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EXPLORING THE RESEARCH GAPS IN CLIMATE SECURITY PATHWAYS FOR SOMALIA

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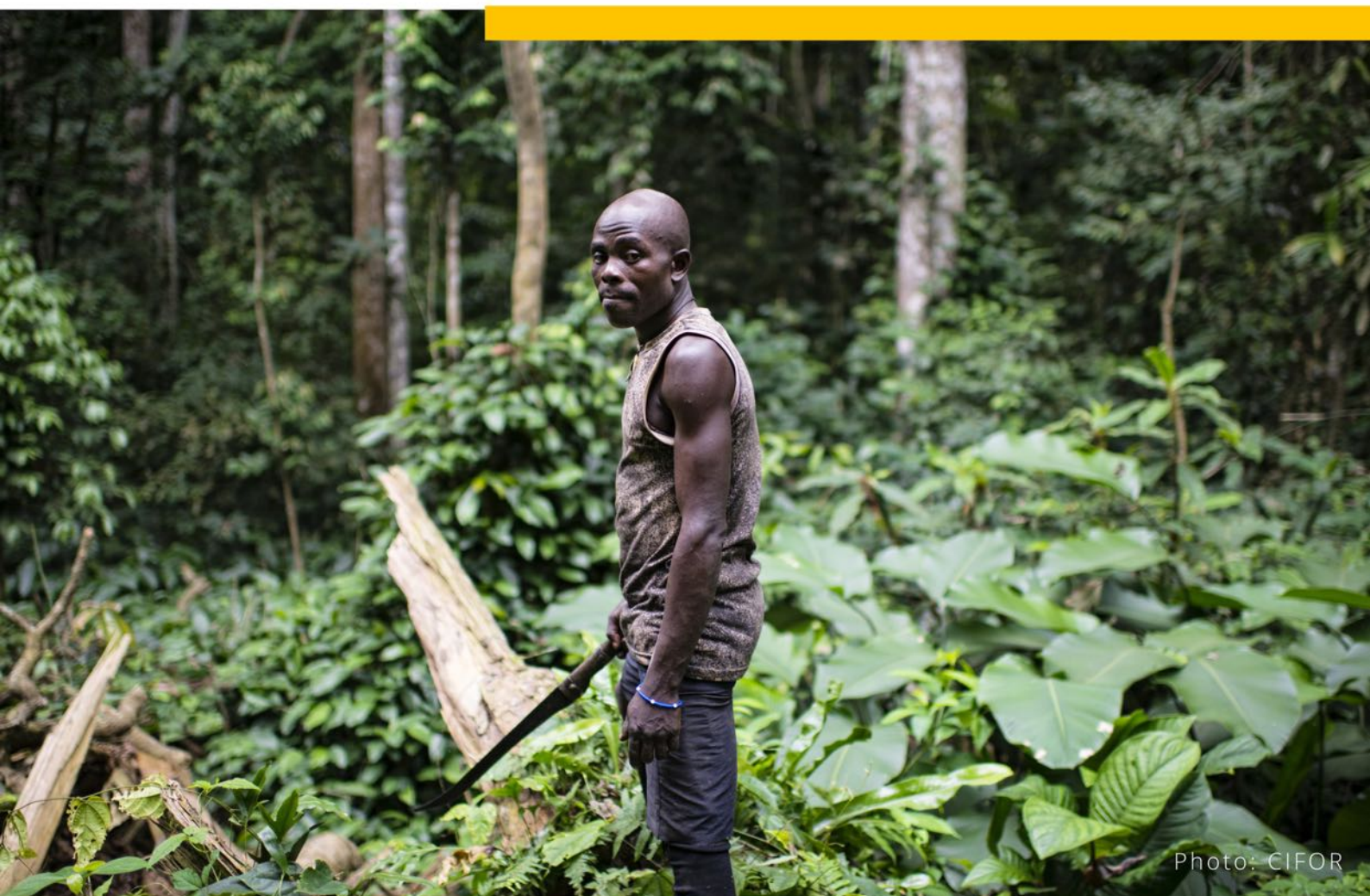


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INTRODUCTION

While climate science is a well-established field, the turn of the century has seen significant growth in global interdisciplinary research on climate change and its interlinkages with various social, economic, and political dimensions. While theorizing about the interlinkages between climate change, peace and security is important to establish a common ground, scholars also acknowledge that the effects of climate change-induced stresses are heavily context-specific. Consequently, beyond global perspectives, it is essential to understand these interactions at the local level, not only to continue building a robust body of climate security literature, but also to make scientific evidence relevant at the policy level.

In Somalia, peacebuilding efforts have inevitably been impacted by the security implications of climate change, some of which has been addressed by the scientific community. However, potential knowledge gaps remain that could undermine efforts towards national development due to a lack of robust evidence to support climate change and development planning.

This brief presents the preliminary results of a literature review with two overarching goals:

1. **To identify the complex interactions between climate and security-related risks with a special focus on food, land, and water systems.** A Climate Security Pathway Analysis approach is implemented to explore and describe potential context-specific pathways through which climate impacts may interact with intermediate variables to influence peace and security risks.
2. **To address gaps in knowledge about climate change and food security for peace and security policies and operations** through a unique multidisciplinary approach that contributes to building resilience to vulnerabilities, shocks, and stress.

The main purpose of identifying the gaps in scientific production is to propose areas where further research could be developed. Understanding these complex interconnections and interdependent challenges, as well as the areas in which additional evidence is required, represents a first step in informing policymakers on interventions needed to tackle climate-related security risks.

METHODOLOGY

Figure 1 summarizes the strategy for this study. The approach draws upon the foundations of bibliometrics analysis, a field that has been expanding beyond measuring the impact of academic outputs to include systematic thematic reviews (Carneiro et al, 2021). This analysis leverages such methodological innovations to explore relevant subjects through content analysis and network analysis techniques.

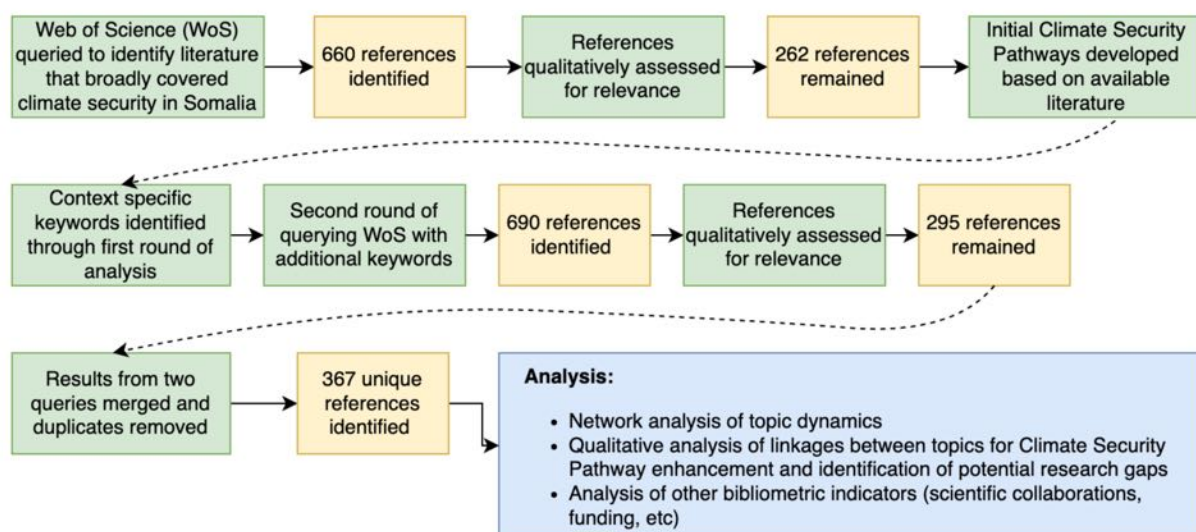


Figure 1 Research protocol for climate security pathway analysis and evidence gap mapping.

The Web of Science database – one of the most comprehensive abstract and citation databases of peer-reviewed literature available – was queried to identify literature that broadly covered climate security in Somalia. This initial query and subsequent rapid review were an iteration of the methodology for the climate security pathway analyses developed for the Climate Security Observatory (Madurga Lopez et al, 2023). Query design was adapted to focus on exploring the research gaps. Subsequent steps, such as eliciting expert knowledge and conducting fieldwork are envisioned for 2024.

The keyword query included climate-related terms, security-related terms, as well as keywords specific to the pathways. As we are exploring potential pathways, we search for literature along the climate security nexus, as very few cover the entire dynamics between climate, peace and security. Yet, research focused on parts of the nexus still provides important context to their indirect implications to climate security risks.

METHODOLOGY

Results yielded 660 academic references, which were qualitatively assessed to verify relevance, i.e. if the terminology found in the references were used within the context of climate change, or peace and security. From these, 262 references were deemed relevant and were complemented by grey literature.

Grey literature was identified through a scoping review with our climate security specialists, identifying 46 websites of potential sources (Annex 3). Knowledge products (reports, briefs, policy papers, etc.) from climate security-specific research institutions were retrieved from their websites, with a focus on research that has analysed climate security dynamics in the country, or that provided current data for parts of the nexus, such as those related to displacement, food security and others. Lastly, we also consulted reports contributing more context to the issues we elaborate on, mostly connected to current conflict dynamics, which have not been well covered by scientific research yet. The rapid review identified five initial Climate Security Pathways. The main purpose of these preliminary pathways was to achieve an understanding of prevailing dynamics that aim to guide further research design and focus. The next step will explore the prevalence of the proposed pathways vis a vis existing academic literature.

In addition, this first round of analysis elicited additional terms and concepts specific to the pathways in the Somalian context, derived qualitatively from themes that emerged in the rapid review. While the first query included general concepts known to be relevant for the climate security nexus, a second query was structured to consider more context-specific keywords for Somalia (e.g., Al-Shabab, Clan, Piracy, etc.). Web of Science was queried again, resulting in 690 references, of which 296 were qualitatively assessed as relevant. The two query results were merged, resulting in 367 unique relevant publications for analysis. The two queries are available in Annex 1 and the final Web of Science dataset is available in Annex 2.

Preliminary results are presented below.

THE LITERATURE ON CLIMATE SECURITY IN SOMALIA

Figure 2 presents the distribution of publications by year, where the last decade shows a significant intensification of research activity related to climate, peace and security for Somalia.

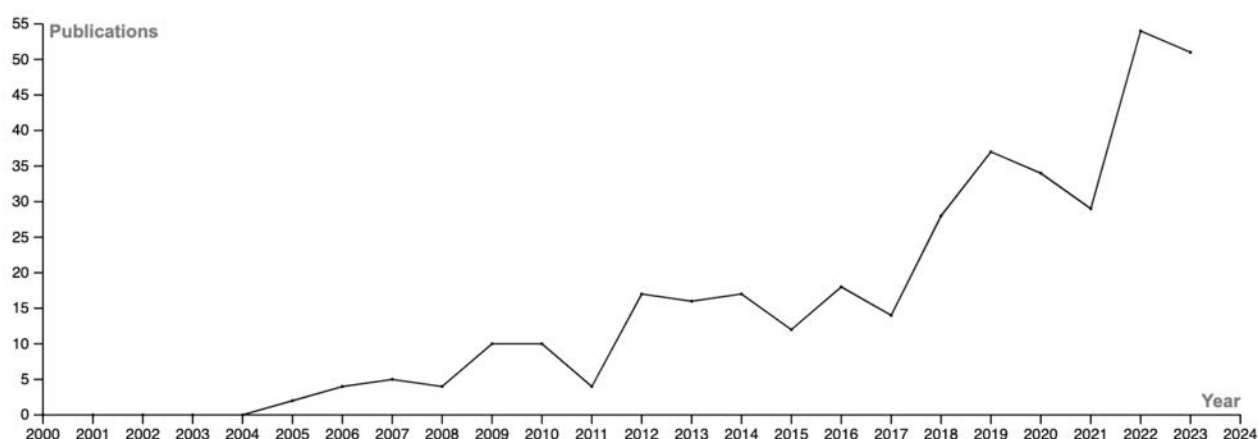


Figure 2 Timeline of publications extracted from Web of Science (merged queries).

The 263 keywords used in the two queries were detected in the text of the abstracts, as the main feature of a bibliographic reference where a research article summarises its key concepts and findings. Figure 3 shows the 30 most frequent keywords, with each topic coloured according to its thematic category. The conflict-related variables 'war', 'conflict' and 'security' were the highest occurring subjects in the dataset, followed by pathway-related variables 'land', 'development' and 'government'. 'Rain' is the most frequent climate-related topic. This distribution characterizes the focus of the research agenda for Somalia, which has prioritized conflict studies over other subjects and can serve as an initial indication of what issues within the climate security context deserve greater attention.

While the overall distribution of topics can uncover the cumulative prominence of themes, to further unpack any associations between different keywords within the publications, a network analysis enables visualizing the overall dynamics among them.

THE LITERATURE ON CLIMATE SECURITY IN SOMALIA

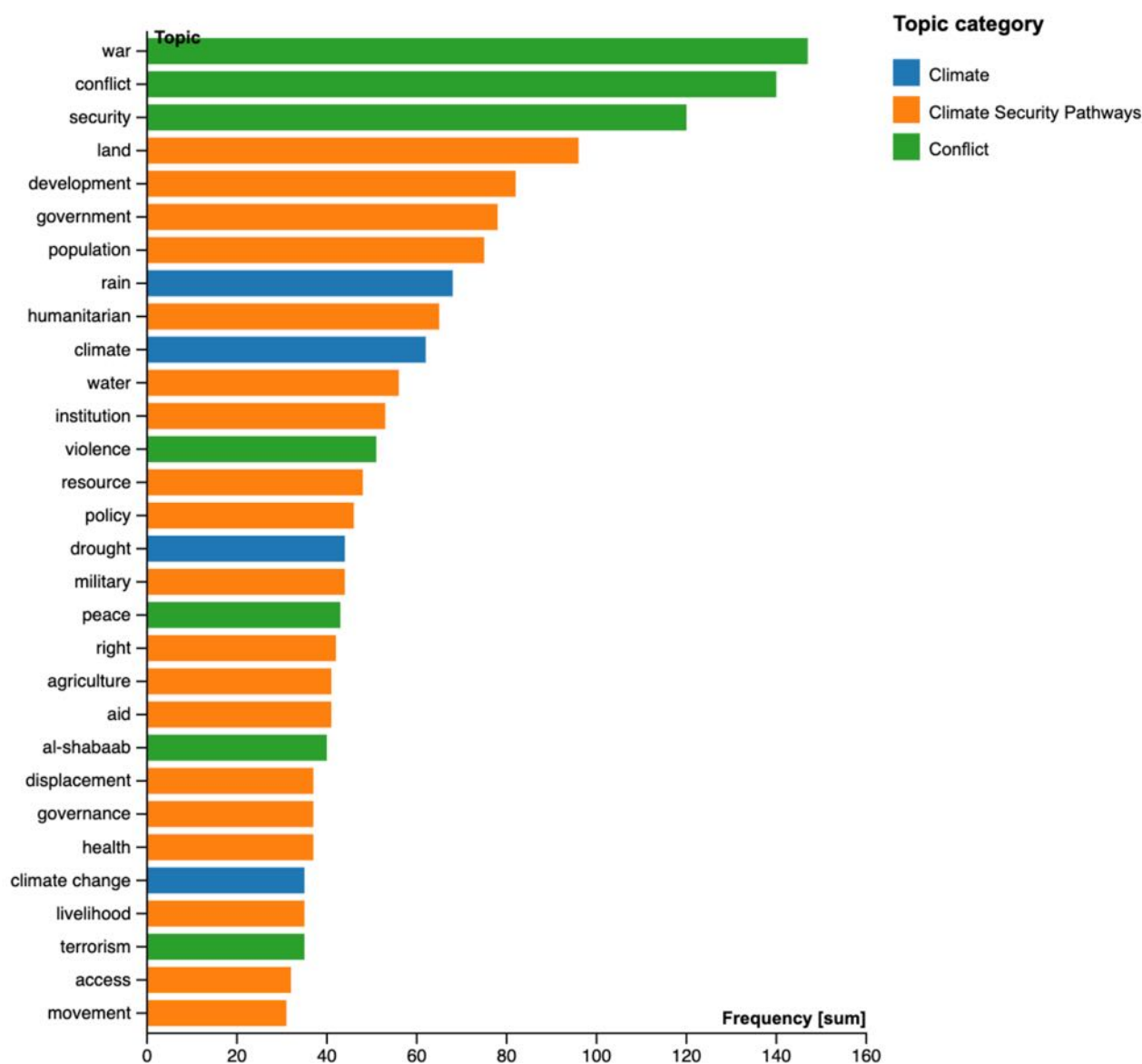


Figure 3 Top 30 most frequent topics in publications extracted from Web of Science (merged queries), coloured by category.

Considering a network as graphical representation of the relationships (edges) between different entities (nodes), in this case, the publications and the keywords are the nodes, and their relations are determined by the identification of topics in each publication. This means that a publication is connected to a keyword if the term is present in the abstract.

THE LITERATURE ON CLIMATE SECURITY IN SOMALIA

Figure 4 presents the topic network. The spatialization of nodes was estimated with a force-directed algorithm that turns structural proximities into visual proximities (Jacomy et al. 2014). This means that linked nodes are drawn closer while unrelated nodes are pushed farther apart, thus facilitating interpretation of the data. The layout algorithm places each node depending on the other nodes, in a process that relies on the connections between them, thus creating groups, or 'communities' of nodes. To further explore these dynamics, a modularity algorithm (Blondel et al. 2008) was applied to identify clusters of nodes that are more densely connected together than to the rest of the network, and these were coloured accordingly. The sizes of the nodes and the labels are partitioned by in-degree centrality, a measure of the number of connections to a particular node.

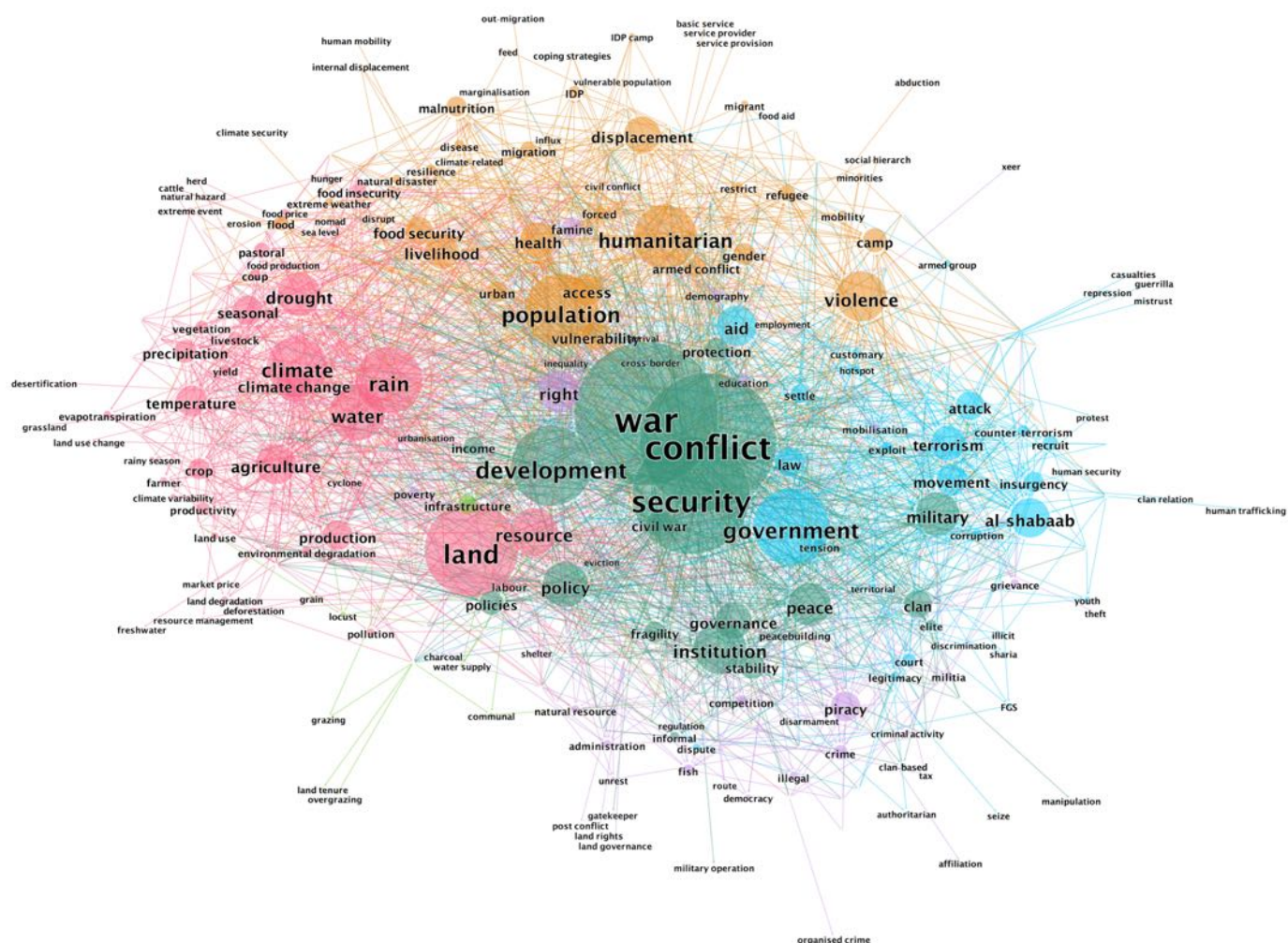


Figure 4 Network visualization of climate, peace and security-related topics detected in publications extracted from Web of Science. Force-directed graph, with node size partitioned by weighed in-degree, coloured by modularity class.

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The average in-degree centrality of the network is 5.58, meaning that on average, between five to six keywords are detected in each publication. As expected, the most frequent conflict-related terms appear as central nodes in the network. It is also possible to see five major clusters, which have a modularity coefficient of 0.353 (on a scale from -1 to 1), indicating that topics are frequently co-occurring in the same publications but not exclusively.

The biggest group is dark green and encompasses 23% of the network. It contains the largest 'war', 'conflict' and 'security' nodes, but also 'development', 'policy', 'institution' and other governance terms. The pink group (22% of the network) contains the majority of climate and ecological variables such as 'rain' or 'drought', but also keywords related to natural resources and agriculture, notably 'land', 'water', and 'agriculture'. The orange cluster (20%) includes keywords related to humanitarian aid, migration and displacement, as well as livelihoods. The blue (17%) and purple (13%) clusters concentrate keywords largely associated to conflict.

While such a visualization does not attempt to establish direction or causation, the sizes and the distribution of nodes in clear thematic communities reflect, first, the frequency with which the individual topics are addressed by the scientific community, and second, the prevalence of co-occurrence of these topics within an abstract, indicating which issues are associated in the research - i.e., covered in the same papers. While topics from different groups do co-occur in some of the references we have reviewed, the general pattern revealed by the network is that the full spectrum of the climate security nexus is not yet widely represented, i.e. the complex relationship between climate, conflict and intermediary drivers. As shown in the graph, the literature tends to group around parts of the nexus, especially in relation to the implications of insecurity on socioeconomic drivers.

In summary, the network provides an initial step to identify not only which topics are more or less featured in scientific research, but also to determine how interlinkages among pathway components are represented.

PRELIMINARY CLIMATE SECURITY PATHWAYS AND POTENTIAL RESEARCH GAPS

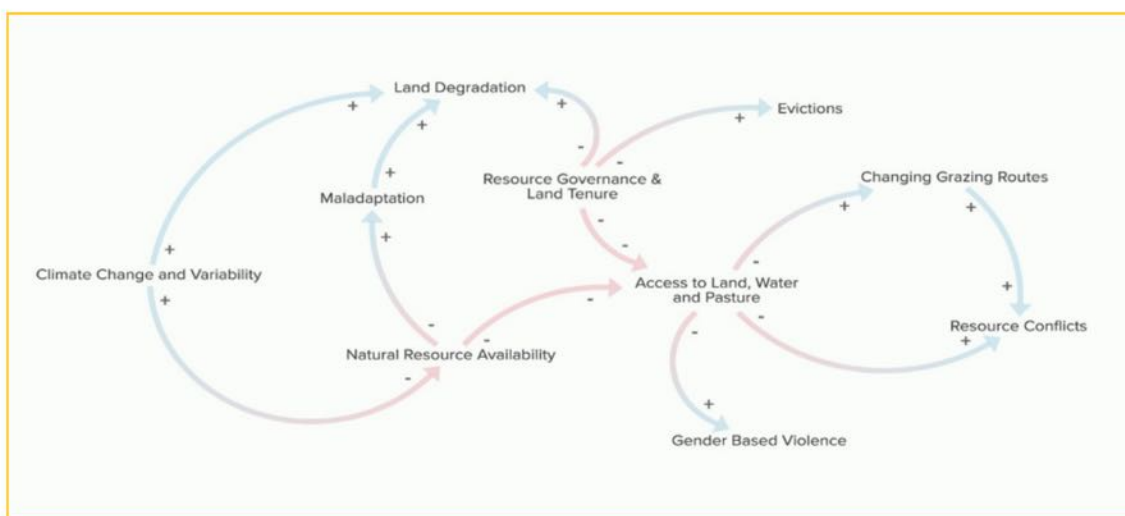
The pathways summarised below are dynamics we found prominent in the first round of the literature review, which was based on both scientific as well as grey literature and had the intention to make sense of the existing climate security dynamics to further guide our research.

They followed the rapid review approach, identifying the existing climate security dynamics in Somalia, that should be elaborated in subsequent research processes. In this review, five climate security pathways have been identified that each represent different dynamics in which climate impacts insecurity dynamics over variable intermediate factors.

The pathway dynamics are visualised below in form of causal loop diagrams, describing the connection between the most relevant factors. In each pathway, key linkages were explored, which will be examined more closely in the next steps of the analysis. The literature consulted to develop the pathways is listed under each of them, with the full bibliographic references available in Annex 3.

PRELIMINARY CLIMATE SECURITY PATHWAYS AND POTENTIAL RESEARCH GAPS

1. Resource Access and Availability Pathway: climate impacts affect natural resource availability, leading to different forms of resource conflicts.



- Climate change and variability is severely decreasing the availability of natural resources from land, water and pasture.
- Climate change and its pressure on livelihoods have increased environmental and anthropogenic drivers of land degradation.
- The lack of clear land governance systems and tenure rights has profound and adverse effects, leading to conflicts, tensions, and displacement across the country.
- Climate impacts on pasture and water have altered the mobility strategies of pastoral groups to change their grazing routes.
- Diminished access to natural resources has increased the competition and lead to resource conflicts.

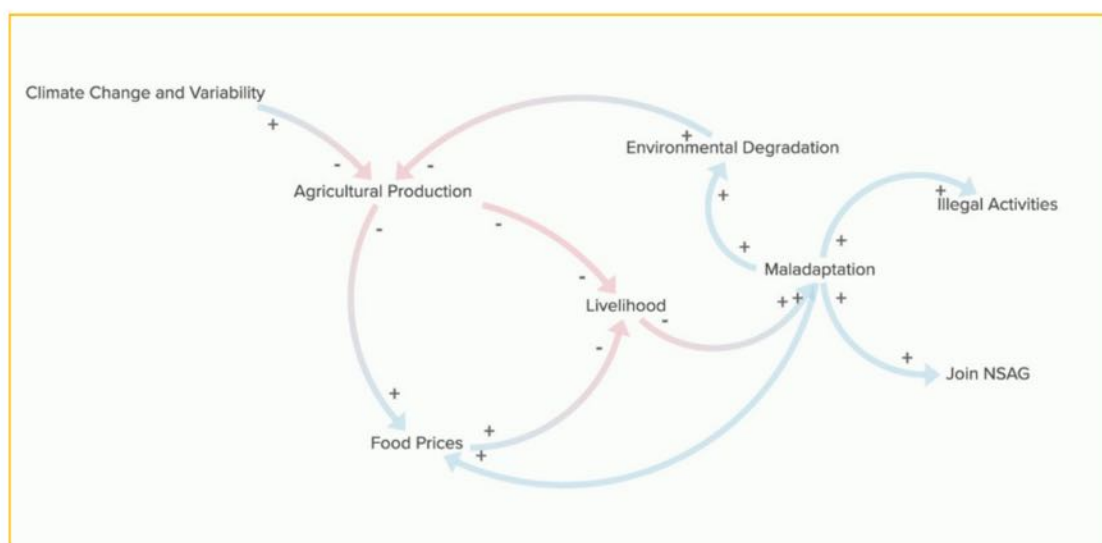
References:

Jalango et al. 2021; SWALIM 2023; Maesho et al 2021; Tarif et al. 2023; Broek and Hodder 2022; Erlöw and Krampe 2019; Ogallo et al. 2018; Dahir and Yusuf 2023; Thulstrup et al. 2018; Mohamed and Nagaye 2020; Chaudhry and Ouda 2021; NAPA 2013

Potential research gaps: How are land tenure systems in Somalia compounding conflict dynamics? Which grazing routes are affected, where do people turn to?

PRELIMINARY CLIMATE SECURITY PATHWAYS AND POTENTIAL RESEARCH GAPS

2. Livelihood and Food Insecurity: climate change impacts agricultural production and livelihoods, overburdening the capacity of affected populations with adverse effects of further insecurity dynamics.



- Climate change and variability is profoundly reshaping Somalia's agricultural landscape, exerting severe consequences on both crop and livestock production.
- The high dependency on agriculture under current climate impacts has devastating effects on the country's economy and people's livelihoods.
- Climate change and its repercussive effects are contributing to increasing food prices for crops and livestock.
- Vulnerability towards climate and conflict differs along lines of gender, placing women into higher risk.
- Coping strategies of affected population are often leading to maladaptive behaviour, which is leading to illegal and/or violent alternatives.

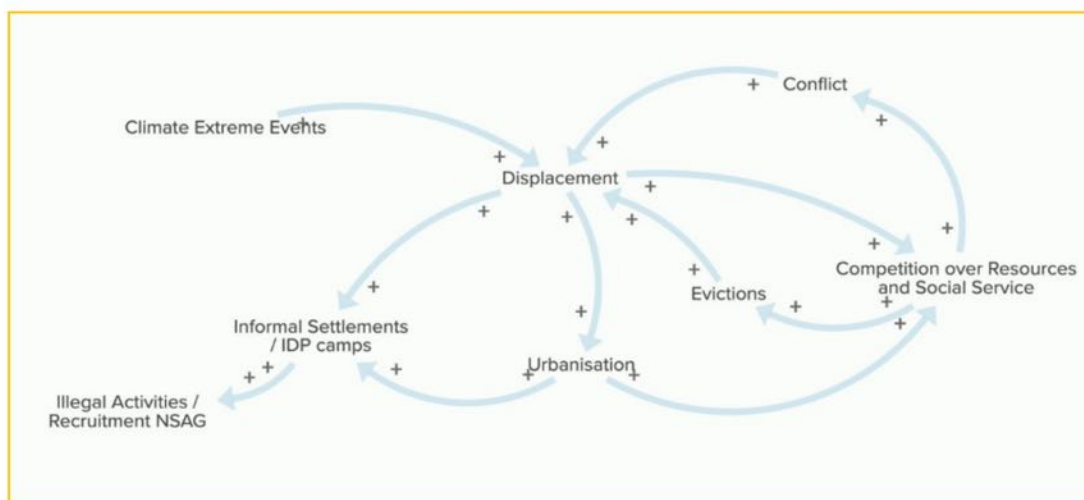
References

Ogallo et al. 2018; Dahir and Yusuf 2023; Broek and Hodder 2022; Said and Bashir 2023; Jalango et al. 2021; Erlöw and Krampe 2019; Warsame et al. 2022; Tarif et al. 2023; IOM/UNEP 2021; Majid et al. 2022; Maystadt and Olivier 2014; Middleton 2008

Potential research gaps: How are increased food prices affecting insecurity dynamics? What are the linkages between piracy and climate?

PRELIMINARY CLIMATE SECURITY PATHWAYS AND POTENTIAL RESEARCH GAPS

3. Disaster and Conflict Displacement: climate-induced and conflict-driven displacement have compounding effects on insecurity.



- Climate change and particularly climate extreme events are inducing displacement in Somalia.
- Conflict further drives displacement dynamics which are often linked to climate impacts.
- Most displacement is occurring from rural towards urban areas, leading to unsustainable rates of urbanisation.
- Displaced populations are straining the available resources in receiving areas, often within informal settlements of urban areas, thereby increasing competition and tensions.
- Affected livelihoods of displaced populations within IDP camps or urban areas, are making them susceptible to illegal activities or recruitment into armed groups, exacerbating insecurity.

References

Broek and Hodder 2022; Said and Bashir 2023; Jalango et al. 2021; Chaudhry and Ouda 2021; Thalheimer et al. 2023; Yuen et al. 2022; Halakhe and Miller 2023; Tarif et al. 2023; NRC 2017; Eklöw and Krampe 2019; Harnisch 2010; Jackson and Aynte 2013; Mwangi 2012; Majid et al 2022; Maruf et al. 2018

Potential research gaps: further explorations of the intersection between conflict and climate driven displacement; data on push factors is often difficult to distinguish; viable options for rural population in urban areas and the dangers of turning to violent alternatives.

- ## References

PRELIMINARY CLIMATE SECURITY PATHWAYS AND POTENTIAL RESEARCH GAPS

5. Fragility and Social Vulnerability: climate change exacerbates existing socioeconomic inequalities, political representation, power dynamics and grievances within the country, leading to elite exploitation and resource grabbing, further marginalizing vulnerable groups.



- Elite rent seeking and resource grabbing of powerful clans are exacerbating insecurity dynamics and fragility of the state.
- Minorities and marginalized groups within the society and clan power hierarchy are increasingly vulnerable to climate impacts.
- Elites and NSAG are exploiting grievances connected to climate change and poverty for their political agenda and personal gains.
- Climate change is weakening already fragile institutions by reshaping the local social, political and economic context, thereby undermining the legitimacy of the state.
- Legal mechanisms to resolve natural resource conflicts, exacerbated by climate change, are being replaced by sharia courts, increasing the legitimacy of Al-Shabaab.

References

Broek and Hodder 2022; Eklöw and Krampe 2019; Majid et al. 2022; Tarif et al. 2023; Halakhe and Miller 2023; Brown and Keating 2015

Potential research gap: How are elites exploiting grievances connected to climate impacts?

ADDITIONAL RESEARCH PLANNED FOR 2024

1. Conduct additional bibliometric analysis to determine the main **research communities** contributing to Somalia-focused literature;
2. Qualitatively assess **linkages identified between topics** and how they are supported by the literature;
3. Establish the **confidence of research available** through numbers of publications, timescales and type of research;
4. Refine research gaps to **identify pathways** where support from literature is lacking or only partially recognised;
5. **Validate the findings** on climate security dynamics and elaborate on identified research gaps with international, governmental and local experts in a workshop in Mogadishu in first quarter of 2024;
6. **Map actors working around topics related to the pathways and streamline a coordinated approach.**

METHODOLOGICAL REFERENCES

Carneiro, B.; Resce, G.; Läderach, P.; Pacillo, G. (2021) How does climate exacerbate root causes of conflict? Mapping the science around climate security. CGIAR FOCUS Climate Security. <https://hdl.handle.net/10568/116463>

Madurga Lopez, I.; Dutta Gupta, T.; Silveira Carneiro, B.; Medina, L. (2023) Climate security pathway analysis. Climate Security Observatory Methods Papers Series, 07/2023. 10 p. <https://hdl.handle.net/10568/131339>

SUGGESTED CITATION

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