has ruined #Somalia.*" Similarly, a female Mogadishu-based social media influencer accused Somalia's president of "*redeploying troops from frontlines to the territories of his political opponents*," allowing Al-Shabaab to roam freely. Her tweet also claimed that limited funds have reached drought-affected communities in Gedo because "*10M USD was used to deployed troops to rig elections.*" In another tweet, a Nairobi-based analyst who works at the Fellow Rift Valley Institute noted that the Somali government "*lacks resources [and the] means to respond*" to ongoing issues like "*chronic conflict, instability, collapse of livelihood systems*" as *"long-delayed & bitterly divisible polls proved [a] huge distraction.*"

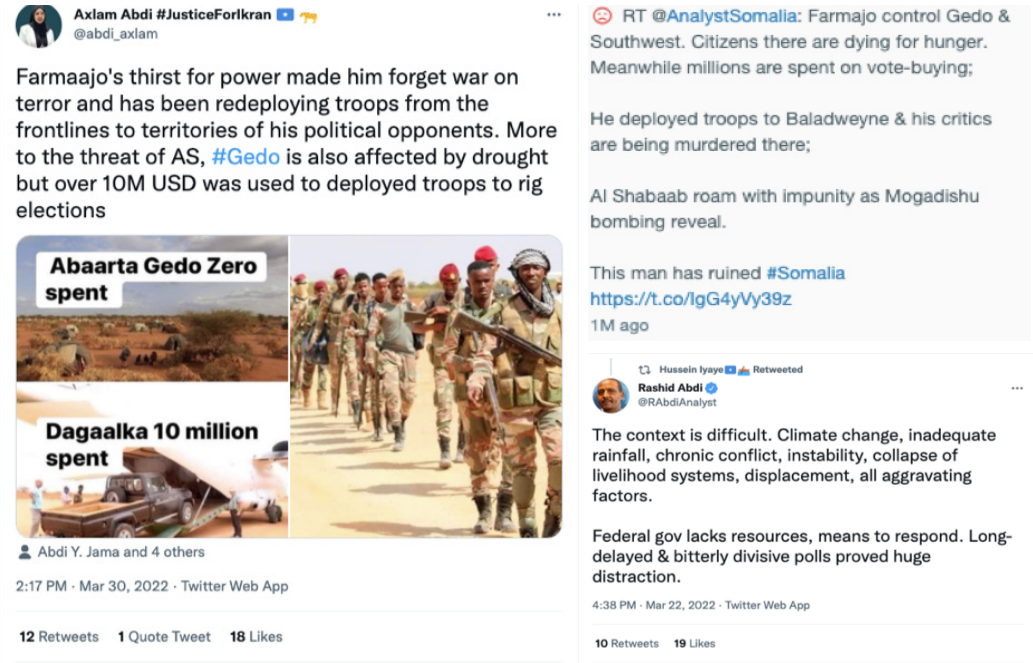


Figure 8: Criticisms of the government for inadequate reponse

International organisations also came under fire for failing to respond to the humanitarian situation caused by the climate-conflict nexus. Several tweets from international organisations about the combined impacts of drought and conflict were met with backlash. Users commented that funds sent to international organisations do not reach local communities and that international organisations have failed to implement real change. For instance, one Somali-based user with no credentials or personal information, commented on a UN tweet, saying: "*do not FUND THE UN and help Somalia directly if you want…less than 1% of funds have reached the Somali people. The UN Organs have systematically lied, looted and spent donor funds in Nairobi and elsewhere.*" Another user without any credentials or personal information commented on a UN tweet, "*Evil NGO's [sic] doing their best taking pictures of doing nothing for those people, why didn't you dig water wells and take pictures of those wells? Evil NGO's collect billions and do nothing at all except take pictures.*"

Some criticisms of international organisations were less impassioned and more constructive; one grassroots organisation named NAI Somalia urged USAID to adopt a holistic approach to addressing climate change and conflict in Somalia. More specifically, the organisation encouraged USAID to work towards "*addressing the symptoms rather than the problem*" because "*the linkages between anthropogenic climate change cannot be adequately addressed with humanitarian relief alone.*" Instead, they should follow "*a nexus approach that encompasses humanitarian efforts, peacebuilding and ecosystem restoration…to effectively combat the impact of climate change.*"

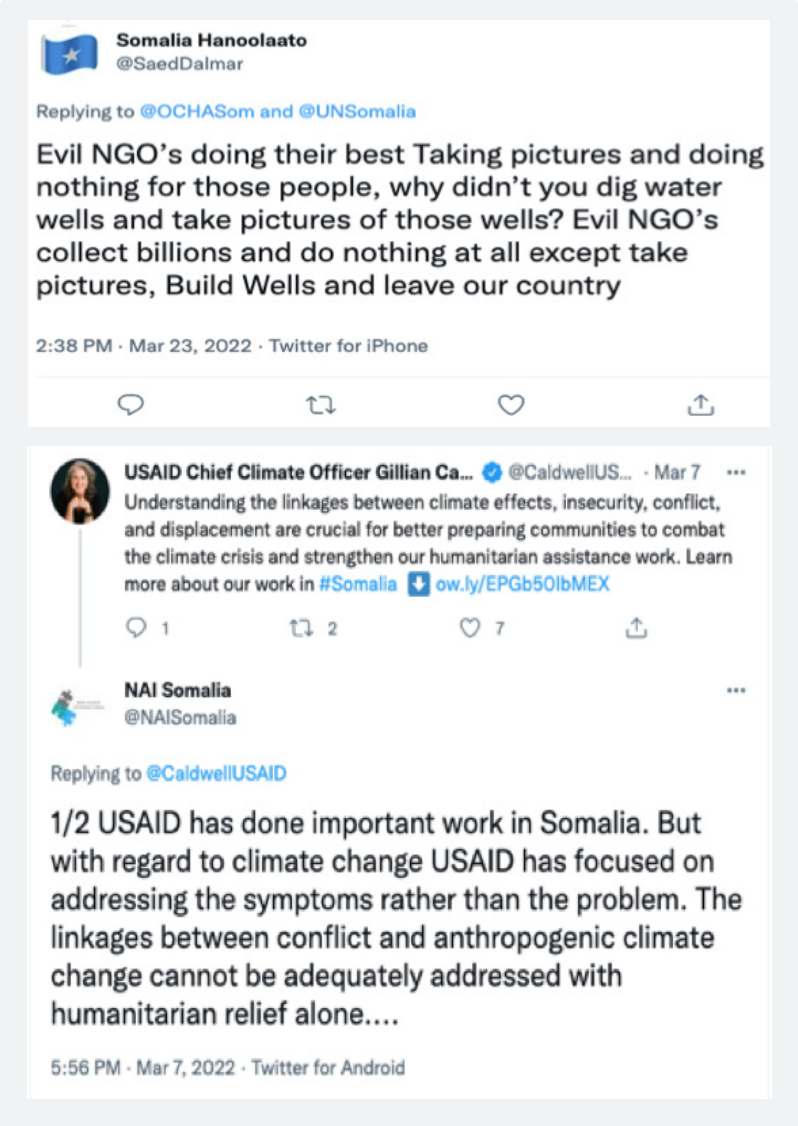


Figure 9: Posts crticising international organisations

It is also worthwhile noting that one Somaliland-based user with unknown credentials appeared to praise Al-Shabaab for delivering aid to drought-affected communities in the face of limited government and international assistance. The user commented "*looks like al shabaab is doing more than [illegible] combined for these helpless people*."

Figure 10: Commenting hinting at support for Al-Shabaab

2.1.5 Reactions

We assessed which types of climate-conflict posts gained the most reactions by ranking them according to the number of times they were shared or retweeted. Local news agencies appeared to attract the most attention, with articles about how conflict is creating food insecurity shared the most out of all climate-conflict results. An article by local news agency, Allbanaadir, about how conflict is making the risk of famine more likely was shared more than 9,000 times. All articles that mentioned conflict were written in English. Other posts that received significant attention were tweets by international organisations with large followings, like IOM Somalia and UNICEF. Often these tweets were about the combined impacts of conflict and climate change. Tweets created by individuals received the least retweets, which is unsurprising given that these accounts had far fewer followers than international organisations. Interestingly, however, individuals' tweets that criticised government inaction attracted

2.1.6 Sentiment

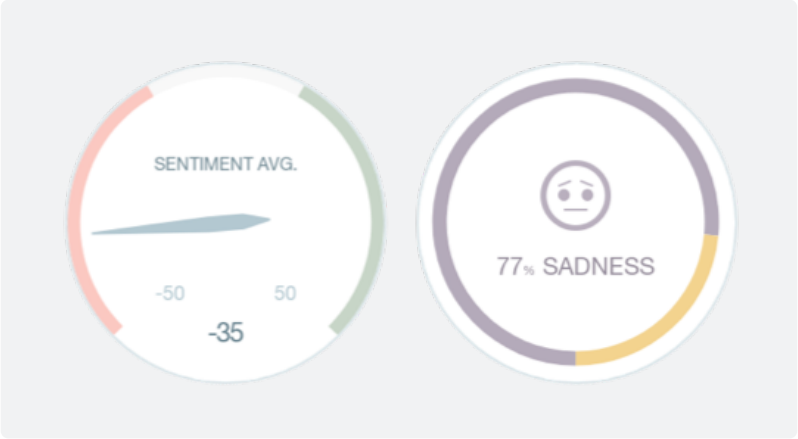


Figure 11: Overall sentiment of climate-conflict results according to Pulsar

Figure 11 illustrates that 77% of climate-conflict posts were classed as "sad," and 82% considered "negative" by Pulsar. Pulsar calculates sentiment using an algorithm that looks for words in posts with an explicitly positive or negative meaning, such as "good" or "bad" (Maruta, n.d.). In cases where such a word is not available, the algorithm will record the sentiment as neutral. However, Pulsar's use of natural language processing can lead to false results. That said, most climate-conflict posts can indeed be considered negative because they emphasised the cumulative effects of drought and conflict. Humanitarian organisations and aid workers were particularly active in using negative language to draw attention to the combined impacts of drought and conflict on local populations to appeal for aid. Anger was commonly expressed among users who criticised leaders and organisations for failing to alleviate the humanitarian situation. Posts classed as "positive" tended to be tweets by humanitarian organisations about the steps they were taking to provide emergency assistance.

2.1.7 Who is contributing to the discussion?

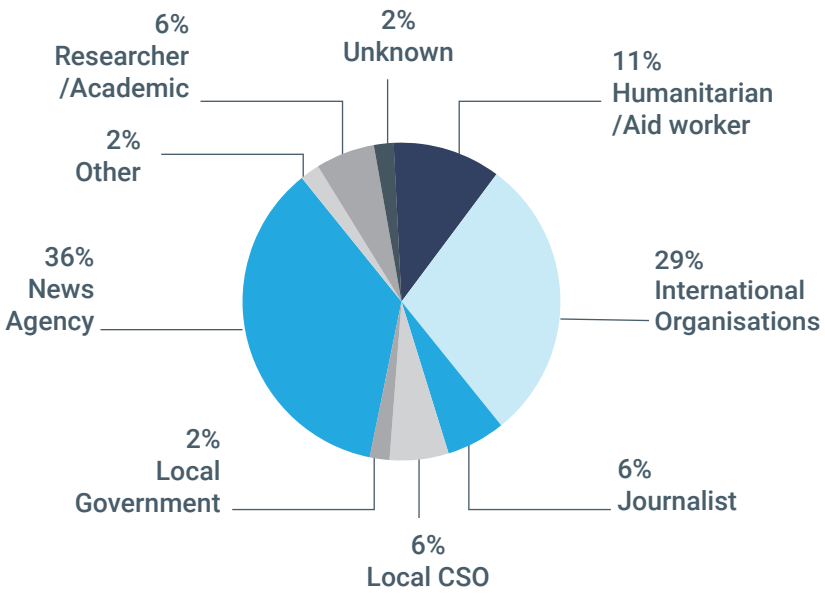


Figure 12: Contributors to the online conversation around conflict and climate change in Somalia (by volume of posts)

1. Local News Agencies: As demonstrated in figure 12, a considerable proportion of climate-conflict content (36% of the 92 results) could be attributed to news agencies, almost all of which were based in Somalia. These included Radio Dalsan, Wardheer News, and Qaran News.

2. Individuals: Individuals – accounts belonging to a person, rather than an organisation – made up the second largest group of those discussing the climate-conflict nexus in Somalia. Individual posters primarily consisted of aid workers, journalists, researchers, and academics. Almost all individuals were based in Somalia and appeared to be of Somali nationality. As shown in figure 13, most individual posters were male.

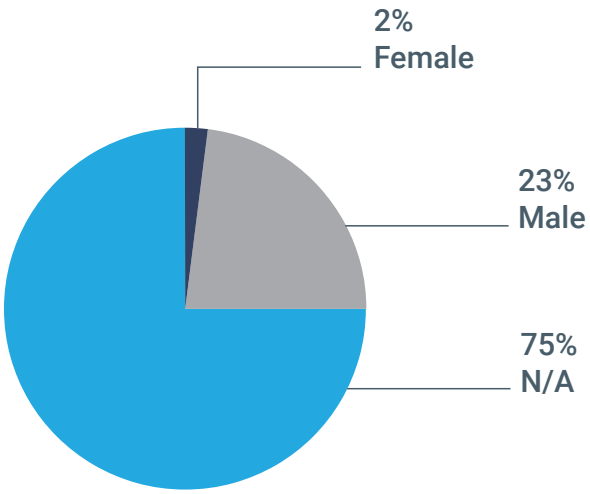


Figure 13: Twitter accounts by gender

3.International organisations: As demonstrated in figure 12, international organisations were the third most common contributors to the discussion around conflict and climate change, having authored 29% of climate-conflict posts. Of these, UN bodies, like IOM and UNICEF, were the most prolific posters.

4. Local Civil Society Organisations (CSOs): Local CSOs contributed less climate-conflict content than news agencies, individuals, and international organisations. Just 6% of climate-conflict posts could be attributed to local CSOs. Local CSOs that participated in the discussion tended to be development and peacebuilding organisations, like NAI Somalia and MAANSO Peace Centre. It is worthwhile noting that local organisations appeared to have a better grasp on the complexities of the climate-conflict nexus in Somalia than international organisations; as already discussed, local CSOs criticised international organisations for overlooking the causal links between conflict and climate change.

2.2 Results Part 2: Posts and articles that did not mention conflict

Below, we review results retrieved using Pulsar that did not mention conflict, most of which focused on the effects of drought on displacement and women. As discussed above, we decided to explore these results separately because they were seen as less relevant to the overarching research aim and, as such, we did not feel they required in-depth analysis. Results that did not mention conflict formed the bulk of data retrieved by Pulsar (926 of 1,018 results), which suggests limited interest in the relationship between climate change and conflict. As with the previous section, we explore results that did not mention conflict in terms of their themes, reactions, sentiment, and contributors.

2.2.1 Themes

In general, posts and articles that did not mention conflict focused on one of two themes – drought as a driver of displacement and the impact of drought on women.

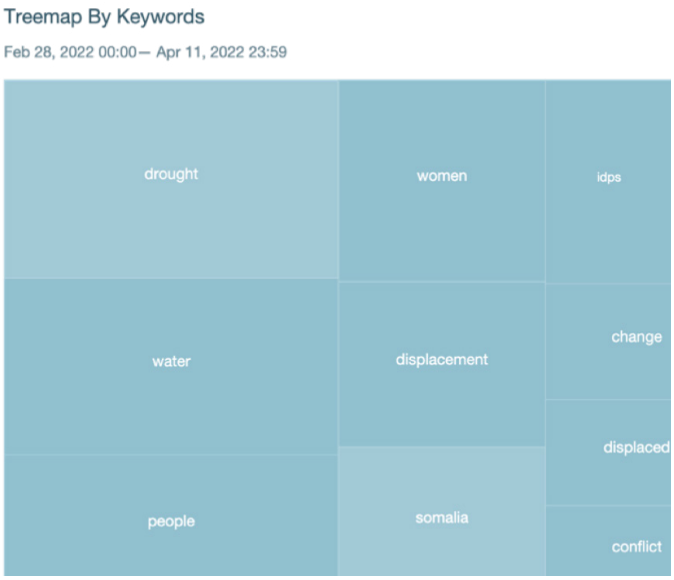


Figure 14: "Treemap" showing commonly mentioned words across all 1,018 results (larger boxes indicate higher volume of mentions)

2.2.2 Drought & Displacement

As shown in figure 14, "drought" occurred most frequently, featuring 250 times across all 1,018 results. Water came after, with 223 mentions. Interestingly, no posts mentioned flooding or floods, which might be because the data was collected outside of Somalia's rainy season. Most drought- and water-related posts focused on the current displacement crisis caused by drought. In March, a foreign aid worker based in Somalia called Liam Kelly noted that the country's "*displacement camps are coming under intense pressure with more than 300,000 people leaving their homes in search of food and water so far this year*" due to the current drought being the "*worst in decades*."

Figure15: Post about drought-induced displacement

Posts also highlighted the places and people that have been worst affected by drought. According to the Danish Refugee Council, the Southwestern Bay region has been severely affected, as *thousands of families"* from the region have now fled to the Capital. A local development organisation, DEH Somalia, tweeted about how pastoralists have been badly impacted; they have been forced to *"travel with their animals in search of pasture"* and must flee to towns and IDP camps when they run out of water and/or when their animals die.

2.2.3 Women

The word "women" was mentioned relatively often, occurring 158 times across all results. The high volume of mentions occurred around International Women's Day. Many posts focused on how drought uniquely affects women. For instance, SOS Children's Villages Somalia, a grassroots civil society organisation, noted that women and children are at

greater risk of malnutrition due to drought. In addition, “Somali Pageant Girls” – an account that represents Somalia's beauty pageants – commented on how drought is affecting women due to their traditional responsibilities: *"women and girls are responsible for herding small livestock and collecting water. Yet as most water points dried up, they now have to walk long distances in search of water, food and pasture."* Drought has also placed women and girls at greater risk of gender-based violence. A Mogadishu-based CSO called the Centre for Peace and Democracy tweeted that women and girls displaced by drought are at risk of sexual violence at wash facilities in refugee camps. The economic fall-out of the drought has also created obstacles for women's financial empowerment. CARE International observed that 98% of women-led businesses in Somalia reported losses during the drought.

Other posts that mentioned women focused on harnessing their leadership to combat climate change. UNASOM tweeted that women "*can be powerful agents for change*" because they can advance durable solutions to climate change. A male Somali environmental activist tweeted about how "*women play a key role in fighting climate change*" because they "*have the knowledge and understanding of what is needed to adapt to changing environmental conditions and to come up with practical solutions*."

Figure 16: Post about the gendered inpacts of droughts

2.2.4 Reactions

As with climate-conflict results, news articles written by local agencies garnered the most attention. Articles by Allbanaadir about government aid delivery were the most widely shared of all content. Although only a handful of articles were written in Somali, Somali-language articles tended to receive more shares than English articles. As with climate-conflict results, tweets with the highest number of retweets were those by international organisations with large followings like the UN.

2.2.5 Sentiment

Results were primarily negative in sentiment, with 62% classed as "sad" by Pulsar's sentiment tracker. As with climate-conflict results, most posts were negative because they focused on the impacts of drought to appeal for aid. The majority of “positive” posts centred on the successful provision of aid and initiatives to combat climate change.

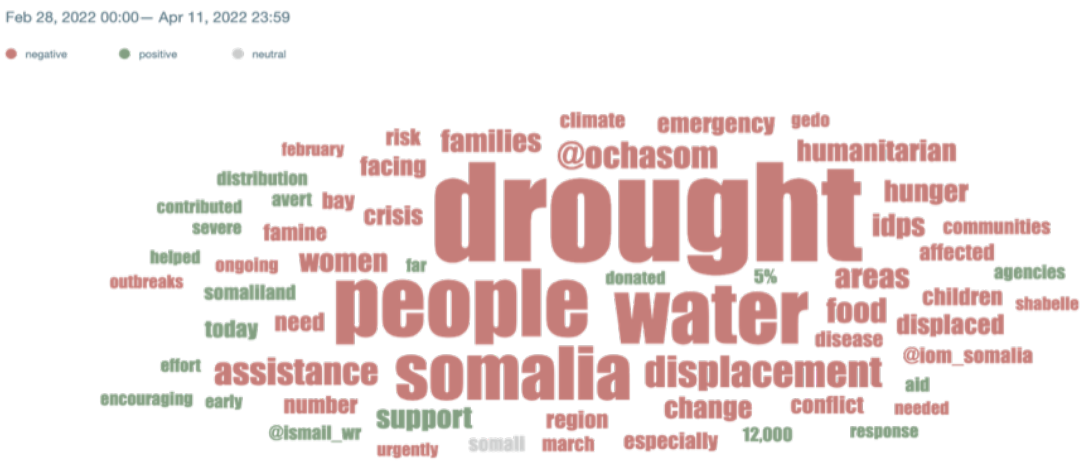


Figure 17: Keywords by sentiment

2.2.6 Who is contributing to the discussion?

Those contributing to the discussion around drought, displacement, and women's rights were similar to the contributors identified in the previous section; they primarily consisted of local news agencies, international organisations, grassroots civil society organisations, and twitter accounts belonging to individual users, such as journalists, humanitarians, and activists, as well as individuals with unknown credentials.

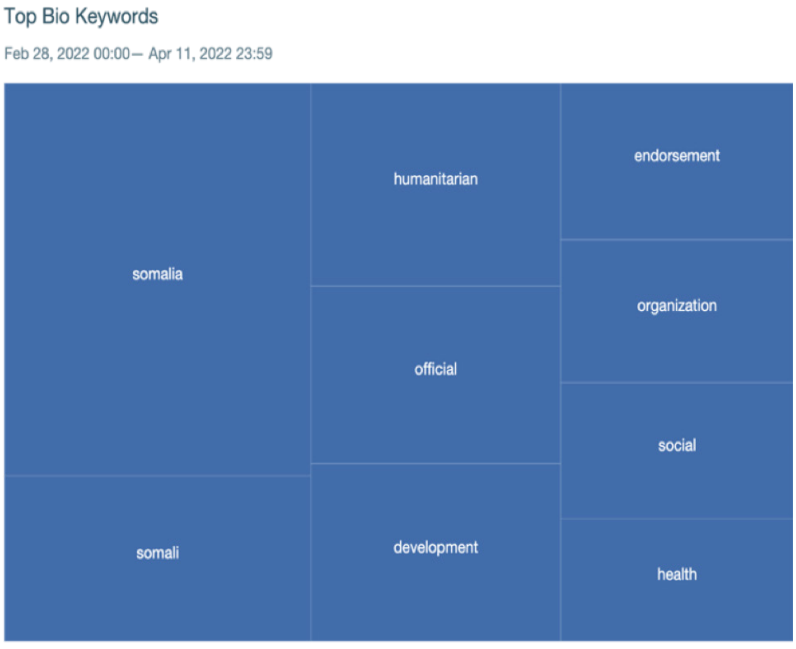


Figure 18: Words commonly found in Twitter bios

Figure 18 depicts the most common words found in Twitter bios, illustrating that those contributing to the discussion around climate change, displacement, and women's rights worked in the fields of humanitarianism, development, and health. "Official" was also commonly listed in bios, implying key contributors included a large number of high-ranking humanitarian workers.

Profiles: Figure 19 shows the demographics of those contributing to the conversation around drought, displacement, and women's rights. Considerably more authors were male (25.3%) than female (5.7%). The description of the primary audience (i.e., those contributing to online discussions) indicates that stakeholders were mostly from Mogadishu and spoke English. The relative frequency with which English was spoken among stakeholders, coupled with the types of jobs they held (discussed above), implies a relatively high level of education.

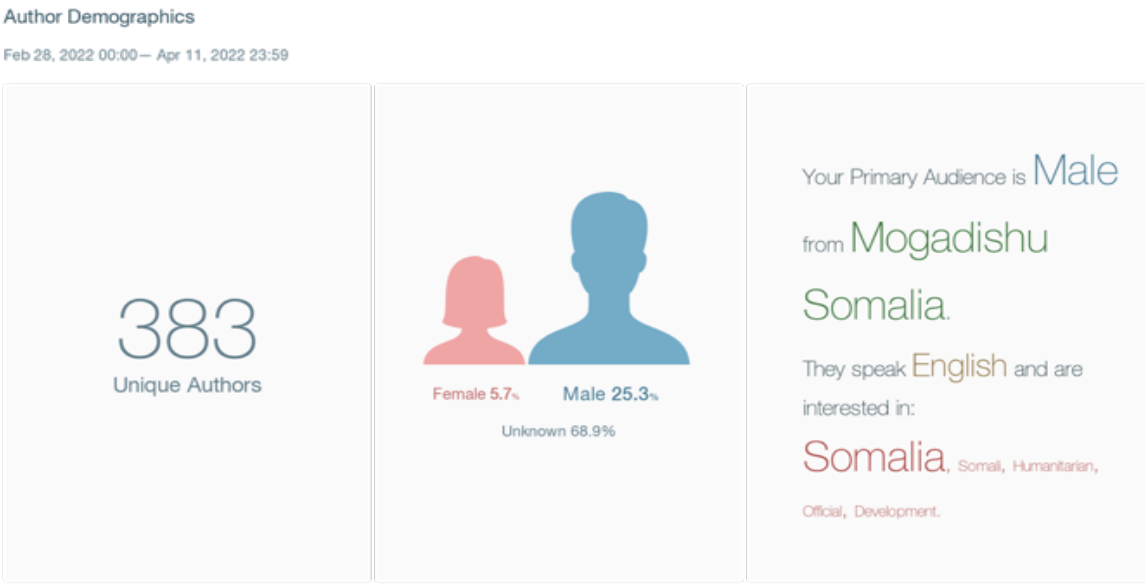


Figure 19: Demographics of those contributing to the online conversation around drought, displacement, and women.

2.3 Summary

This section presented the results retrieved using Pulsar. We began by providing an overview of all results, finding that most conversations around climate change in Somalia are taking place on twitter and local news agencies. We found that most posts and articles are in English, with a handful of local news articles written in Somali.

We provided an in-depth analysis of the results that mentioned conflict and its relationship to climate change. Most climate-conflict results underscored the combined impacts of drought and conflict, particularly on displacement. A small number focused on drought as a driver of conflict, and a handful criticised the Somali Government and international organisations for failing to properly respond to the dual crises of conflict and climate change. We examined the types of climate-conflict content that gained the most attention, finding that articles produced by local news agencies were the most widely shared. Most climate-conflict content was classed as "negative" or "sad," owing to discussions around the negative impacts of the climate-conflict nexus on the humanitarian situation. We also investigated who is contributing to the conversations, finding that key contributors consisted of local news agencies, individuals, international NGOs, and local CSOs. Individual posters were primarily male, spoke English, and of Somali nationality.

In the second part of the section, we examined results retrieved by Pulsar that did *not* mention conflict but instead drew attention to the links between climate change, displacement, and women's rights. Most of these results focused on the impact of drought on displacement. Some results also discussed the consequences of drought on women and the need for empowering them as leaders in the face of climate change. As with climate-conflict content, articles produced by local news agencies received the most shares, especially the small number that were written in Somali. In terms of sentiment, most posts and articles were classed as "negative." Those participating in the discussion included local news agencies, individuals (most of whom are male, educated, and from Mogadishu), and local and international organisations.

3. Key Findings and Policy Recommendations

Below, we present key findings from the results, structured around their themes, reactions, sentiment, and key contributors. This section concludes with policy recommendations.

3.1 Themes

The combined impacts of conflict and drought: In the first section we examined results that mentioned conflict and its relationship to climate change in Somalia. Most online conversations around the climate-conflict nexus in Somalia focused on the ways that conflict – specifically the activities of Al-Shabaab – have exacerbated displacement. For instance, Al-Shabaab have forcefully evicted those affected by drought, making remaining water points more crowded. In addition, clashes between the Government and Al-Shabaab have made journeys more perilous for those fleeing drought. Al-Shabaab have also obstructed aid delivery to drought-affected populations. The latter point is reinforced by intelligence reports about Al-Shabaab targeting peacekeeping and aid convoys during the search period in March 2022 (Agnon, 2022).

Drought as a source of conflict: Online discourse surrounding the climate-conflict nexus in Somalia pointed to three causal mechanisms by which drought has fuelled conflict. First, drought has reduced pasture and water available to agricultural communities, creating competition between pastoralist groups. Second, drought-induced displacement has placed a strain on resources available to displaced and host populations, intensifying competition between these two groups. Third and finally, opposing forces, like Al-Shabaab and the Kenyan Defence Force, have delivered aid to communities affected by drought to gain support and build a relationship with local populations.

Criticism of the Government and international organisations: The Somali Government and international organisations were viewed by individuals and local CSOs as failing to address the humanitarian situation created by the climate-conflict nexus. The Government was regarded as prioritising politics over drought relief and counterterrorism. International organisations were also accused of neglecting to transfer funds to local communities. One user appeared to welcome the fact that Al-Shabaab has helped drought-affected communities, indicating that terrorist groups may attract support if they are perceived as

doing more than the Government and international agencies.

Drought and displacement: Many of the results that did *not* mention conflict focused on how drought is causing widespread displacement, particularly among rural populations who have been forced to migrate to cities amid crop failures and the deaths of their livestock. We also found that far more online content focused on the relationship between drought and displacement than the relationship between drought and conflict.

Women and climate change: How drought is affecting women was another common theme. Discussions emphasised how women are travelling further to collect water, how their economic empowerment has been encumbered by drought, and how drought-induced displacement is forcing them into refugee camps where gender-based violence is rife. There were also discussions around how women's leadership can and should be harnessed to identify durable solutions to climate change.

In addition, we found gaps in online discussions around women and climate change. For instance, most content focused on the gendered impacts of drought, rather than the gendered impacts of conflict. How gender fits into the climate-conflict nexus was also critically overlooked. Moreover, most posts that focused on women and drought were created by international organisations and written in English. As such, the voices of rural women who are affected by drought were excluded from online discussions around their wellbeing.

3.2 Reactions

Articles and tweets by news channels and international organisations received far more shares than content created by individual users and local organisations. Somali-language news articles received a particularly large number of shares. Notably, posts created by individuals that criticised the Somali Government for failing to address the climate-conflict nexus attracted more attention than other posts created by individuals, which could suggest relatively widespread dissatisfaction.

3.3 Sentiment

Most content was negative in sentiment. This is in part because international organisations highlighted the severity of the humanitarian situation to appeal for aid. "Positive" posts tended to focus on initiatives to combat climate change and successful aid delivery. Anger was expressed by those complaining about inadequate Government and international assistance.

3.4 Who is contributing to the conversation?

A small and select pool of stakeholders were found to contribute to online discussions around conflict and climate change in Somalia. These included news agencies, international organisations, local civil society organisations, and individuals. Individual posters often worked within humanitarian or related fields as officials or were journalists, academics, and researchers. An assessment of user profiles reveals that individuals discussing these topics

were typically urban, well-educated, and male. In other words, online conversations are concentrated among urban, elite individuals who are not directly impacted by instability.

3.5 Policy Recommendations

- **Ensure that aid reaches drought-affected communities**: Somalia's Government should ensure that aid reaches rural populations, as well as displaced and host communities. This would help address the combined impacts of drought and conflict on displacement. It would also mitigate resource competition between host and displaced populations and help tackle the exploitation of aid delivery by Al-Shabaab. Beyond this, it would address perceptions that the Government is providing inadequate humanitarian assistance. However, it is critical that aid delivery does not exacerbate conflict – any delivery of aid should be sensitive to the local context and take drivers of conflict into account (Norwegian Institute of International Affairs & Stockholm International Peace Research Institute, 2021).
- **Adopt policies to address climate-related displacement in the long-term**: The Government should consider ways of preventing climate-related migration in the long-term. Possible actions include investing in climate-sensitive crops and increasing funding to rural communities, both of which could prevent future migration and encourage the return of those already displaced (Independent Commission for Aid Impact, 2021).
- **Focus on conflict prevention**: The Government should consider ways of addressing climate-related conflict before it begins. For example, they could monitor climate-related security risks, such as food and water insecurity, resource disputes, and the control of resources by extremist groups. It is also important to monitor rates of violence against women, as an increase in gender-based violence can be a conflict early-warning sign and an indication of heightened extremist activity (O'Reilly, 2015). Monitoring can be conducted with the assistance of grassroots civil society organisations.
- **Work with grassroots civil society organisations to address climate change and conflict:** Grassroots organisations should be supported in addressing climate change and conflict. It is particularly important to engage groups with inclusive agendas, such as youth- and women-led organisations. Supporting these groups would help identify equitable and robust solutions to conflict and climate change; it has been shown that the involvement of women-led civil society organisations in peace processes makes peace more durable (Krause et al., 2018).
- **Include a gender perspective in climate- and conflict-related policies**: It is critical that the government considers the effects of conflict and climate change on women. For example, policymakers should find ways of addressing gender-based violence in refugee camps and ensuring women-run businesses remain open. It is also important to harness the knowledge of rural women in responding to climate change. Women can also be empowered to address violent extremism within their families and local communities (O'Reilly, 2015).
- **Encourage research into the climate-conflict nexus in Somalia**: Limited online content explored the nexus between conflict and climate change in Somalia, while even less considered the role of gender in this nexus. The government should

consider ways of raising awareness around – and encouraging research into – Somali's climate-conflict nexus and how gender intersects with this.

- **Consider new ways of communicating with the public**: The government should harness local news outlets to communicate climate- and conflict-related information as local news articles were found to be the most widely shared content, particularly those written in Somali. The government should raise awareness of the steps they are taking to address drought and extremism; doing so would address negative perceptions of the government's response to drought and conflict. In addition, the voices of drought- and conflict-affected populations should be amplified online to avoid the conversation being dominated by the urban elite. This may also help those affected by drought and conflict feel that their grievances are being listened to.

4. Conclusion

In the digital component of the research, we identified and analysed online discussions around the climate-conflict nexus in Somalia. We found that most of these conversations took place on twitter and local news channels. Online discussions highlighted how drought and conflict are combining to exacerbate displacement; how resource competition and the exploitation of aid delivery by armed groups is driving conflict; and how the government and international organisations are failing to respond to the humanitarian situation caused by the climate-conflict nexus. Discussions also highlighted the rise in drought-induced displacement and the impact of drought on women. Most discussions were dominated by the male urban elite.

Recommendations included addressing some of the immediate and long-term challenges posed by drought and conflict, such as providing aid and investing in long-term solutions to displacement. Recommendations also underscored the need for the government to engage grassroots organisations in formulating equitable and durable solutions to crises. We also recommended finding new ways to communicate with the public more effectively. Finally, we underscored the need to amplify the voices of rural, conflict- and drought-affected communities.

Glossary of Terms

Articles: News articles published by news agencies.
Posts: Messages published in an online forum, such as Twitter or a news site. Excludes replies and mentions.
Results: The combined number of posts and retweets.
Retweets: Retweets alone. Excludes comments on tweets.

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