CGIAR FOCUS Climate Security

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How does climate exacerbate root causes of conflict in Sudan?

An impact pathway analysis

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This factsheet gives answers on how climate exacerbates root causes of conflict in Sudan, using an impact pathway analysis. Two main impact pathways are identified:

1. Resource availability and access pathway: Owing to factors like land degradation, fragmentation of grazing lands, water scarcity, breakdown of traditional coping strategies and limited mobility, impact of climate variability can exacerbate risk of conflict between the farmers and pastoral communities, as they compete over dwindling resources;

2. Weak state capacity, resource governance and maladaptation pathways: Climate-induced energy, health, and livelihood insecurities can culminate in grievances against the state that can be seen as an opportunity for armed groups to expand their support base on the ground by parallelly providing goods and services to local communities in need.

This publication is part of a factsheet series reporting on the findings of the CGIAR FOCUS Climate Security Observatory work in Africa (Kenya, Mali, Nigeria, Senegal, Sudan, Uganda, Zimbabwe).
The research is centered around 5 questions*:

1 **How does climate exacerbate root causes of conflict?**

Impact pathways

Kenya Mali Nigeria Senegal Sudan Uganda Zimbabwe

Econometric analysis

Kenya Mali Nigeria Senegal Sudan Uganda Zimbabwe

Scopus analysis**

2 **Where are the climate insecurities hotspots?**

Spatial analysis

Kenya Mali Nigeria Senegal Sudan Uganda Zimbabwe

3 **What is the underlying structure of the climate, conflict, and socio-economic system?**

Network analysis

Kenya Mali Nigeria Senegal Sudan Uganda Zimbabwe

4 **Are climate and security policies coherent and integrated?**

Policy coherence analysis

5 **Are policy makers aware of the climate security nexus?**

Social media analysis

Kenya Mali Nigeria Senegal Sudan Uganda Zimbabwe

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* Questions 1, 2, 3, 5 are analyzed at country level through a Climate Risk Lens (impact pathways, economic, spatial, network and social media analyses). The policy coherence and scopus analyses are at continental level.

**Scopus is one of the largest curated abstract and citation databases, with a wide global and regional coverage of scientific journals, conference proceedings, and books. We used Scopus data for analyzing: (1) how global climate research addresses the dynamics between climate, socio-economic factors, and conflict, and (2) how the countries studied are represented in the database.

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PATHWAY#1:

Resource availability and access pathway

In Sudan, owing to factors like land degradation, fragmentation of grazing lands, water scarcity, breakdown of traditional coping strategies and limited mobility, impact of climatic stresses and shocks on animal feed resources, animal health and market value of livestock, can push pastoral communities to settle in areas that bring them in close proximity to other groups. These factors can exacerbate risk of conflict between the farmers and pastoral communities, as they compete over dwindling resources. Along with tensions between herders and farmers, this scarcity-induced dynamic can push pastoral communities into a poverty trap. Given the dependence on livestock and rainfed agriculture for Sudan, such poverty trap can mobilize grievances to contribute to risk of violent incidences like cattle raiding and recruitment in non-state armed groups (NSAGs).

PATHWAY#2:

Weak state capacity, resource governance and maladaptation pathway

In Sudan, higher evaporation due to increasing temperatures can seriously affect water supply and access, shrink river discharge and groundwater recharge. This can then reduce availability of water for irrigation, drinking, and sanitation, culminating in acute water stress. With more than half of Sudan's electricity generated from hydropower, this water stress, together with growing population and urbanization can contribute to energy insecurity. Along with the energy sector, climate can have adverse impacts on the public health sector. Increase in flood risks can be associated with the spread of water-borne diseases as well as flood related damages to healthcare infrastructure. Inadequate capacity of the state to handle such crises can then result in political unrest and protests. Anti-government protests in Sudan are usually met with state repression and use of violence against protesters. Grievances against the state can further be seen as an opportunity for armed groups to expand their support base on the ground by parallelly providing goods and services to local communities in need. Furthermore, climate-induced livelihood stress has culminated in maladaptation, with people switching livelihoods and engaging in alternative strategies such as artisanal gold mining. Struggle over control of these mines by government-financed armed groups, and local conflicts over contested mining rights and boundaries, together with lack of effective resource governance, can weaken community resilience, trapping people in a complex loop of climate-related stress and conflict-related insecurity risks.

1. OBJECTIVE AND RESEARCH QUESTIONS

The Impact Pathway Analysis (IPA) aims to identify, describe, and represent the complex and non-linear interactions between climate, conflict, and existing vulnerabilities and risks with a special focus on food, land, and water systems. In particular, the IPA intends to address the following questions:

- What are the potential climate security pathways through which climate may act as a threat multiplier?
- Which specific vulnerabilities and risks, that are at the heart of insecurity and conflict, may be exacerbated by the climate crisis?
- How can dimensions such as natural resources, livelihoods, mobility, governance and food, land, and water systems, inform climate security pathways in specific contexts?

2. METHODS AND DATA

The IPA follows a systematic literature search and review to find, collate, analyze and synthesize insights from relevant knowledge products, including reports, policy briefs, fact sheets from grey literature, as well as books, journal articles, and other sources of documented evidence in academic literature and public media. The construction of a narrative is then followed by consultation with a designated set of experts and stakeholders through interviews and written feedback to gather evaluation and incorporate suggested revisions.

3. RESULTS

3.1 Climate exposure and vulnerability

Sudan records high vulnerability and low readiness to climate impacts, especially in the food and water sectors (University of Notre Dame 2019). With a medium level exposure to ecological threats, Sudan faces high risks from droughts and floods, compounded by population growth (Institute for Economics & Peace 2020). Impacts of climate variability through decreasing and highly variable rainfall, increasing temperatures and more frequent droughts have resulted in southward creeping of the Sahara Desert, with dire implications for water scarcity and food production (UNEP 2020). Less severe effects include Nile flooding and sea level rise (Republic of the Sudan Ministry of Environment, Forestry and Physical Development 2013). Despite large territories of desert and semi-desert environment, agriculture still constitutes a major source of livelihood, employing about half of Sudan's labor force (UNEP 2020). Historically imagined as a "breadbasket" (Verhoeven 2011), the country's dependence on rainfed agriculture, yet limited investment in the agricultural sector (Foong et al. 2020), translate effects of unpredictable rains into late harvests and crop losses (Vidal 2011). This can then result in livelihood and food insecurity, with local agricultural production not being able to adequately meet the demand for food (Zakieldeen 2009; UNEP 2020). Food security challenges may also arise from erratic flooding events, leading to infrastructural and crop damage in agricultural lands affected by drought and desertification (Siddig et al. 2018), as well as locust infestation of crops in areas suffering from desertification (Eltoum and Dafalla 2014).

3.2 Socio-economic and political insecurity

Sudan presents a complex historical, socio-economic, and political backdrop, with multiple potential pathways for studying regional dynamics of climate security risks within Sudan as well as the dynamics between Sudan and its neighbors, including South Sudan (after its 2011 secession from the single state of Sudan). Sudan's complex conflict landscape has been characterized by:

1. tensions between groups along ethnic lines, interlinked with issues of access to resources like land and water (Bromwich 2018), and;

2. grievances over uneven development, weak governance, and unequal distribution of power between Khartoum and peripheral communities (Foong et al. 2020).

The most recent coup in Sudan, with the military taking control of the government, saw thousands of people protesting on the streets, and met with violence from security forces (The Associated Press 2021). Even with the ending of al-Bashir's 30-year-long regime in 2019, Sudan's unstable transition toward democracy signals an urgent need for unpacking climate-related security risks in this fragile conflict-affected context.

3.3 Climate security pathways

Following are potential pathways (Figure 1) through which complex interactions between impacts of climate variability and conflict in Sudan can amplify and reproduce risks of insecurity and violence.

PATHWAY #1: Resource availability and access pathway

A major pathway in the climate-conflict nexus for Sudan has been hypothesized through the mechanism of violence between herders and farmers (Keen and Lee 2007). The boundary between desert and semi-desert areas has reportedly shifted southwards over last several decades and projected to continue with decreasing rainfall (UNEP 2020). Owing to factors like land degradation, fragmentation of grazing lands, water scarcity, breakdown of traditional coping strategies and limited mobility, impact of climatic stresses and shocks on animal feed resources, animal health and market value of livestock can push pastoral communities to settle in areas that bring them in close proximity to other groups. These factors can exacerbate risk of conflict between the farmers and pastoral communities, as they compete over dwindling resources (Siddig et al. 2018). Along with tensions between herders and farmers, this scarcity-induced dynamic can push some communities into a poverty trap. Given the dependence on livestock and rainfed agriculture for Sudan, such poverty trap can contribute to localized grievances, which can then heighten risks in certain areas of violent incidents like cattle raiding and recruitment in armed groups (Gray et al. 2003; Maystadt et al. 2015).

The logic surrounding the above pathway has been oriented around a scarcity framing of critical resources like water and land. This is accompanied by other framings representing both the Sudans as examples of "under-developed" and "fragile" states (Keen 2001; Ellis 2005; Selby and Hoffmann 2014). Partly linking water scarcities to climate variability impacts, amplified through desertification, famine, and food insecurity, the understanding revolves around a cycle of friction, whereby migration of people and livestock can potentially result in more friction. Paradoxically, when it comes to examining the role of non-renewable resources like oil in exacerbating conflict risks, it is the "resource curse" of "abundance" that is seen as key. Recognizing scarcity and abundance as relational, Selby

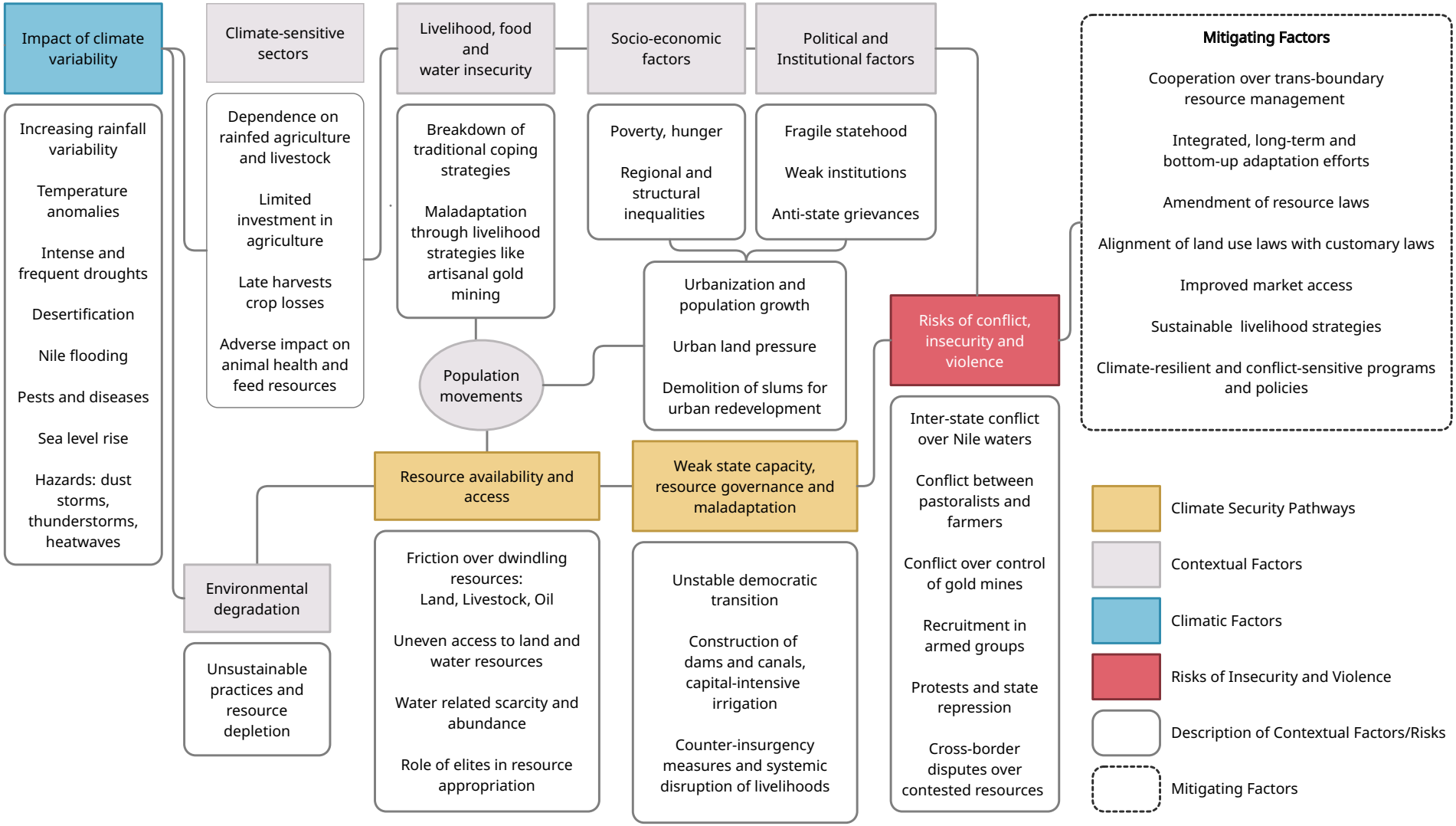

Figure 1: Climate Security Pathways for Sudan.

and Hoffmann (2014) examine historical links between relative water abundance (an essential factor in the Anglo-Egyptian colonization of Sudan in the 1890s), development regimes and emergent risks of violence.

Along with water related abundance, a combination of interactions between conditions of relative abundance of other resources, political economic and institutional factors have informed risks of human insecurity and violence. Colonial and postcolonial policies and practices such as the construction of dams and canals (like the Jonglei canal in southern Sudan, inciting widespread protests and riots before ceasing operation in 1984), together with capital-intensive irrigation schemes, have resulted in displacement and dispossession, which in turn have led to political tension and unrest in the form of protests and demonstrations. Anti-government protests in Sudan are usually met with state repression and use of violence against protesters (Sudan Tribune 2011; Human Rights Watch 2019).

PATHWAY #2: Weak state capacity, resource governance and maladaptation pathway

Projections indicate higher evaporation due to increasing temperatures would seriously affect water supply and access, shrink river discharge and groundwater recharge, thereby reducing availability of water for irrigation, drinking, and sanitation, and culminating in acute water stress. This is predicted to be more severe for northern and eastern Sudan, as well as areas around Khartoum (Siddig et al. 2018; Foong et al. 2020). With more than half of Sudan's electricity being generated from hydropower, this water related scarcity dynamics, together with growing population and urbanization can contribute to a rise in energy insecurity. Along with the energy sector, climate can have adverse impact on the public health sector. Increase in flood risks can be associated with the spread of water-borne diseases as well as flood related damages to healthcare infrastructure. Recent floods in 2020 during the COVID-19 pandemic not only highlighted how climate risks can make public health vulnerable, but also revealed the limitations of Sudan's healthcare system to cope with this intertwined crisis (Foong et al. 2020). The inability of the government to ensure basic service provision, especially water supply, has recently sparked demonstrations in water stressed areas like North Kordofan (Radio Dabanga 2021).

Resource scarcity and livelihood loss can drive population movements, with consequences for community resilience. Rural communities in the north could be especially hard hit by climate and conflict dynamics, which then act as a major push for rural-urban migration to cities like Khartoum. Urbanization and growth of informal settlements in the capital have been further driven by conflict-induced internal displacements from Darfur, Blue Nile and South Kordofan. Factors like rapid, imbalanced urban expansion, together with a growing urban population, rising land prices, and pressure on urban land, have fueled the spread of informal settlements or ashwaeyat in Khartoum, many of which expanded during periods of drought, desertification and conflicts to receive displaced people (Assal 2004; Steel et al. 2019). Further, while lacking a cohesive national instrument for land-tenure system, government policies have sought to transform and integrate lands from peri-urban and rural areas into the larger urban fabric. This has been accompanied by selling of lands to private investors and development companies by the state government of Khartoum for revenues, resulting in uneven land transformations, loss of livelihoods, and social exclusion (Steel et al. 2019). Demolitions and forced evictions from informal settlements as part of urban redevelopment plans by the government have fueled anti-government sentiments, resulting in clashes between state authorities and civilians (Omer 2018; Steel et al. 2019; Foong et al. 2020).

Grievances against the state can further be seen as an opportunity for armed groups to expand their support base on the ground by parallelly providing goods and services to local communities in need. Recent instance shows that an inadequate healthcare system during the COVID-19 pandemic has made it easier for armed groups to gain public sympathy by offering medical support amidst the public health crisis (Alamin and El Wardany 2020).

Moreover, climate-induced livelihood stress has culminated in maladaptation, whereby people engage in alternative strategies such as artisanal gold mining. With growing importance of gold revenues since the split with South Sudan, as the government tried to compensate for lost oil revenues and reduced oil exports, armed groups were allowed control of the gold mines. Struggle over control of these mines by government-financed armed groups such as the Rapid Support Forces (RSF), as well as local conflicts over contested mining rights and boundaries characterize the conflict landscape around the mining areas (De Waal 2019). Resource extraction through artisanal gold mines in turn contribute to environmental degradation, by releasing toxic elements like mercury, with detrimental effects for health (Foong et al. 2020). Furthermore, lucrative returns in this sector have acted as incentives for farmers to switch livelihoods, resulting in conversion of vast swaths of land, followed by their eventual degradation, that could otherwise have been used for cultivation (UNEP 2020). Against this backdrop, the absence of effective resource management and governance structures can reinforce a vicious cycle that weakens resilience of local communities, trapping them in a complex loop of climate-related stress and conflict-related insecurity risks.

The situation can be further compounded by cross-border dynamics around extractive activities, such as extraction of oil, which is now a contested resource between the two Sudans, with Sudan losing around three quarters of its oil reserves due to the secession (UNEP 2020). Although the Comprehensive Peace Agreement (CPA) in January 2005 laid a roadmap for peace, followed by the independence of South Sudan in 2011, the issue of contentious oil-rich territory of Abyei has remained unresolved. Contested resources like land for grazing and oil have led to military confrontations at the border, putting communities at further risk of being displaced (Mayik and Ochi 2020). In a similar vein, there is cross-border dispute (dating back to the colonial era) between Sudan and Ethiopia over the fertile al-Fashaga borderland fringing the eastern part of Gedaref state (Sudan's breadbasket). Sudan has recently displaced thousands of Ethiopian farmers from this area in December 2020 (International Crisis Group 2021). Cross-border disputes over contested resources in this fragile climate vulnerable context can not only exacerbate human security risks for those who are displaced, but also make areas where they relocate in vulnerable to political unrest and tensions.

Some key factors that can potentially mitigate such climate fragility risks have been identified to include:

1. integrated community-based bottom-up approaches for climate adaptation, linked with community stabilization and peacebuilding efforts;
2. amendment of water policies for equitable distribution of resources;
3. alignment of land use laws with customary laws;
4. provision of livelihood support for diversifying livelihood options and enhancing community resilience;
5. recognition of entry points for improving governance capacity, and;
6. overall, realization of co-benefits and greater synergies between climate-resilient programs and conflict-sensitive policies (Zakieldeen 2009; Foong et al. 2020).

REFERENCES

Alamin M, Wardany SE. 2020. *Notorious Sudanese Militia Poses as Savior in Coronavirus Fight.* https://www.bloomberg.com/news/articles/2020-04-14/notorious-sudanese-militia-poses-as-savior-in-coronavirus-fight

Assal MAM. 2004. *Displaced Persons in Khartoum: Current Realities and Post-war Scenarios.* Report for MEAwards. Cairo: The Population Council. https://www.popcouncil.org/uploads/pdfs/displaced.pdf

Bromwich B. 2018. Power, contested institutions and land: repoliticising analysis of natural resources and conflict in Darfur. *Journal of Eastern African Studies* 12(1):1 – 21. https://doi.org/10.1080/17531055.2017.1403782

De Waal A. 2019. Sudan: *A Political Marketplace Framework Analysis.* Occasional Paper No.19. Somerville, MA: World Peace Foundation. https://sites.tufts.edu/reinventingpeace/files/2019/07/Sudan-A-political-market-place-analysis-final-20190731.pdf

Ellis S. 2005. How to rebuild Africa. *Foreign Affairs* 135–148. https://doi.org/10.2307/20031711

Eltoum MA, Dafalla MS. 2014. Eco-Geographical Analysis of Desertification and Desert Locust Infestation Problems in Sudan. *Sudan Journal of Desertification Research* 6(1): 28-45.

Foong A, Pohl B, Rüttinger L. 2020. *Climate-Fragility Risk Brief: Sudan.* The Climate Security Expert Network. Berlin: adelphi, November 2020. https://www.adelphi.de/en/publication/climate-fragility-risk-brief-sudan

Gray S, Sundal M, Wiebusch B, Little MA, Leslie P, Pike IL. 2003. Cattle raiding, cultural survival, and adaptability of East African pastoralists. *Current Anthropology* 44: 3–30. https://doi.org/10.1086/377669

Human Rights Watch. 2019. *In Sudan, Repression of Protests by Another Name.* June 26. https://www.hrw.org/news/2019/06/26/sudan-repression-protests-another-name

Institute for Economics & Peace. 2020. *Ecological Threat Register 2020: Understanding Ecological Threats, Resilience and Peace.* https://ecologicalthreatregister.org/

International Crisis Group. 2021. *Containing the Volatile Sudan-Ethiopia Border Dispute.* Crisis Group Africa Briefing N°173, Khartoum/Nairobi/Brussels, 24 June 2021. https://www.crisisgroup.org/africa/horn-africa/ethiopia/containing-volatile-sudan-ethiopia-border-dispute

Keen D. 2001. Sudan: conflict and rationality. In: Stewart F, Valpy F, Eds. War and Underdevelopment: II, vol. 2. Oxford: Oxford University Press.

Keen D, Lee V. 2007. Conflict, trade, and the medium-term future of food security in Sudan. *Disasters* 31: 9–24. https://doi.org/10.1111/j.1467-7717.2007.00346.x

Mayik BM, Ochi EB. 2020. The Issue of Oil and Disputed Areas in the Conflicts between Sudan and South Sudan. J*ournal of Global Peace and Conflict* 8(2): 12-18. http://=.doi.org/10.15640/jgpc.v8n2a2

Maystadt JF, Calderone M, You L. 2015. Local warming and violent conflict in North and South Sudan. *Journal of Economic Geography* 15(3): 649-671. https://doi.org/10.1093/jeg/lbu033

Omer K. 2018. Policy Reform, not Evictions! The Case of Slum Urbanisation in Khartoum, Sudan. https://www.urbanet.info/sudan-slum-urbanisation/

Patey L. 2010. Crude days ahead? Oil and the resource curse in Sudan. *African Affairs* 109: 617–636.

Radio Dabanga. 2021. *Clashes and protests in Kordofan.* https://www.dabangasudan.org/en/all-news/article/clashes-and-protests-in-kordofan

Republic of the Sudan Ministry of Environment, Forestry and Physical Development. 2013. *Sudan's Second National Communication Under the United Nations Framework Convention on Climate Change.* Khartoum, Sudan: Ministry of Environment, Forestry and Physical Development. https://unfccc.int/sites/default/files/resource/Sudan-2NC-Final.pdf

Selby J, Hoffmann C. 2014. Beyond scarcity: rethinking water, climate change and conflict in the Sudans. *Global Environmental Change* 29: 360-370. https://www.researchgate.net/publication/271008843_Beyond_scarcity_Rethinking_water_climate_change_and_conflict_in_the_Sudans

Siddig K, Stepanyan D, Wiebelt M, Zhu T, Grethe H. 2018. *Climate Change and Agriculture in the Sudan. Impact pathways beyond changes in mean rainfall and temperatures. Middle East and North Africa Regional Program.* Working Paper 13. Washington DC: International Food Policy Research Institute (IFPRI). https://cgspace.cgiar.org/bitstream/handle/10568/101350/Climate_change_and_agriculture_in_the_Sudan.pdf?sequence=1&isAllowed=y

Steel G, Abukashawa S, Hussein MO. 2019. Urban Transformations and Land Governance in Peri-Urban Khartoum: The Case of Soba. *Tijdschrift voor economische en sociale geografie* 111(1):45-59. https://doi.org/10.1111/tesg.12372

Sudan Tribune. 2011. *Sudanese police clamp down on water cuts protestors.*

The Associated Press. 2021. *Sudan's military has seized power and arrested the prime minister.* https://www.npr.org/2021/10/25/1048911534/sudans-prime-minister-and-other-sudanese-officials-are-detained-in-an-apparent-c

UNEP. 2020. *Sudan: First State of Environment and Outlook Report 2020.* UNEP and the Higher Council for Environment and Natural Resources in Sudan. https://www.unep.org/resources/report/sudan-first-state-environment-outlook-report-2020

University of Notre Dame. 2019. *Notre Dame Global Adaptation Index – Sudan.* https://gain-new.crc.nd.edu/country/sudan

Verhoeven H. 2011. Climate change, conflict and development in Sudan: global neo-Malthusian narratives and local power struggles. *Development and change* 42(3): 679-707. https://doi.org/10.1111/j.1467-7660.2011.01707.x

Vidal J. 2011. *Sudan – Battling the Twin Forces of Civil War and Climate Change.* The Guardian, 21 November 2011. https://www.theguardian.com/environment/2011/nov/21/sudan-civil-war-climate-change

Zakieldee SA. 2009. *Adaptation to climate change: A vulnerability assessment for Sudan.* Gatekeeper series/International Institute for Environment and Development, Sustainable Agriculture and Rural Livelihoods Programme. https://pubs.iied.org/sites/default/files/pdfs/migrate/14586IIED.pdf

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