

[View this email in your browser](#)



Dear Colleagues,

This month's **CSF Research Update** brings you a curated roundup of key open-source research and analysis to support aid actors working in Sudan. These updates provide timely insights into evolving dynamics, helping strengthen conflict-sensitive and effective aid responses.

We also feature select articles from the **CSF Knowledge Hub**, offering historical context, lessons learned, and background analysis. You can find all the publications below in the CSF Knowledge Hub.

New here? If this email was forwarded to you, **sign up here** to receive future updates, along with information on upcoming events, roundtables, and trainings open to aid actors in Sudan.

[SUBSCRIBE TO OUR NEWSLETTER](#)

Environment, Climate, and Health

[The Environmental Costs of the War in Sudan](#)



Cholera in Conflict: Outbreak Analysis and Lessons from Gadaref State (2023–2024)

BMC Public Health

April 2025

The paper follows the root causes of the Cholera outbreak in Gadaref during the first two years of the war. The analysis is quite crucial as we are entering the third rainy season during the war. It identifies Atbara River as the infection source and highlights conflict-related delays in response and healthcare access. The analysis shows how fragile systems, late vaccination, and poor water quality facilitated the disease's spread. It calls for investment in border surveillance, case management, and community-led

The 2023 war has caused severe ecological damage ranging from direct destruction of infrastructure and habitats to indirect threats like pollution, loss of vegetation, and threats to livelihoods. Despite monitoring by CEOBS since late 2023, environmental impacts remain largely underreported. The report urges urgent assessments to track toxic legacies and support climate-sensitive recovery and peacebuilding planning.

Izzoddeen et al. *BMC Public Health* (2025) 25:881
<https://doi.org/10.1186/s12889-025-22128-1>

BMC Public Health

RESEARCH

Open Access



Cholera in conflict: outbreak analysis and response lessons from Gadaref state, Sudan (2023–2024)

Ahmad Izzoddeen^{1,2}, Hafsa Abualgasim², Mazza Abasher², Hala Elnoor², Mustafa Magbol³, Safaa Fadelmoula⁴, Ali Abolgasim², Alaa Hamed Dafaalla², Khalid Elgamry², Anwar Banaga², Babiker Magbol⁵, Muntaz M. Osman² and Elfadil Mahmoud²

Abstract

Background Cholera is an acute, severe, illness caused by infection with *Vibrio cholerae*. Cholera outbreaks are closely linked to armed conflicts and humanitarian emergencies. This study describes the cholera outbreak amidst conflict in Gadaref state, discusses the possible factors mediated its spread and proposes future improvements in preparedness and response measures.

Methods A retrospective analytical study was conducted using national surveillance records of cholera cases, supported by interviews with key informants involved in preparedness and response, along with a review of state reports, to identify possible factors contributing to the spread and to evaluate the response.

Result The outbreak was confirmed after the isolation of *Vibrio cholerae* of O1 serotype, with both Inaba and Ogawa serogroups. A total of 2,047 cholera cases records reviewed. The mean age was 16.8 (SD, 15.8) with an equal gender distribution. The case fatality ratio was 2.4% and the overall attack (AR) rate was 7.38 cases per 10,000 population, with the highest in Medinat Gadaref locality (21.07/10,000). Interviews and reports review suggest that the outbreak was likely imported to villages near Ethiopian border before spreading to other parts of Gadaref. Atbara seasonal river, was the identified source of infection at the beginning. A disrupted health system due to conflict, delays in response teams' deployment, and late implementation of control measures were identified as factors contributing to response delay and expansion of the outbreak. Oral cholera vaccine campaign was implemented in five localities, followed by an observable decline in cases.

Conclusion Cholera remains a recurrent risk that has been further exacerbated by the armed conflict. The reporting of index cases from a border village highlights the need to strengthen surveillance at points of entry. Investment in case management and risk communication is necessary to improve clinical outcomes. The use of Oral Cholera Vaccine was associated with a decline in cases; however, further field studies are recommended to analyze its actual contribution in limiting the outbreak. The government's primary role in leading and financing preparedness and response interventions has been limited by the conflict, urging investment in community-led interventions, while

*Correspondence:
 Mustafa Magbol
mustafaalyeb01236009@gmail.com

Full list of author information is available at the end of the article



© The Author(s) 2025. **Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.



Article

Climate Change as a Double-Edged Sword: Exploring the Potential of Environmental Recovery to Foster Stability in Darfur, Sudan

Abdalahman Ahmed ^{1,2,*}, Brian Rotich ³ and Kornel Czimber ¹

¹ Institute of Geomatics and Civil Engineering, Faculty of Forestry, University of Sopron, Bajcsy-Zs 4,

9400 Sopron, Hungary; czimber.kornel@uni-sopron.hu

² Department of Forest and Environment, Faculty of Forest Science and Technology, University of Gezira,

Wad Madani 22211, Sudan

³ Faculty of Environmental Studies and Resources Development, Chuka University,

P.O. Box 109-60000 Chuka, Kenya; brotich@chuka.ac.ke

* Correspondence: ismakhani@sopron.hu or omada336@gmail.com

Abstract: The Darfur conflict, which emerged in the early 21st century, represents a multi-faceted crisis driven by socio-political and environmental factors, with resource scarcity, exacerbated by climate change, playing a pivotal role in intensifying tensions between agricultural and pastoral communities. While climate change is typically associated with adverse environmental outcomes, an analysis of data spanning four decades (1980–2023) reveals a contrasting trend of increased precipitation, enhanced vegetation, and decreased drought frequency in recent years. This research explores the potential of these positive environmental changes to mitigate resource-based conflicts and foster political stability in Darfur as improved environmental conditions are posited to create a foundation for conflict resolution and sustainable peacebuilding. The present study integrates trends in the Enhanced Vegetation Index (EVI) and the Standardized Precipitation Evapotranspiration Index (SPEI) to examine these shifts. EVI data, derived from the Moderate Resolution Imaging Spectroradiometer (MODIS) at a 250 m resolution, was used to assess large-scale vegetation patterns in arid and semi-arid landscapes. The Autoregressive Integrated Moving Average (ARIMA) model was employed to forecast future precipitation scenarios up to the year 2034, enhancing the understanding of long-term climatic trends. Data processing and analysis utilized advanced tools, including Google Earth Engine (GEE), ArcGIS Pro (version 3.4), and R software (version 4.3.2). The findings reveal a significant (33.19%) improvement in natural vegetation cover between 2000 and 2023, with degraded and unchanged areas accounting for 1.95% and 64.86%, respectively. This finding aligns with a marked increase in annual precipitation and a reduction in drought intensity over the study period. Historical SPEI analysis showed persistent drought events between 1980 and 2012, followed by a notable decline in drought frequency and severity from 2013 to 2024. Precipitation projections suggest a stable trend, potentially supporting further vegetation recovery in the region. These environmental improvements are preliminarily linked to climate-change-induced increases in precipitation and reductions in drought severity. This study's findings contribute to a nuanced understanding of the interplay between environmental dynamics and socio-political stability in Darfur, offering actionable insights for policy interventions aimed at fostering sustainable peace and resilience in the region.

Keywords: climate variability; enhanced vegetation index; environmental recovery; drought frequency; Darfur



Academic Editor: Nektarios Koutroulas

Received: 29 January 2025

Revised: 2 March 2025

Accepted: 5 March 2025

Published: 18 March 2025

Citation: Ahmed, A.; Rotich, B.; Czimber, K. Climate Change as a Double-Edged Sword: Exploring the Potential of Environmental Recovery to Foster Stability in Darfur, Sudan. *Climate* 2025, 13, 63. <https://doi.org/10.3390/cli13030063>

Copyright: © 2025 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Climate 2025, 13, 63

<https://doi.org/10.3390/cli13030063>

Climate Change as a Double-Edged Sword: Exploring the Potential of Environmental Recovery to Foster Stability in Darfur, Sudan

Abdalahman Ahmed, Brian Rotich and Kornel Czimber

March 2025

Exploring Darfur, this study assesses whether environmental regeneration could promote peace. While climate change has amplified scarcity and conflict, the paper argues that investment in environmental recovery—particularly community-based water and land initiatives—could foster local stability and resilience if coupled with inclusive governance and long-term planning.

War Economy and Resource Conflict

Escalation Pathways to the April War and the Dynamics of Sudan's Political Economy

Saleh Mustafa, Osama Hassan and

Mohamed Nagi Alassam

March 2025

Applying economic escalation theory, this analysis charts how political deals, resource alliances, and informal revenue streams set the stage for full-scale war starting in April 2023. It recommends early targeting of market

regional spillover effects.



ESCALATION PATHWAYS TO THE APRIL WAR AND THE DYNAMICS OF SUDAN'S POLITICAL ECONOMY

Saleh Mustafa
Osama Hassan
Mohamed Nagi Alassam



المركز السوداني لدراسة السياسات
Sudanese Center for Policy Studies



The Revenue Sources Sustaining Sudan's Civil War Lessons for the year 2023

Ernst Jan HOGENDOORN

Key Takeaways

- Since the beginning of the conflict, both the regular army and the rebel forces have consolidated their strength through internal and external sources of revenue.
- They benefit from significant economic networks and a political economy long based on patronage.
- Control of gold mining areas, oil infrastructure, and the taxation of trade flows have become strategic for financing military operations.
- The forces involved are supported by foreign partners, from Africa, Turkey, and the Middle East.

The Revenue Sources Sustaining Sudan's Civil War. Lessons for the year 2023

Ernst Jan HOGENDOORN
May 2025

A granular analysis of how war economies have financed Sudan's ongoing conflict in 2023. Previous reports have shed lights on gold smuggling and gum arabic sales, this reseach add genuine perspectives especially about the role of informal taxation and corporate complicity. The brief highlights how informal and extractive supply chains fuel violence, arguing that peace interventions must target these economic drivers and

Locally Led Responses and Humanitarian Practice

What Can We Learn From Locally Led Experiences in Sudan?

FENNIA

June 2025

This short reflection draws on Norwegian People's Aid's engagement in Sudan to critique top-down aid models. It emphasises the value of local knowledge, trust-building, and equal partnerships in humanitarian work. The authors argue that for locally led responses to thrive, INGOs must actively reflect on and challenge their institutional power and decision-making practices.

Reflections

What can we learn from locally led experiences in Sudan?

KARI ELIASSEN-VIEJO & SIAN OLWEN ROWBOTHAM



Eliassen-Viejo, K & Rowbotham, S-O. (2025) What can we learn from locally led experiences in Sudan? *Fennia* 2025(1) 140-143. <https://doi.org/10.11143/fennia.162748>

While it is easy to say that partnership is a two-way process, this is not so easy to implement in practice. Norwegian Peoples Aid (NPA) wish to respect partners' agency and recognise the inherent power imbalances that exist in a partnership relationship. Having worked in self-implementing international non-governmental organisations, we've seen firsthand how traditional aid models can sometimes sideline local knowledge and reinforce Western-dominated narratives. That's why we value the model that NPA champions. We are actively challenging those imbalances by prioritising local leadership, amplifying community voices and shifting from a model of imposition to one of genuine collaboration. It's not just a different approach; it's a necessary correction in a sector that has struggled to adhere to the values of anti-colonialism, independence and participation.

Keywords

Locally led, equitable, partnerships, humanitarian, Sudan

Kari Eliassen-Viejo, Sian Olwen Rowbotham, Norsk Folkehjelp, Norway. E-Mail: Kareli360@npaid.org, Siarow843@npaid.org

Norwegian People's Aid (NPA) supports locally led initiatives across its humanitarian, development and peacebuilding work. The organization works together with a range of actors — non-governmental organisations (NGOs), but also women or refugee led organisations, indigenous groups, trade unions or community groups — organised around specific objectives or areas of shared interest. Its key approach is to stand in solidarity with the efforts of those affected by conflict or crisis, by working on the interest areas and thematic areas these partners identify as most important. We have developed an equitable partnership approach that allows us to identify, assess and work alongside a wide range of actors that share our values, work in areas of similar or mutually beneficial competence and identify that working in partnership together would strengthen our efforts. Having implemented this work for Norwegian Peoples Aid (NPA) for many years, we wish to share our insights from putting into practice locally-led assistance in times of crisis. We have played a role in humanitarian responses, working alongside partners, in countries around the world including Palestine, Myanmar, Mozambique and Syria — each time beginning with an understanding of the context that straddles not only humanitarian considerations, but also looking at the longer term — and the value that civil society will play during a crisis but also in the years prior and following. We believe that strong civil society can ensure that fast, relevant and appropriate support reaches those affected by conflict, but that they also play a key role in the strengthening of institutions, social inclusion and democracy that is required to reduce the burden of conflict in the future.

URN:NBN:fitsv-oa162748

DOI:10.11143/fennia.162748



© 2025 by the author. This open access article is licensed under a Creative Commons Attribution 4.0 International License.

Social Protection and Humanitarian Systems Reform

Charting a Course for Social Protection in Sudan: Bridging Research and Policy

Social Protection Technical Assistance, Advice, and Resources Facility, STAAR
April 2025

Charting a Course for Social Protection in Sudan: Bridging Research and Policy

Lena Mahgoub,
Dr Omer Egemi,
Calum McLean.

JUNE 2025

Suggested citation: Mahgoub, L., Egemi, O., McLean, C (2025), Charting a Course for Social Protection in Sudan: Bridging Research and Policy, Conference Report. Social Protection Technical Assistance Advice and Resources (STAAR), DAI Global UK Ltd, United Kingdom.

Sudanese-led social protection models can replace collapsed state structures. It advocates for conflict-sensitive, decentralised, locally embedded systems that integrate humanitarian cash with long-term social assistance. Key recommendations include supporting local actors, improving donor coordination, and using foresight planning to adapt to Sudan's fragmented reality.

Implemented by



In collaboration with



Rift Valley
Institute

The Social Protection Technical Assistance, Advice and Resources (STAAR) facility is a joint initiative of FCDO's Better Assistance in Crises (BASIC) and Gender Responsive Social Protection (GSP) programmes (funded by UKAid). STAAR materials do not necessarily represent FCDO's own views or policies or commit FCDO to any particular course of action.

[EXPLORE THE NEW WEBSITE TODAY!](#)

Connect with us!

Don't forget to follow us on social media to stay up to date with the latest CSF analysis, courses and events.

The Conflict Sensitivity Facility (CSF) does not attempt to verify or substantiate any claims made within these publications. The opinions found therein are the responsibility of the authors themselves, and do not necessarily reflect those of the CSF.



Foreign, Commonwealth
& Development Office



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

**Swiss Agency for Development
and Cooperation SDC**



Copyright (C) 2025 CSF. All rights reserved.

[Update Preferences](#) | [Unsubscribe](#)