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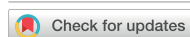
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The causes of Sudan's protracted armed conflicts from a human geography and ecology perspective

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E-mail: mohamedbabekir95@gmail.com**Keywords:** conflicts, human ecology, human geography, Sudan, peacebuilding

The causes and consequences of conflict incidents have been increasingly investigated through the lenses of human geography and human ecology, enabling a more comprehensive understanding of the ecological, social, and economic dimensions involved in environmental and social conflict. Human geography principally strives to understand the structure of the interrelations between anthropogenic and environmental factors, and how they interact and influence each other (Fan *et al* 2022). Human ecology, on the other hand, aims to explain how people's culture, livelihood, and social organization are reciprocally influenced by the natural environment.

Human ecology further examines human life and activities across diverse ecosystems and cultural contexts to better understand the factors influencing human-environment interactions. Consequently, socio-ecological concerns have emerged as a critical area of inquiry across disciplines such as geography, anthropology, political science, and economics. Complex socio-environmental phenomena, such as conflict and poverty, can no longer be confined to single disciplines. Instead, addressing these challenges requires a comprehensive and sustainable approach to development that integrates perspectives from the humanities, social sciences and natural sciences.

Academics, policymakers, and practitioners are increasingly calling for a comprehensive assessment of the environmental, social, economic, political, and geopolitical impacts of the ongoing armed conflict in Sudan (Konozy 2023, 2024, Basheer and Elagib 2024, Gregoire 2024, Siddig and Basheer 2024). This conflict, which erupted on 15 April 2023 between the Sudan Armed Forces and the Rapid Support Forces, has spread across much of the country. Addressing these concerns effectively requires a thorough conceptualization and explanation of the root causes underpinning Sudan's protracted conflicts, thereby

enabling the development of appropriate and sustainable solutions.

This essay examines the underlying causes of protracted armed conflicts in Sudan, drawing on key concepts from human geography and human ecology. The analysis is based on data and information obtained from secondary sources, complemented by observations of existing systems across social, economic, political, environmental and ecological dimensions in major conflict hotspots within Sudan. A descriptive-analytical approach is employed to explain the deep-rooted drivers of these prolonged conflicts.

Attributing social phenomena to physical environmental aspects has a long history in several scientific disciplines. Owing to the extractive and primary nature of the Sudan's economy, natural resource-based economy, a solid understanding of the country's social settings and economic performance would not be attainable without extending knowledge and cognition of the pervasive environmental contexts since labor, food, livelihood, economic activities, and socio-cultural life of Sudan revolve around land resources. This not only draws attention to the significance of valuing environmental and resource assets that hold socioeconomic development prospects but also recognizes them as decisive for political power and social life influence.

Numerous studies have attempted to explain the social and anthropological phenomena, such as conflicts by linking them to eco-environmental aspects and variables. Two conflicting narratives of 'resource curse' which attributes conflicts to resources abundance and 'resource scarcity' which frames conflicts as competition for the access and control of scarce resources have mainstreamed the explanation of resource-conflict links (Vesco *et al* 2020) among the three prevailing schools of thought

that conceptualize the resources-conflict relationships. The Neo-Malthusianism school attributes the conflicts to resource scarcity. The Neo-classical economists' school references conflicts to resources abundance. The political and economic ecologists' school perceives the conflict to be induced by unequal access and unjust distribution of resources. Examining these theories in the Sudan context provides noteworthy insights that enrich the scholarship on causatives and impacts of enduring conflicts.

Several causes are believed to stand behind Sudan conflicts, including eco-environmental factors of harsh climate conditions, desertification, land degradation, and deemed resource scarcity, compounded by resulting socio-economic conditions, such as severe land grabbing, competitiveness for dominance over valuable economic natural resources—especially during periods and in zones of scarcity—and unequal access and unjust distribution of the resources (Assal 2006, Almer *et al* 2017, Vesco *et al* 2020). For this, heated competition over land tenure, pasture-farmland issues, and widely recognized conflicts in accessing and controlling natural resources such as water sources are deemed significant factors behind many social conflicts (Elhadary and Samat 2011, Almer *et al* 2017, Sulieman 2018).

This situation, coupled with the unrecovered from the prolonged 1970s African Sahel drought, vulnerable and sluggish restoration of natural ecosystems, population, and economic growth in the context of concurrent climate change that necessitate more attentive and adaptive plans (Elagib and Elhag 2011). Regrettably, observations on the performance of political authorities and administrative system indicate that the state's economic and environmental agenda have no emphasis or plans supporting certain livelihoods alternates let alone the mitigation measures and strategies to adapt with the pressing changes in natural and human environments, which will likely induce poverty, food insecurity and socio-political unrest and even civil war, in worst scenario (Assal 2006, Elhadary and Samat 2011).

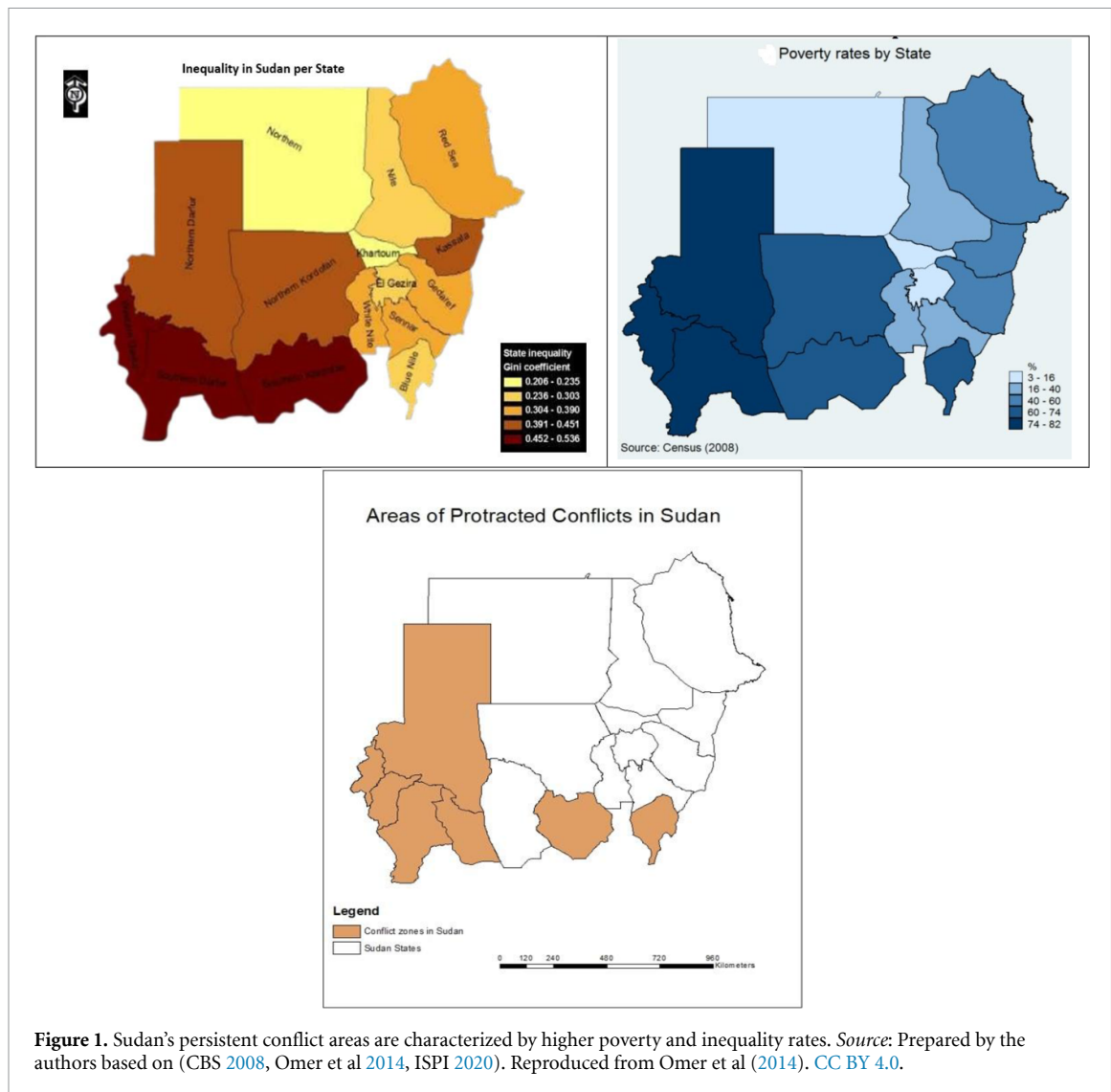
Further socio-environmental obstacles have also exacerbated the situation. Before this ongoing war, the environment and resource sectors suffered unstable and disintegrated strategic planning, characterized by neglecting achieving sustainability in the agricultural and pastoral resources, upon which the greater majority's livelihoods depend, for unsustainable and minority-controlled mineral and oil exports. Moreover, increased militarization expenditure and minimized investment in human development (Eltayeb 2017) and the undermined environmental governance (Osman and Yassin 2024), are among the factors that exacerbated the socio-economic situations and indirectly contributed to the conflicts in Sudan.

For this, the poor management and failure to cope with the environmental and resource degradation in the African Sahel region are among the alleged conflicts' causatives. The massive engagement in violence and armed conflicts of Sudan's pastoral tribes, who have received lower socio-economic welfare, indicates that socio-environmental deprivation is a primary driver of militant mobilization. However, environmental stressors such as desertification and deforestation, in addition to harsh climatic conditions like recurrent drought, are thought to be partially predictive of the conflicts (Ayana *et al* 2016). This worsened socio-environmental conditions and scarcer resources might lead to short-run and localized social tensions, with minimal likelihood to cause an organized 'institutional' and continued armed conflict. Therefore, Sudan's prolonged conflicts cannot be optimally framed to the miserable environment and resources alone.

It is worth saying that the conflict theatre and hotspot zones in Sudan are not the most fragile and marginal ecosystems in the country. The imbalanced political economy, with rampant rural and nomadic poverty is the 'perceived' root cause that paved the way for violence and the exploitative warring warlords to disturb the social cohesion. Prolonged conflicts were caused by the escalated competition over access to power and resources control (figure 1). Moreover, it would be misleading to devalue the societal socio-economic disparity and its role in keeping the country's political authority confined to a limited, unrivaled social group of a single region.

Despite the relatively high economic growth rate, the human development index reports show the continuous deterioration in socioeconomic welfare (UNDP 2024). The accentuation of poverty rate where 46.5% of the population are living under poverty line (FAO 2025), coupled with the uneven economic growth in Sudan contributed to the escalation of conflict in certain regions. The uneven economic growth benefited certain areas and social groups and marginalized the rest. The high growth rate attained during the last decades conceals the unevenness of income, development, employment, and poverty distribution. The poverty incidence between rural-urban and center-peripheries disparity is remarkably skewed (FAO 2025). A notable rise in systemic income, education, and health inequalities is well documented (UNDP 2024).

Persistent conflict zones of Sudan confront a multifaceted marginalization, For example, ecogeographically, politically, and economically. Ecologically, the prevailing fragile environment and land degradation. Economically, by weakened infrastructure, limited socioeconomic facilities, and poor service sector. Politically, by limited political representativeness and denied access to leading policy-making positions. The state lent its power to elites from certain social

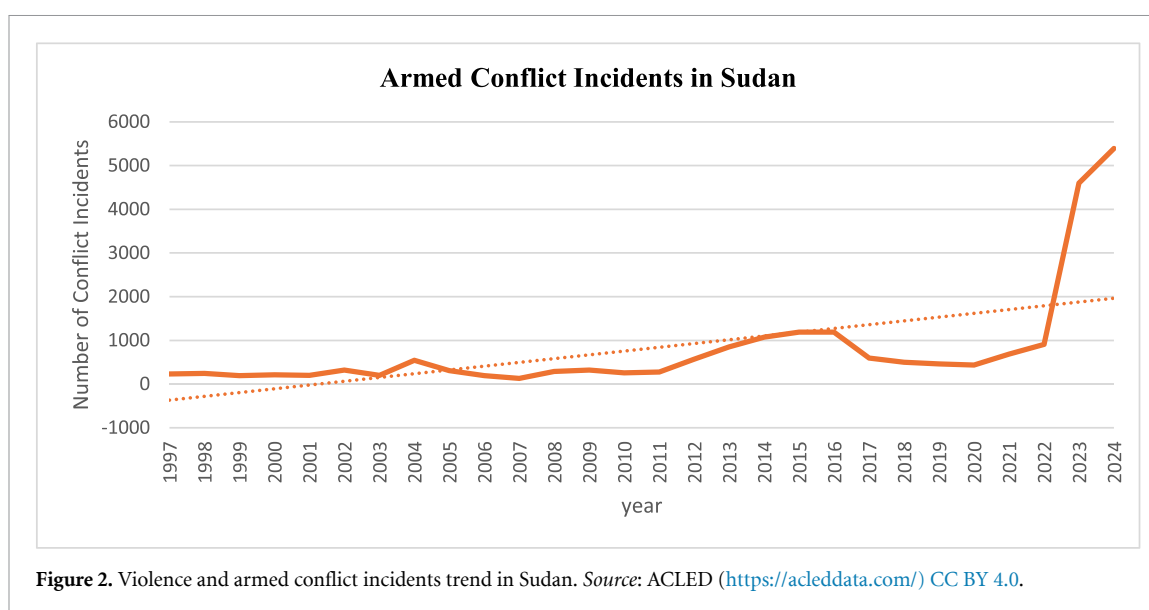


groups; consequently, the least developed communities of these marginalized conflict zones lost their rights to freedom, peace, and justice. Furthermore, these regions still lack access to important social services of financial resources, quality education, healthcare, and essential infrastructure, such as paved roads and electricity. This marginalization persists despite the fact that these zones contribute the highest share of the country's agricultural, pastoral, and mineral exports.

This imbalanced political order and the defective state's political economy enabled some exporters' minority to have exclusive exportation rights, in a context of unfair trade—low price of raw materials when compared with the actual traded price—and exploiting a cheaper workforce, which accentuated the economic marginalization and widened the poverty gaps among Sudan communities. This not only indicates the unfair and inequitable distribution of benefits from resource utilization (imbalanced sub-regional development) but also deepens wealth disparity and unequal access to political power.

Considering the amounts of Sudan's resources and population, and the fact that the conflicts persist in resource-rich regions of the least developed and lower-income communities. Enduring conflict is likely associated with economic deprivation more than with environmental and resource scarcity. This justifies the belief that the defective state's political economy and imbalanced access to power and political influence enabled the privileged elites to fuel wars to maintain economic and political supremacy. Intentionally or otherwise, the discriminatory state's administrative order and economic policies empowered some groups and marginalized others through denying rights, exploiting resources and labor under unfair trade and production relations.

As armed conflicts and civil wars in Sudan continue to intensify and expand in the spatiotemporal scales (figure 2), their impact is growingly alarming. The current war has not only escalated in its spatiotemporal dimensions but has also unfolded in regions previously unfamiliar with violence. Peaceful communities have begun to show the tensions and



readiness for violence. To confront looming threats of widespread chaos and potential national fragmentation. Human geographers must rise to the occasion and respond to pressing geographic inquiries related to the Sudanese conflict. Why are certain regions persistently conflict hotspots? Why is armed violence encroaching on the areas that have long remained peaceful? What is the political outlook expected to prevail? How will regional geographers positively intervene towards sustainable, peaceful coexistence and maintain a unified nation, in the context of escalated political polarization and separatist rhetoric?

Similarly, political economists must shed light on critical questions such as: Why are the most conflict-prone areas also the least developed, despite being home to the bulk of Sudan's economically productive natural resources and workforce majority? Why do rural poverty and marginalization persist in these resource-rich rural zones, although the country's gross domestic product still heavily relies on agricultural, forestry, and pastoral exports? What are the broader socio-political consequences of such uneven sub-regional economic development? Extending knowledge and finding answers to these fundamental questions will help chart a roadmap for addressing the causes of conflict at the grassroots level across the country.

This essay primarily attributes the prolonged conflicts to the factors of political economy, without denying the secondary roles of pressing ecological and resource scarcity. It calls for further investigative studies on the political ecology, political economy, and regional geography to further comprehend and map the human ecology of Sudan, towards informed policymaking and strategists that formulate the various national agendas, including

peacebuilding and sustainable development. Based on a firm understanding of the role of political, administrative, and economic power, as well as the dynamics of environmental change and population growth contributing to social violence and armed conflict.

It is crucial to emphasize that sustainable peace building in Sudan should start from public-rooted statutory frameworks, established academia, and specialized policy makers, not customary leaders and politicians. The comprehensive and integrated planning for sustainable environment and resources management, political and administrative stability, strengthening social co-existence, socioeconomic development, fair political representability, equitable resources and wealth distribution are the prerequisites to promote development and peace in Sudan.

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Data availability statement

All data that support the findings of this study are included within the article (and any supplementary files).

Conflict of interest

The authors declare no competing interests.

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