

## Mapping policymaker narratives of the Climate Security nexus on Social Media: a case study from Kenya

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### **Abstract**

*Despite increasing awareness of the nexus between climate change and human security, especially in fragile contexts, this complex relationship has yet to be reflected in the policy arena. To investigate this potential policy gap, we apply an online issue mapping approach to assess representations of climate security within the public discourse of policymakers on social media, using Kenya as a case study. Considering Twitter as a proxy for public debate, text mining and network analysis techniques were employed to a corpus of almost 50 thousand tweets from selected national-level state actors, aiming to identify the evolution of thematic trends and actor dynamics. Results show a disassociation between climate, socioeconomic insecurities, and conflict in the public communications of national policymakers. These findings can have useful implications for the policy cycle, indicating where policy attention around climate security-related topics has been and what are the entry points for enhancing sensitivity on the issue.*

**Keywords:** *climate security; social media; text mining; sentiment analysis; online issue mapping; digital methods.*

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## **1. Introduction**

Climate security refers to climate-related threats to societies, communities and individuals that encompass risks directly or indirectly caused by climate change, including the potential for conflict. The relationship between climate and conflict has been receiving increased attention in the past decade, as the climate crisis has been shown to impact social and political stability. However, despite heightened awareness regarding potential linkages between climate, peace and security, such connections have yet to be reflected in the policy arena. Policy cycles for climate adaptation and mitigation, as well as national security concerns, often fail to reflect the complex pathways that link the two dimensions (Brzoska 2012).

To explore the potential policy gap related to the climate-security nexus, a data-driven method was developed to assess representations of climate security as a topic of governance within the public discourse of state actors, using Kenya as a case study. While the country is characterised as relatively peaceful compared to some of its neighbours, climate variability and extremes have had adverse impacts on agricultural production. Compounded by external shocks that exacerbate existing inequalities, Kenya faces increased risks of resource-related violence (CGIAR FOCUS Climate Security, 2022). Consequently, though climate may not directly impact localized conflict dynamics, its context-specific interactions with socio-economic and political factors can shape and increase risks of human insecurity and conflict.

While extensive research about climate change discourses on social media have been conducted, focusing on various subjects such as issue polarization, disinformation, activism, and climate communication (see Pearce et al 2019 and Falkenberg et al 2022, among many others), this study investigates this study relies on the foundations of Digital Methods (Rogers 2013; Carneiro et al 2022) to explore climate security narratives and dynamics among policy actors. An online issue mapping approach (Rogers et al. 2015) was applied to investigate two main questions: 1) How salient are climate security issues in national policy agendas? 02) How are linkages between climate, socioeconomic risks and insecurities, and conflict represented in the public narratives of policymakers? Insights emerging from this analysis provide a starting point for the development of evidence-based advocacy and engagement strategies so that effective responses to climate change are sensitive to the interlinkages with the human security context in the country.

## **2. Methods and data**

Twitter has been widely recognized as an important venue for institutional communications; news media increasingly rely on the platform as a primary source of official statements and positiontaking. Its potential as a real-time, topic-driven platform enables rapid detection of trends to uncover discourse dynamics (McDonald 2013). Hence, to frame perceptions around the climate-socioeconomic insecurities-conflict nexus at the national policy level in Kenya,

an analysis of government communications on Twitter was performed. An algorithm was developed to extract all publicly available Tweets from the official accounts of central government bodies, ministries of agriculture, environment, and natural resources, as well as national security bodies (Table 1), from which the presence of a climate security taxonomy was explored. In total, 49,335 Tweets were collected between 2012-09-13 to 2022-05-26.

**Table 1: Categories of official Twitter accounts of state actors selected for analysis.**

<b>Categories of Twitter Accounts</b>	<b>No. Tweets</b>
Central government	12850
Ministries of agriculture	1040
Ministries of environment	7379
Ministries of natural resources	8863
Security-related bodies	19203
<b>TOTAL</b>	<b>49335</b>

A scoping review on the climate security nexus in Kenya (Dutta Gupta et al., 2021) identified 111 topics organised into a framework with five categories: climate; conflict; livelihood and food security; resource availability and access; state capacity and resource governance. Based on this framework, a custom taxonomy was created using the term expansion strategy proposed in Carneiro et al (2022), in which topics were matched to AGROVOC<sup>1</sup>, the Food and Agriculture Organization's (FAO) open-source, multilingual vocabulary. For each topic, the corresponding AGROVOC concept was extracted, and a custom algorithm was developed to detect and classify the related terminology within the text of Tweets. Topics were then assessed through correlation measures to identify any interlinkages.

In addition, leveraging on the specific affordance of Twitter that enables direct conversations among users, a network analysis assesses the relationships among policy actors through a mentions network (Williams et al 2015), where accounts are the nodes and their relations are the lines connecting pairs of nodes. This means that accounts are connected if they are mentioned by another, with the weight of the connection calculated from the number of mentions by the same account.

### 3. Results

Drawing on the mechanisms through which climate stressors may interact with socioeconomic, ecological, and political dimensions identified in Kenya, figure 1 shows their overall distribution, as frequency counts. 'Famine' and 'Aid programmes' are the most regularly mentioned topics, followed by resource availability and access pathway variables

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<sup>1</sup> <https://www.fao.org/agrovoc/>

‘Ethnic groups’ and ‘Cattle’. The most present topics for climate variables are ‘Risk’ and ‘Weather hazards’ and for conflict variables are ‘Crime’ and ‘Sexual violence’.



Figure 1 Distribution of topics identified in Tweets from the official accounts of selected government bodies. More frequent terms represented by wider wedges in the pie chart.

While the overall distribution of variables uncovers the cumulative prominence of topics, a temporal distribution provides a more nuanced perception of topic prevalence over time. Beyond the presence or absence of a topic, the algorithm also quantified their presence<sup>2</sup>. Figure 2 presents timelines for the prevalence of climate variables (top) and conflict variables (bottom) in the corpus of tweets. The visualisation indicates not only which topics were in focus, but also when they were of most interest. Among climate variables, ‘Drought’ presents several major peaks. In 2018 and 2022, they reflect consecutive failed seasons that led the Kenyan government to declare a national disaster in several parts of the country in 2021<sup>3</sup>. The conflict timeline shows higher variability among topics, with ‘Armed conflict’, ‘Dispute’, ‘Theft’, and ‘Crime’ oscillating between peaks and low prevalence. As noted by DuttaGupta et al (2022), ‘Theft’ is most likely associated to livestock raiding, a significant problem in the country’s rural areas, whereas the increase in ‘Disputes’ in the last five years points to increased attention to conflict over resources.

<sup>2</sup> Values were normalized on a scale from 0-1, so that prevalence is shown as a proportion of all frequency, on all topics, in the corpus of Tweets.

<sup>3</sup> <https://www.businessdailyafrica.com/bd/economy/kenya-declares-drought-national-disaster-3543276>

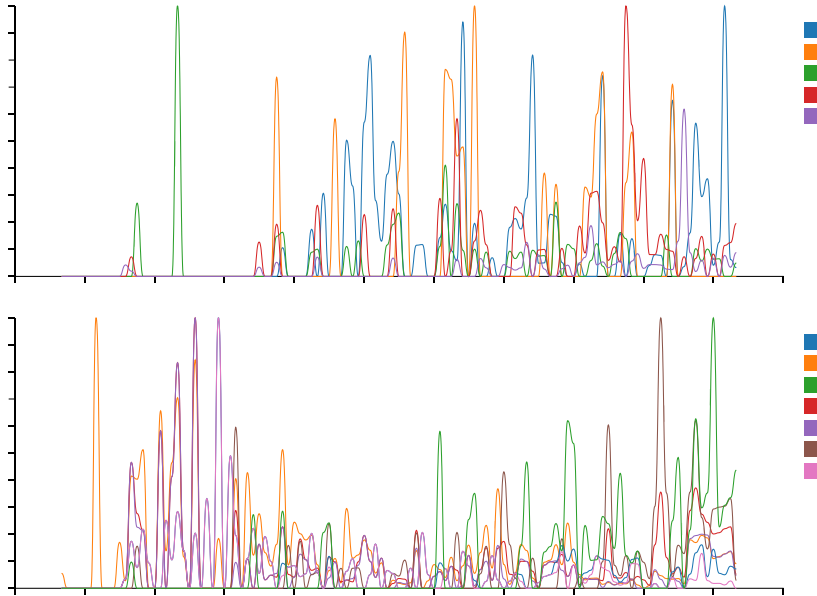


Figure 2 Timeline of Tweets that contain climate (top) and conflict (bottom) variables.

To further unpack the interlinkages between different topics within the Tweets, a measure of correlation was established to identify when terms are present within the same body of text. A strong positive correlation indicates that the terms consistently occur within the same Tweet, whereas a negative correlation denotes they are occurring in separate Tweets. Figure 3 displays the 10 topics most positively correlated to climate variables (right) and to conflict variables (left). In the case of climate, the strongest associations are to livelihood and food security pathway and resource availability and access pathway variables; conflict is not represented in the table. Conversely, conflict-related content is frequently co-occurring with several climate and socioecological variables, namely ‘Desertification’, ‘Risk’, ‘Climate change’, ‘Poaching’, ‘Environmental degradation’, and ‘Resource management’.

Direct associations between climate and conflict are presented in Figure 4, which features the correlations among the six conflict types described in the impact pathways and climate stressors and socioecological variables. The strongest positive associations (in blue) concern ‘Disputes’ with ‘Erosion’, ‘Theft’ with ‘Rain’, and ‘Violence’ with ‘Environmental degradation’. However, it is notable that most variables present negative associations (in red), meaning that the connection between climate and conflict is largely absent from the official discourse of Kenyan government actors on Twitter.

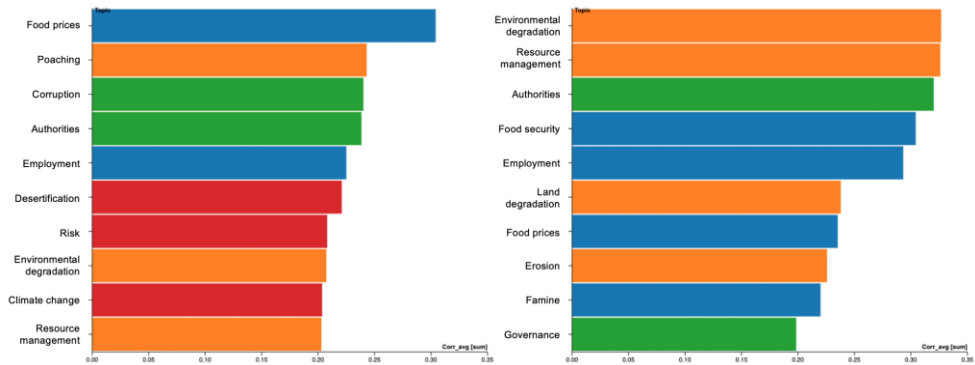


Figure 3 Top 10 correlations between climate (left) and conflict (right) with other topics identified the Tweets extracted from the official accounts of selected government bodies. Bar coloured by category: Climate (red), Livelihood and food security pathway (blue), Resource availability and access pathway (orange), State Capacity and resource governance pathway (green)

Lastly, the mentions network in figure 6 presents a visualization of the dynamics between the key state bodies representing climate, agriculture, natural resources and security interests. As the focus of this analysis is on the interaction between national security and climate adaptation and mitigation policy narratives, the network was filtered to display only the connections between the 13 government accounts. The spatialization of nodes was estimated with the force-directed algorithm Fruchterman-Reingold (Fruchterman and Reingold 1991), which moves nodes further or closer from each other in an attempt to find an equilibrium. The sizes of the nodes and the labels are partitioned by degree centrality, a measure of the number of connections to a particular node, whereas the edges are also weighed by the number of times a pair of nodes is connected. The graph points to the strongest connections between the ministries and central government accounts, but to weaker or non-reciprocal linkages between ministries from the different areas.

#### 4. Discussion and conclusion

Content analysis and network analysis techniques enable identification of trends in political agendas and actors over time. The machine-driven approach employed to explore the salience of climate security in the Twitter communications of Kenyan policy actors found that the pathways that link climate stressors, socioeconomic risks, and conflict are not well represented in the narratives of government bodies. While Tweets that addressed different types of conflict did show some association to ecological threats, most climate and conflict variables were negatively correlated. Further, the weaker or absent connections in the network analysis point to potential gaps in dialogue.

A limitation of our analysis is that social media narratives may not fully capture the complexity of policy cycles in a country like Kenya, where policy actors interact across

multiple scales, and this engagement may not be adequately represented in digital platforms. Moreover, the African continent continues to have the lowest Internet access, with Kenya’s internet penetration rate at 32.7 percent of the total population at the start of 2023, and Twitter reaching 3.5 percent of the total population<sup>4</sup>. However, given the continued trend to integrate digital platforms in policy and governance, especially during times of crisis such as the Covid-19 pandemic or natural disaster responses, this study contributes towards mapping policymaker perspectives in public discourse. Our findings can have useful policy implications, indicating where policy attention around climate security-related topics has been, as well as what are the gaps and entry points for enhancing sensitivity on the issue, facilitating the integration of the climate security debate into Kenya’s formal policy arena.

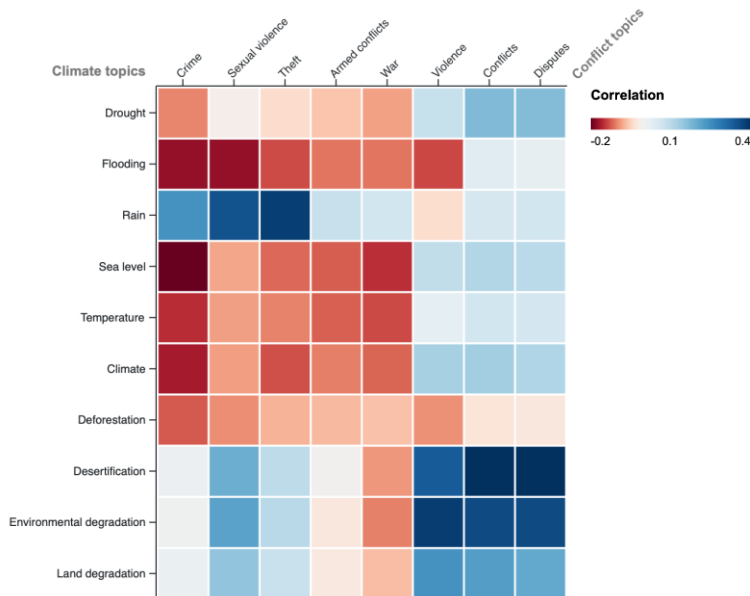


Figure 4 Correlations between conflict types and climate shocks identified in the Tweets extracted from the official accounts of selected government bodies.

<sup>4</sup> <https://datareportal.com/reports/digital-2023-kenya> (retrieved 19 April 2023)

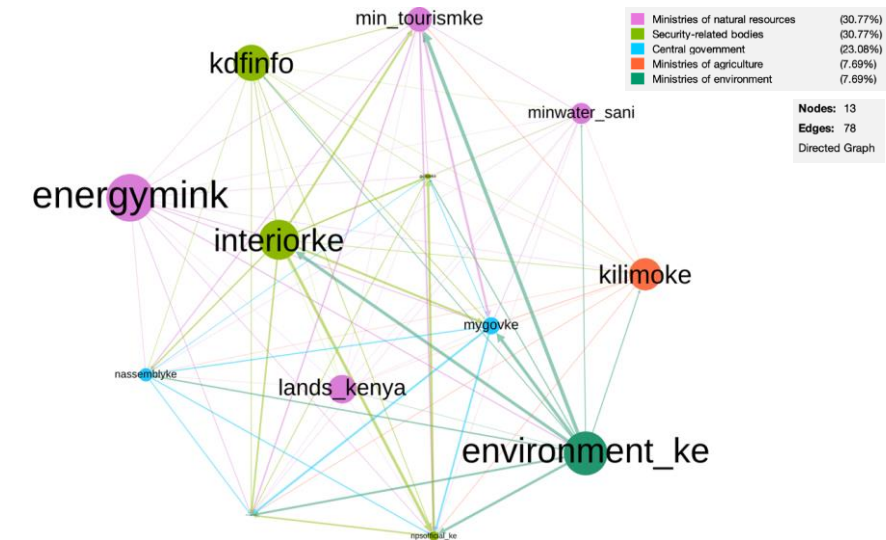


Figure 5 Network of policy actors.

## References

- Brzoska, M. (2012). Climate Change as a Driver of Security Policy. In: Scheffran, J., Brzoska, M., Brauch, H., Link, P., Schilling, J. (eds) *Climate Change, Human Security and Violent Conflict.*, vol 8. Springer, Berlin, Heidelberg.
- Carneiro, B., Resce, G. & Sapkota, T.B. (2022). Digital artifacts reveal development and diffusion of climate research. *Scientific Reports*, 12, 14146.
- CGIAR Focus Climate Security (2022) *Climate Security Observatory Country Profile: Kenya*. Rome, Italy: CGIAR FOCUS Climate Security.
- Dutta Gupta, T., Madurga Lopez, I., Läderach, P., & Pacillo G. (2021). *How does climate exacerbate root causes of conflict in Kenya? An impact pathway analysis*. Rome, Italy: CGIAR FOCUS Climate Security.
- Falkenberg, M., Galeazzi, A., Torricelli, M. et al. (2022) Growing polarization around climate change on social media. *Nat. Clim. Chang.* 12, 1114–1121.
- Fruchterman, T.M.J. and Reingold, E.M. (1991), Graph drawing by force-directed placement. *Softw: Pract. Exper.*, 21: 1129-1164.
- McDonald, M. (2013). Discourses of climate security. *Political Geography*, 33, 42–51.
- Pearce, W, Niederer, S, Özkula, SM, Sánchez Querubín, N. The social media life of climate change: Platforms, publics, and future imaginaries. *WIREs Clim Change*. 2019; 10:e569.
- Rogers, R. (2013) *Digital Methods*, The MIT Press.
- Rogers, R., Sanchez-Querubin, N., & Kil, A. (2015). *Issue Mapping for an Aging Europe*, Amsterdam: Amsterdam University Press.
- Williams, H. T. P., McMurray, J. R., Kurz, T. & Hugo Lambert, F. (2015). Network analysis reveals open forums and echo chambers in social media discussions of climate change. *Global Environmental Change* 32, 126–138