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Environment, conflict and peace in South Sudan: Implications for conflict sensitive aid

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Executive Summary

This analysis draws out some of the complex ways in which environmental degradation, climate change and conflict intersect in South Sudan, and draws out recommendations to provide guidance to aid actors on conflict-sensitive engagement.

South Sudan has a diverse array of ecosystems, rich biodiversity in both flora and fauna, and an abundance of natural resources, including large areas of natural forests, considerable water sources and deposits of petroleum, gold and other minerals. The majority of the population in South Sudan are dependent on natural resources for subsistence livelihoods, particularly poorer and more vulnerable communities in rural areas. A combination of a shift to over-use of natural resources due to increasing pressures on communities, a lack of a serious commitment by the national government to environmental sustainability and unbridled resource exploitation by the private sector are all contributing to environmental degradation, accelerating the depletion of the very resources on which communities depend and enhancing their vulnerability to economic and climatic shocks.

Environmental degradation has significant implications for conflict dynamics in South Sudan, given the complex, multi-directional interplay between the environment, natural resources, and conflict in the country, which is further affected by and interacts with climate change. Natural resources, particularly oil revenue, have contributed to financing and prolonging conflict in the country and continue to act as a key driver of inter-elite political competition. On the other hand, prolonged conflict has directly and indirectly harmed the environment and natural resource management in a number of ways: for instance, fighting during the civil war damaged oil refineries resulting in oil spills. Disputes over natural resources also risk increasing tensions both at the local and regional level across borders. An example of this has been the management of the Sudd and the Nile waters, which has at times become a source of friction. In addition, displacement and changing mobility patterns (driven especially by conflict but also by flooding and drought) has led to unsustainable resource use and environmental degradation, while also exacerbating local conflict dynamics e.g. among pastoralist communities. These dynamics are also impacted by the effects of climate change, which further compounds changes to the local environment (e.g. through exacerbating environmental degradation) with further implications for food security, resource competition and local conflict dynamics; while such dynamics in turn may also have an impact on climate change and its effects (e.g. by impeding nature-based solutions and inhibiting climate resilience).

South Sudan's political economy is another factor which needs to be considered in the interplay of conflict, the environment and natural resources. The importance of natural resources to South Sudan's patrimonial and violent political economy presents both a challenge and an opportunity. The main challenge is that the extraction of oil and exploitation of other natural resources is an attractive option for politicians looking to secure power and generate revenue. The main opportunity lies in the alternative routes of sustainable and green development, approaches which protect the environment and facilitate nature-based solutions (especially when this is done in ways which reinforces community agency and

shared socio-economic benefits) and sustainable natural resource management. Environmental peacebuilding approaches may provide further opportunities for exploring pathways and approaches through which the management of environment issues and conflict prevention and peacebuilding can be integrated towards combined positive outcomes.

In this complex political, social and conflict-prone context, especially in the run up to elections scheduled for 2024, it is imperative that aid actors understand the underlying links between conflict, the environment and natural resource management, and how climate change is interacting with these links. Aid interventions interact with their natural environment in various ways and have the potential of contributing to pollution and environmental degradation, which in turn can potentially exacerbate conflicts. As such, a conflict sensitive approach also entails integrating environmental sustainability to minimise their contribution to environmental degradation, climate change, pollution and biodiversity loss.

The report has generated a number of key recommendations for more-conflict sensitive and environmentally sustainable aid interventions in South Sudan:

1. International donors, UN agencies and all NGOs and civil society should demand that the Government of South Sudan and political leadership at state, payam and county levels take action to invest in South Sudan's future by prioritising environmental sustainability and transparent natural resource management as key measures which also can also play a role in conflict prevention.

2. Aid actors should integrate conflict sensitivity throughout programmes and processes, including ensuring that environmental impacts are considered as integral to assessments of whether programmes risk causing harm or may also contribute to positive outcomes that reinforce environmental sustainability and peace.

3. Peacebuilding actors should increase understanding of how the impacts of climate change, environmental degradation and conflict insensitive natural resource management may negatively affect conflict systems and take action accordingly, including working closely with communities to identify key drivers of conflict and pressure points, supporting dialogue between relevant actors and adapting existing approaches.

4. International donors, UN agencies, and international and national NGOs should step out of their siloes and design contextually informed and integrated programming that take advantage of opportunities to integrate peacebuilding, climate adaptation and natural resource management approaches.

I. Introduction

Over recent years, there has been a rise in research and analysis on the impacts of climate change in South Sudan. Given the persistence of conflict in various locations in the country despite the 2018 peace agreement and other localised peace efforts, alongside South Sudan's status as one of the most climate vulnerable countries in the world, there has also been an increasing interest in the links between climate change and conflict, particularly as the 'climate security' agenda has gained increasing prominence in global policy discussions. The evidence base has been growing, and more recent research has sought to unpack the complexity of conflict systems and how the interaction between climate change and conflict plays out at more locally specific levels.[1] However, in comparison there has been much less connected attention given to how environmental degradation, pollution and biodiversity loss interact with conflict dynamics, apart from in specific academic or technical spheres. Understanding the complex and nonlinear relationship of environmental degradation and conflict in South Sudan is crucial because the country's experience of and ability to respond to the triple planetary crisis of climate change, pollution, and biodiversity loss is highly influenced by the social, political, and economic factors driving South Sudan's conflict system. At the same time, environmental challenges interact with conflict dynamics in many complex ways and will have significant implications for the country's future overall.

Unpacking these linkages is even more pressing given that the outcome of elections scheduled for late 2024 may potentially have significant implications for the country's conflict risks, its approach to natural resource management, and environmental sustainability. Understanding the relationship between these factors will enable aid actors to anticipate and minimise potentially negative contributions to inter-connected social, political, economic, and environmental risk factors linked to both conflict and environmental challenges in the country, and potentially to also maximise aid actors' long-term contribution to an environmentally sustainable future for the country.

This paper presents the findings of desk-based analysis of key environmental trends in South Sudan, and the links between the environment and conflict in the country, integrating analysis of the impact of climate change. Drawing on the research findings, the paper provides an assessment of implications for aid actors and sets out recommendations for guiding more conflict-sensitive aid interventions. Given that the research has covered vast subject areas and draws solely on secondary qualitative data, it is not intended to be exhaustive. Rather, it

[1] See: Doring, S. (2020). Come rain, or come wells: how access to groundwater affects communal violence. *Political Geography*, 76(January). Available at: Link; Gleditsch, N. P. (2012). Special Issue on Climate Change and Conflict. *Journal of Peace Research,* 49(163). Available at: Link; Ide, T. et al. (2020). Multi-method evidence for when and how climate-related disasters contribute to armed conflict risk. *Global Environmental Change*, 62(1). Available at: Link; Theisen, O. M. et al. (2013). Is Climate Change a Driver of Armed Conflict? *Climatic Change,* 117 (3). Available at: Link; van Weezel, S. (2019). On climate and conflict: Precipitation decline and communal conflict in Ethiopia and Kenya. *Journal of Peace Research*, 56(4). Available at: Link; Vesco, P., et al. (2020). Natural Resources and Conflict: A Meta-Analysis of the Empirical Literature. *Ecological Economics,* 172. Available at: Link; Von Uexkull, N., d'Errico, M. and Jackson, J. (2020). Drought, resilience, and support for violence: Household survey evidence from DR Congo. *Journal of Conflict Resolution,* 64(10). Available at: Link.

is meant to act as a primer to highlight key linkages and risks and opportunities, which should then be analysed further through more in-depth research and fieldwork.

The paper is structured as follows: Section II presents an overview of key environmental trends; Section III explores evidence of the links between the environment, conflict, and peace; Section IV examines how aid actors interact with the environment in South Sudan, and; Section V sets out conclusions from the analysis and proposes recommendations to guide aid actors on conflict-sensitive engagement with environmental sustainability and natural resource management in South Sudan.

II. Key environmental trends in South Sudan

II.a. Overview

South Sudan is home to a wide variety of ecosystems, a rich animal and plant biodiversity and a multitude of natural resources. The country is divided into five different ecological zones: the savannah region, the flood region, the montane forest zone, semi-desert regions, and lowland forest.[2] These zones are all home to a distinct biodiversity in flora and fauna. South Sudan is also home to the Sudd wetland, one of the world's largest tropical wetlands, which surrounds the White Nile delta and consists of lakes, swamps, floodplains and marshes.[3] The Sudd wetland has been declared a Ramsar site, which means that it is a "globally-recognised hotspot for biodiversity." [4] Drawing on land cover data from the Food and Agriculture Organisation of the UN (FAO), figure 1 below shows a map of South Sudan's different eco-systems.

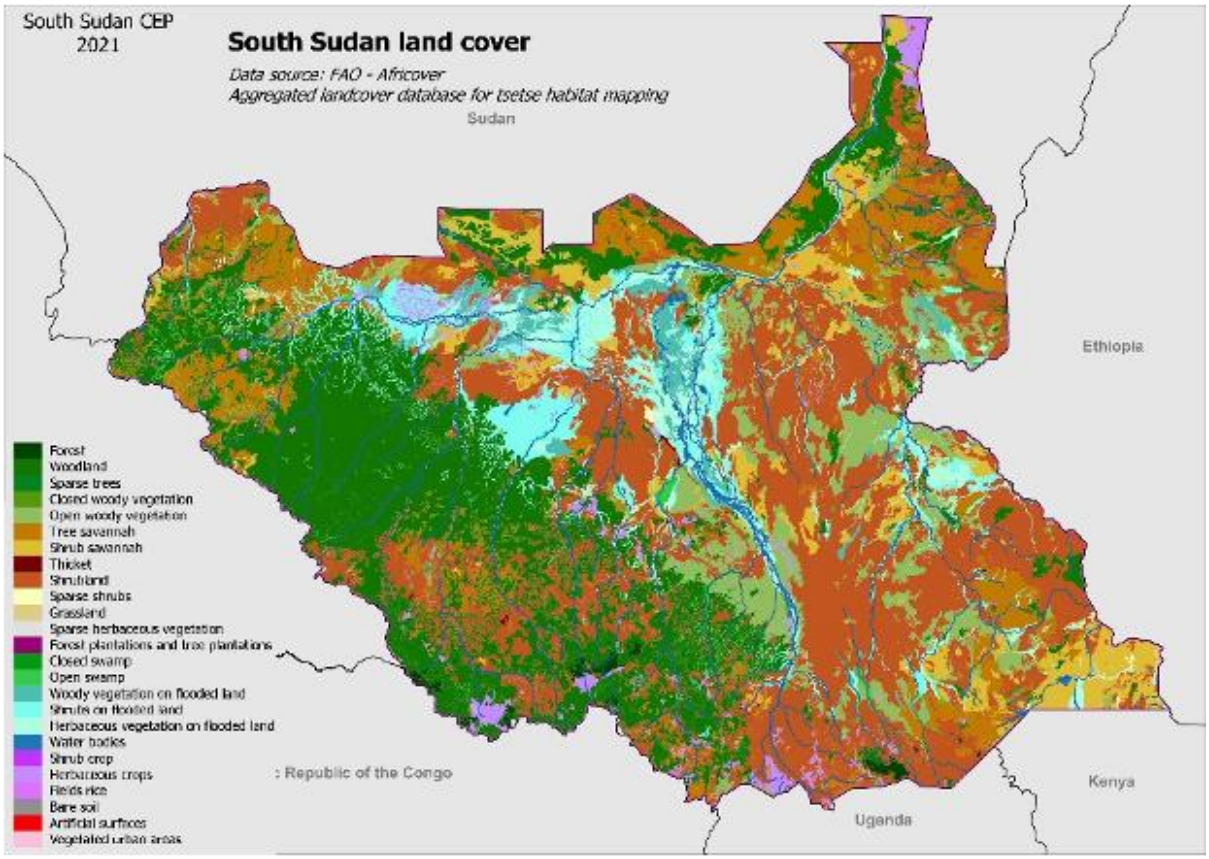
Map 1: South Sudan Land Cover[5]

[2] USAID. (2007). Southern Sudan Environmental Threats and Opportunities Assessment. Available at: link.

[3] UN Environment, 2018. South Sudan: first state of environment and outlook report 2018. Available at: link.

[4] USAID. (2007). Southern Sudan Environmental Threats and Opportunities Assessment. Available at: link.

[5] European Commission (2022). Elaboration of the Country Environmental Profile (CEP) of South Sudan. Available at: link.



South Sudan's climate ranges from tropical semi-humid to tropical rainy climates, varying both spatially and temporally. South Sudan has both wet and dry seasons, with a unimodal regime in the north and a bimodal regime in the more southern areas. Overall rainfall levels are highest during the main rainy season between June and September, with the dry season typically lasting from November to April.[6] Annual levels of rainfall generally range from 700 to 1300 millimetres in lowland areas, 1200 to 2200 millimetre in more humid areas (Western Equatoria State and highland areas of Eastern Equatoria State), and remain around 200 millimetres in the drier south-east of Eastern Equatoria State.[7] Communities have adapted to seasonal rains, with seasonal migration a central part of livelihoods in many parts of the country.[8]

II.b. Natural resource management and environmental degradation

South Sudan is rich in natural resources, including water, forests, fertile land, oil, and minerals such as gold, copper, iron, and bauxite. Most of the South Sudanese population relies on natural resources for their subsistence livelihoods, underpinned by the country's high poverty rates. The contribution of local knowledge and experience to environmentally sustainable natural resource management and resource sharing is critical to allow benefits of learning from customary practice, historic relationships and first-hand knowledge of environmental

[6] Lukwasa, A. Z., Zeleke, T. T., Beketie, K. T., and Ayal, D. Y. (2022). Spatio-temporal rainfall variability and its linkage with large scale climate oscillations over the Republic of South Sudan. Climate Services, Volume 28. Available at: Link.

[7] Ibid.

[8] Iffat, I. (2018). Livestock and conflict in South Sudan. K4D Helpdesk Report 484. Brighton, UK: Institute of Development Studies. Available at: link.

implications[9], many of which tend to be highly specific to local or subnational areas. However, traditional and established practices of resource management have been shifting due to conflict and changing pressures including migration, changing administrative boundaries and national political dynamics. As will be explored in the 'Forests' section below, research shows that due to limited economic opportunities (especially linked to the impact of years of conflict, and consequent displacement for example), many communities have turned to increasingly unsustainable natural resource exploitation as the main or only source of food, energy, and income, particularly the poorest segments of the population. This, coupled with a lack of a serious commitment by the national government to environmental sustainability, as well as unbridled resource exploitation by the private sector, is contributing to environmental degradation, accelerating the depletion of the very resources on which communities depend and enhancing their vulnerability to economic and climatic shocks. Below is a brief overview of South Sudan's main natural resources.

Oil

South Sudan's economy and its national budget are highly dependent on oil, with about 85 percent of the budget stemming from revenues linked to the oil sector.[10] Until 2013, South Sudan was producing a volume of 350,000 barrels of crude oil per day. Due to compounding effects of the civil war, COVID-19, recent flooding and economic shocks, the production volume declined to 160,000 barrels per day in 2022 and 140,000 in 2023.[11] In response, in July 2023, the government announced plans to double oil production to 350,000 with Petroleum Minister Puot Kang Chol stating his intention to restore oil production to pre-civil war volumes.[12] He has also indicated that the Ministry of Petroleum is exploring alternative export routes for crude oil, as well as the potential for construction of a large refinery. At the moment, almost all South Sudanese crude oil is transported to refineries in Sudan through direct pipelines before reaching international markets.[13] The risk of this sole reliance on Sudan has been highlighted during the current civil war as crude exports to Sudan were halted due conflict-related ruptures in the main pipeline linking the two countries.[14]

There is limited data available on the environmental impacts of oil fields in South Sudan with the data available coming from NGOs rather than government sources.[15] From the available research, it is clear that persistent pollution due to outdated infrastructure, lack of maintenance and mismanagement of the oil sector has had negative social and environmental impacts in areas surrounding oil fields, particularly in the Upper Nile region. These impacts include deforestation, loss of biodiversity, the loss of grazing land, soil and water contamination, and forced displacement.[16] Concerningly, oil spills have polluted ground

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[9] Kibe, Esther & Nzomo, Maria & Jonyo, Fred. (2023). Citizen Participation in Natural Resource Governance: A Case of Oil in South Sudan. European Journal of Development Studies. 3. 39-47. 10.24018/ejdevelop.2023.3.5.293.

[10] SSOP. (2024). South Sudan to leverage oil as a catalyst for energy transition, says petroleum minister. Available at: link.

[11] Oluoch, F. (2023). Khartoum unable to ensure smooth export of South Sudan oil. The East African. Available at: link.

[12] Mitchell, C. (2023). Interview: South Sudan eyeing crude production, refinery-building blitz. Available at: link.

[13] Ibid.

[14] Mitchell, C., and Ng, M. (2024). Force majeure declared on South Sudan's Dar Blend crude loadings: sources. S&P Global. Available at: link.

[15] Zwijnenburg, W., Jaramillo Vasquez, R., and Hoch, J. (2023). Toxic Floods? Climate, Natural Hazards and Risks to South Sudan's Oil Infrastructure. *PAX*; p. 5. Available at: link.

[16] UN Environment, 2018. South Sudan: first state of environment and outlook report 2018. Available at: link.

and surface water and soil as demonstrated by the high concentrations of salt and heavy metals that have been found in water sources in oil production areas.[17] Polluted water and soils have negatively impacted agricultural productivity, as well as human and animal health.[18] Key reported health issues include infertility, premature births, miscarriages, birth defects, blindness, and death. This combination of negative impacts has caused further displacement of affected populations.[19] In 2021, communities in the Upper Nile region began protesting the oil pollution and the lack of progress in addressing their concerns. As a result, the government announced that oil companies that did not implement environmental protection policies would face expulsion from the country. However, there have been doubts over whether this demand would be implemented, as the country's GDP remains heavily dependent on revenue from oil extraction.[20] The government's inability to pass the Environmental Protection Bill and National Environmental Policy – drafted in 2010 and updated in 2013 – further underscores its lack of political will to prioritise environmental protection.[21]

Water

Water is an essential natural resource for the South Sudanese population. The main water resource is the White Nile (and its tributaries), which flows south to north and forms the highly important Sudd Wetland, the largest wetland in Africa. An estimated 30 percent of the flow of Nile water passes through South Sudan.[22] Water is abundant in some geographical areas and in certain times of year, whereas other parts of the country experience drought. South Sudanese communities rely on water for fishing, livestock keeping, and agriculture, with the agricultural demand for water accounting for 90 percent of total demand.[23] Pollution of water has increased in recent years, particularly, as seen above, due to flooding in areas surrounding oil fields.[24] Poor waste management, the result of decades of conflict and underfunding, has led to the contamination of surface and groundwater, particularly around urban areas. This in turn presents serious risks to ecosystems and human health. A study of water quality of the River Nile and streams within Juba found that they are highly contaminated with plastic, chemical and organic waste.[25]

The management of the Sudd and regional hydropolitics has historically been linked with controversy, in particular over the Jonglei canal project. The Jonglei Canal was originally a

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[17] Tiitmamer and Kut, January 2021. The Sudd Institute. *Sitting on a time bomb: Oil pollution impacts on human health in Melut county, South Sudan.* Available at: link.

[18] Saturlino, M. (2023). Oil exploration and its effects on the environment and pastoralist communities in the Upper Nile region of South Sudan. STG Policy Papers: Policy Brief. Available at: link.

[19] Ibid.

[20] Zwijnenburg, W., Jaramillo Vasquez, R., and Hoch, J. (2023). Toxic Floods? Climate, Natural Hazards and Risks to South Sudan's Oil Infrastructure. *PAX*; p. 8. Available at: link.

[21] Netherlands Commission for Environmental Assessment. (2019). South Sudan EIA profile. Available at: link.

[22] African Development Bank (AfDB) Group, 2013. Chapter 6: Development of Agriculture in South Sudan. *South Sudan: An Infrastructure Action Plan - A Program for Sustained Strong Economic Growth*. Available at: link.

[23] Ibid.

[24] Zwijnenburg, W., Vasquez, R., and Hoch, J. (2023). Toxic Floods? Climate, Natural Hazards and Risks to South Sudan's Oil Infrastructure. PAX. Available at: link.

[25] Karija, M. K., Shihua, Q., and Lukaw, Y. A. (2013). The Impact of Poor Municipal Solid Waste Management Practices and Sanitation Status on Water Quality and Public Health in Cities of the Least Developed Countries: the Case of Juba, South Sudan. *International Journal of Applied Science and Technology, Vol. 3*(4). Available at: link.

colonial era project, conceived to channel more water into downstream agricultural irrigation by effectively creating a diversion for the White Nile to bypass the Sudd, though the project did not begin until 1978. With 240 of the 360 kilometres excavated, the project was eventually brought to a halt by Southern Sudanese rebels in 1984.[26] Rumours fuelled by statements by state officials about a possible resumption have been mounting since 2021, reigniting past divisions and fears. Dredging of the River Naam has also been the subject of controversy – despite being two separate initiatives, these are often conflated; this is partly due to the historic legacy of hydropolitics in the Sudd and partly due to the perception that dredging may be a precursor for the canal. (See below for further details.)

Not enough is known about the full extent of the importance of the Sudd and implications for the region's hydrology, however its potentially significant role as a carbon source or sink as well as in flood prevention, capacity to modulate the regional climate, unique ecosystem and extensive biodiversity alongside the delicate balance of livelihoods in the region mean that irreversible decisions could have catastrophic consequences for people and the environment.[27] Therefore, there is a critical need for further research, environmental impact assessments and much greater understanding of the regional hydrology and implications of changes along the entirety of the Nile Basin.

Forests

South Sudan has extensive areas of natural forests and other wooded land cover, most of which are concentrated in Western Equatoria State, Central Equatoria State, Eastern Equatoria State and Western Bahr el Ghazal. Whilst there is no authoritative source of data on the extent of forest cover in the country, estimates range from 11 to 35 percent.[28] More than 99 percent of South Sudan's population relies on forests as their primary source of energy (fuel wood and charcoal). The forests also provide timber for construction and furniture[29] and other Non-Timber Forest Products (NTFPs) such as food, livestock fodder, medicines, fibres, dyes and resin. Forest-based plants in particular act as a crucial source of food, providing a coping mechanism during times of drought, economic crisis or other shocks.[30]

It is estimated that the country has lost 40 percent of its forest cover over the last 50 years.[31] From 2001 to 2023, for example, South Sudan lost 137 kilo hectares (kha) of tree cover, which represents a 1.2 percent decrease in tree cover since 2000.[32] Between 2002 and 2023, South Sudan lost 2.16 kha of humid primary forest, representing a loss of 2.5 percent of its total humid primary forest.[33] Commercial logging for firewood and charcoal have been cited as the

[26] CSRF. (2023). Hydro-politics in the Sudd Wetland: The implications of past and current water development projects for South Sudan and the Nile Basin. South Sudan Conflict Sensitivity Resource Facility (CSRF). Available at: link.

[27] Darbyshire, E. (2021). Is South Sudan's Sudd wetland at a fork in the road?. Conflict and Environment Observatory. Available at: link.

[28] UNEP. (2018). South Sudan: first state of environment and outlook report 2018. Available at: link.

[29] Ibid.

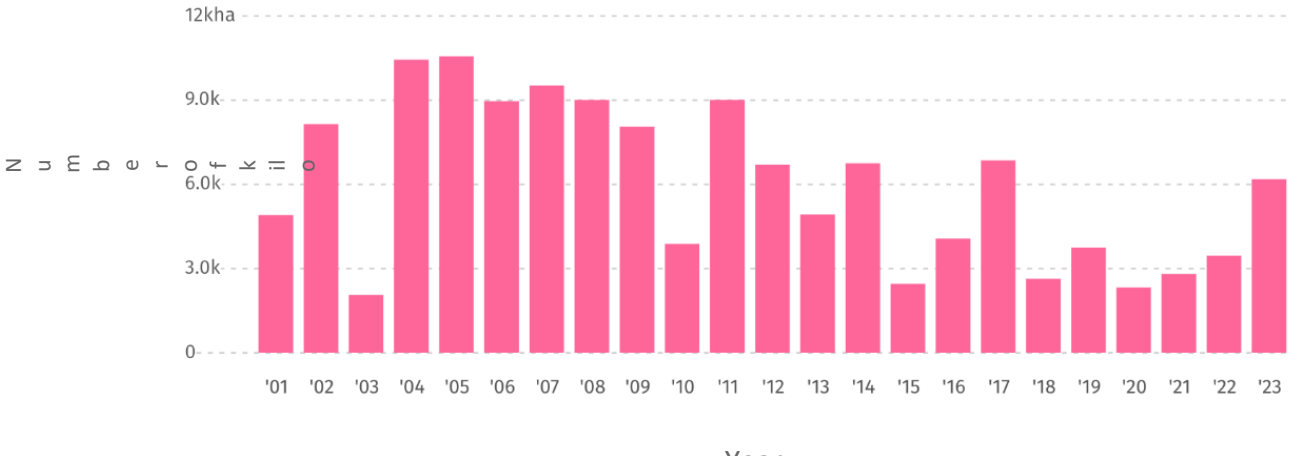
[30] REACH. (2018). Now the Forest is Blocked: Shocks and Access to Food. Available at: link.

[31] European Commission (2022). Elaboration of the Country Environmental Profile (CEP) of South Sudan. Available at: link.

[32] Global Forest Watch. (2022). South Sudan. Available at: link.

[33] Ibid.

primary reason behind deforestation,[34] followed by logging for timber, and the felling of trees for agriculture.[35] Figure 2 below shows the level of deforestation in South Sudan – in terms of hectares of tree cover lost per year – between 2001 and 2023.[36]



In an attempt to alleviate the pressure, timber and charcoal exports were banned by the South Sudanese government in July 2018. Deforestation is contributing significantly to environmental degradation in South Sudan, leading to increased desertification, soil degradation,[37] and the migration and loss of wildlife.[38] The Government of South Sudan's 2016 National Adaptation Programmes of Action (NAPA) estimated that within 50 years there will be no forest cover left in the country if deforestation continues at its current rate.[39]

Land use and management

Approximately 78 percent of South Sudanese households depend on land-based economic activities as a primary source of livelihood, mainly crop farming on small land-holdings or animal husbandry.[40] Of these, 81 percent of households are engaged in agriculture and 74 percent own livestock, livelihood activities which are highly dependent on fertile land, according to South Sudan's first 'State of environment' report, launched in 2018.[41] Whilst an estimated 70 to 90 percent of South Sudan's total area is suitable for agriculture, in 2018 only 3.8 percent was being cultivated.[42] This has contributed to persistent and pervasive food

[34] IOM, (2021). Deforestation in South Sudan. p. 14. Available at: link.

[35] South Sudan Council of Churches and UK Peacebuilding Opportunities Fund. (2020). The impact of logging activities on local communities. Available at: link.

[36] Global Forest Watch. (2022). South Sudan. Available at: link.

[37] IOM, (2021). Deforestation in South Sudan. p. 14. Available at: link.

[38] South Sudan Council of Churches and UK Peacebuilding Opportunities Fund. (2020). The impact of logging activities on local communities. Available at: link.

[39] UNEP (2017). Republic of South Sudan. National Adaptation Programmes of Action (NAPA) to Climate Change. Available at: link.

[40] UNEP (2018). South Sudan: first state of environment and outlook report 2018. Available at: link.

[41] Ibid.

[42] European Commission (2022). Elaboration of the Country Environmental Profile (CEP) of South Sudan. Available at: link.

insecurity in the country, in combination with the impacts of conflict and climate change (more detail in Section III below).[43]

There is evidence that overgrazing, the felling of trees for firewood and charcoal, and agricultural expansion – which increased from 1-2 percent of land cultivated per year between 2005 and 2009 to nearly 4 percent in 2018[44] – are contributing to land degradation, loss of soil fertility, and soil erosion, particularly through the burning and clearing of forests.[45] As seen above, poor management of rangelands and cropland is also contributing to decreased soil fertility and desertification.[46]

A complex mosaic of community land use and regulation according to customary law has historically been applied across what has become South Sudan; however, this has increasingly sat at odds with large scale commercial land acquisition, national legislation and land grabbing, often linked to conflict. To govern land ownership and tenure in South Sudan, the Southern Sudan Legislative Assembly passed three key pieces of legislation in 2009 (before independence): the Land Act, the Local Government Act, and the Investment Promotion Act. The most relevant to communally-owned land is the Land Act, which recognised customary land tenure, stating that "customary land rights including those held in common shall have equal force and effect in law with freehold or leasehold rights". Nevertheless, despite the Land Act, a lack of clear guidelines and regulations for its implementation has allowed its provisions to be undermined.[47] For example, government practice has often undermined customary law, with the government expropriating and leasing communal land to private investors with limited-to-no consultancy with communities themselves. In addition, whilst the Land Act affords women the right to inherit and own land in South Sudan, this is often not enforced in practice, as gender-discriminatory customary rules undermine implementation of the Act.[48]

Minerals

The Equatoria region of South Sudan has considerable gold reserves, although the exact volume of gold reserves, production and trade is unknown. Whilst traditionally gold extraction activities were primarily artisanal and small-scale, in 2015, the government began issuing licences to local and multinational companies to explore for gold. By December 2021, an estimated 91 mineral exploration companies and 15 small-scale mining company licences were active.[49] This makes it difficult to monitor the volume of gold extracted and traded. Uganda and the UAE reported having imported respectively 1822 and 1250 kilograms of gold

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[43] FAO. (2024). South Sudan: The impact of conflict on food security and livelihoods – DIEM-Impact report. Food and Agriculture Organisation of the United Nations. Available at: link.

[44] African Development Bank (AfDB) Group, 2013. Chapter 6: Development of Agriculture in South Sudan. *South Sudan: An Infrastructure Action Plan - A Program for Sustained Strong Economic Growth*. Available at: link.

[45] European Commission (2022). Elaboration of the Country Environmental Profile (CEP) of South Sudan. Available at: link.

[46] Francis Lado, T. (2019). Governmental high-level note of measures to achieve the national LDN targets. Directorate for Agricultural Research, Ministry of Agriculture and Food Security, Republic of South Sudan. Available at: link.

[47] Mennen, T. (2012). Customary Law and Land Rights in South Sudan. Norwegian Refugee Council. Available at: Link; Tiitmamer, N., Mayai, A. T., and Mai, N.H. (2017). Land Tenure in South Sudan: Does it Promote Climate Change Resilience?. Policy Brief. The Sudd Institute. Available at: Link.

[48] Ibid.

[49] Hunter and Opala. (2023). Tarnished hope: Crime and corruption in South Sudan's gold sector. Global Initiative Against Transnational Organized Crime. Available at: link.

from South Sudan in 2020, with a total value of 110 million US dollars. This is likely only a small component of total gold exports, as reports indicate that large additional volumes of gold are being smuggled to Uganda and Kenya.[50] The South Sudanese government has shown an interest in developing the national mining sector as part of its economic development strategy. In 2023, it signed a Memorandum of Understanding with the South African government Department of Mineral Resources and Energy, to enhance collaboration and capacity building on mineral mining.[51]

This, however, could potentially present a significant risk to the country's environment if adequate regulation and protections are not put in place. Evidence from a study on the environmental impact of artisanal gold mining in Central Equatoria State found that mining activities have polluted streams (which serve as crucial water sources for local communities), degraded and made land around mines vulnerable to erosion and disrupted important soil organisms and soil aggregates depriving the soil of organic matter crucial for fertility and plant growth.[52] Mercury, arsenic and cyanide discharges into rivers – commonly associated with artisanal gold mining – can lead to water sources becoming too toxic for drinking, and deoxygenation of the water and death of aquatic organisms. Expanding mining activities without proper regulation could have significant implications for local ecosystems and the food security of surrounding communities. As will be seen below, the links between mining and conflict dynamics also mean that expansion could increase the scale and intensity of the security risks associated with the sector.

II.c. Biodiversity loss

South Sudan boasts rich and diverse habitats that are home to an array of flora and fauna, some which are unique to the country. For instance, South Sudan is the only African country which is known to host both species of eland: the common eland (*Taurotragus oryx*), and Derby's giant eland (*Taurotragus derbianus*). The country is also home to one of the great circular migrations of wildlife which spreads across Jonglei and Eastern Equatoria and into neighbouring Ethiopia. Within its Sudd wetlands, there is the world's largest population of shoebill (*Balaeniceps rex*) and black-crowned cranes (*Balearica pavonina*).[53]

South Sudan has formally committed to maintaining biodiversity and the sustainable use of its components through accession to the UN Convention on Biological Diversity in 2014. Nevertheless, South Sudan has been experiencing considerable biodiversity loss due to ecosystem degradation from encroachment, poaching, wildfires, deforestation, pollution, and urban expansion. As a result, some species have become endangered or are feared extinct. For instance, the numbers of African Forest Elephants (*Loxodanta africana*) have plummeted, and the black rhinoceros (*Diceros bicornis*) and white rhinoceros (*Ceratotherium simum*) are

[50] Ibid.

[51] SSOP. (2024). South Africa, South Sudan to collaborate on mining development. South Sudan Oil Power. Available at: link.

[52] Celestino Ladu, J. L. et al. (2019). Environmental Impacts of Gold Mining: A Study of Mining Communities in Gorom Village, Rejaf County, Central Equatoria State, Republic of South Sudan. *Applied Ecology and Environmental Sciences*, Vol. 7, No. 1. Available at: link.

[53] European Commission (2022). Elaboration of the Country Environmental Profile (CEP) of South Sudan; p. 33. Available at: link.

feared extinct.[54] Moreover, at a national-level conservation efforts are poorly managed, with little investment and a lack of capacity to enforce the required protections, which is in turn increasing the vulnerability of ecosystems within the country[55]. This is despite the presence (on paper) of six national parks and twelve game reserves (accounting for 13% of South Sudan's surface area).[56] That said, there have been some notable initiatives to support the management of Protected Areas at local and subnational levels, based on community conservation approaches and facilitated by partnerships between international and national NGOs, local communities and the Ministry of Wildlife Conservation and Tourism (MWCT) and state Wildlife Services.[57]

II.d. Climate change and environmental degradation

Climate change is having a significant impact on South Sudan's natural environment, exacerbating the environmental and human risk factors that contribute to environmental degradation and biodiversity loss in the country. South Sudan is experiencing both long-term changes, experiencing some of the fastest rates of warming globally and more frequent extreme weather events. Since the mid-1970s, rainfall has decreased by 10-20 percent and mean annual temperatures across the country have increased by more than 0.4°C every decade between 1990 and 2020 – and are projected to increase between 1°C and 1.5°C by 2060.[58] There has also been an increase in frequency of extreme rains[59] whilst at the same time seasonal rainfalls have become unpredictable impacting on agriculture.[60]

In recent years, the incidence of extreme weather events has increased markedly. From 2019 to 2022, there were four consecutive years of severe flooding, which affected between 750,000 and more than one million people each year.[61] In other parts of the country, particularly in the south east, climate change has caused conditions of extreme drought.[62] Given that more than 85 percent of the population relies on the rainfed agriculture and other climate-sensitive natural resources for their livelihoods, climate change is impacting food security and livelihoods by affecting the availability of rain water.[63] Flooding also threatens to elevate pollution, with the majority of oil blocks being located near rivers. For instance, 533 out of 1352 (~40%) of oil extraction points were flooded in Unity state in 2021-22.[64] The effects of climate change are contributing to displacement of human and livestock

[54] Ibid.

[55] Ibid.

[56] Winter, P. (2024) Conflict and Conservation in South Sudan. Available at: link.

[57] Garside, A. (2021). Conflict cycles and the management of Protected Areas in South Sudan. Conflict and Environment Observatory.Available at: link.

[58] Siddig, K. et al. (2020). Climate change and agriculture in the Sudan: Impact pathways beyond changes in mean rainfall and temperature. *Ecological Economics*, Volume 169. Available at: link.

[59] ADB. (2018). National Climate Change Profile: South Sudan. African Development Bank. Available at: link.

[60] Tiitmamer, N. (2021). A Climate Crisis in Africa: The Case of South Sudan. The Cairo Review of Global Affairs. Available at: link.

[61] UNICEF. (2022). Climate change and flooding: Responding to the needs of growing number of children and families affected by floods. Available at: link.

[62] Ibid.

[63] UNEP. (2023). South Sudan Adapts to Climate Change By Restoring Its Ecosystems. Available at: link.

[64] Zwijnenburg, W., Jaramillo Vasquez, R., and Hoch, J. (2023). Toxic Floods? Climate, Natural Hazards and Risks to South Sudan's Oil Infrastructure. *PAX*; p. 5. Available at: link.

populations. At the same time, extreme weather events like flooding and drought have contributed to the destruction of crops and the loss of livestock. These impacts, in turn, have undermined food security and led communities to overgraze and to move to new areas for grazing and agriculture, further exacerbating land degradation and deforestation, and increasing the risk of conflict, as is detailed in the next section.[65] Consequently, by contributing to environmental degradation, climate change is eroding South Sudanese' resilience and enhancing their vulnerability to the impacts of climate change itself. In fact, the 2024 INFORM Risk Index indicates that South Sudan is the world's second most vulnerable country to natural hazards.[66]

III. Links between the environment, conflict, and peace

This section presents an assessment of the interaction between the environment (and natural resources) and conflict. It first looks at how conflict has impacted the environment and intersects with natural resource management, and then it explores the different ways in which natural resources and environmental degradation have intersected with conflict at national, local, and regional levels. Overall, while the intersection between the environment and conflict has profound implications, the links between the environment, conflict and peace are highly complex and can only be understood in conjunction with an understanding of broader social, political, economic and gender dynamics.

III.a. Conflict and environmental degradation

Prolonged conflict in South Sudan has adversely impacted the country's natural environment and its natural resource management, both directly and indirectly. Direct impacts include, for example, oil spills resulting from damage to oil refinery equipment due to conflict-related violence.[67] Moreover, many oil fields were abandoned without dealing with leaks and spills during the civil war.[68] In forested areas, particularly in the Equatorias, there is evidence of soldiers from the South Sudan People's Defence Forces (SSPDF) engaging in tree felling for charcoal production to supplement their salaries,[69] and of the government issuing illicit forestry concessions to raise revenue.[70] In terms of natural resources, there is ample evidence that members of the SSPDF and opposition military forces of the Sudan People's Liberation Army-in-Opposition (SPLA-IO) amassed large herds of cattle during the conflict, which, due to the compounded impacts of climate change and localised conflict in the greater Jonglei area, have had to migrate to new areas, resulting in further conflict over grazing land and water with farmers and other pastoralists.[71] Evidence also shows that SSPDF soldiers deployed to fight

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[65] UNEP (2017). Republic of South Sudan. National Adaptation Programmes of Action (NAPA) to Climate Change. Available at: link.

[66] UNOCHA. (2023). Humanitarian needs and response plan South Sudan. Available at: link.

[67] UNEP. (2018). South Sudan First State of Environment and Outlook Report. Available at: link.

[68] Tiitmamer N. (2015). Understanding the Enforcement of Environmental Provisions of Petroleum Act 2012 and Why Environmental Ruin Continues. *Sudd Institute.* Available at: link.

[69] Yaw Tchie, A., and Tarif, K., 2021. Climate, Peace and Security: The case of South Sudan. ACCORD. Available at: link.

[70] Garside, A. (2021). Conflict cycles and the management of Protected Areas in South Sudan. Conflict and Environment Observatory. Available at: link.

[71] Kuot, L. (2024). Farmers-Herders' Conflict Undermines Peace building Efforts in South Sudan. *International Journal of Humanities and Social Science Invention*, Volume 13, 1. Available at: link.

the National Salvation Front (NAS) – a non-signatory of the 2018 peace agreement, which is still militarily active in the Equatorias – are involved in the gold trade, including by providing security services to mining companies and engaging directly in artisanal mining.[72]

Indirect impacts are primarily related to conflict-induced displacement and poverty. These have forced communities to adopt negative, usually environmentally harmful, coping mechanisms, leading to further increased risk of conflict in the future as competition for natural resources is heightened or increasingly securitised. The most notable such coping mechanism is excessive tree felling for firewood and charcoal production, which in turn has contributed to deforestation and soil degradation.[73] Another notable coping mechanism is the poaching of wildlife, which has been enabled by the wide availability of firearms in the country due to legacy of conflict, insecurity, and the absence of the rule of law.[74] Poor communities have used these firearms to poach wildlife as a coping mechanism when other sources of livelihood are not available, selling the bushmeat as a form of income generation.[75] Antelope and deer are reported to be the most poached animals in South Sudan for the purpose of bushmeat. In addition, elephants are also targeted for their ivory, smuggled out of the country for sale.[76] [77]

III.b. Natural resource exploitation and national-level conflict

This section examines the interaction between natural resource extraction and national-level conflict dynamics, particularly oil production and mining. It highlights the role that these resources have played in shaping and perpetuating a political system in which conflict and violence are in-built. These also serve as examples from which to draw lessons for other natural resource exploitation, a particularly important element given the likelihood of increased exploration as oil reserves further reduce.

Oil and conflict

Since South Sudan gained its independence in 2011, oil revenues have been both a source of stability and conflict. South Sudan had access to such vast oil revenues that it qualified as a middle-income country at independence, and many hoped that the country's oil wealth would play a critical role in helping to build a state and funding the development of public infrastructure. Instead the scramble for oil money amidst corruption (South Sudan scored just 13 of 100 on Transparency International's 2023 Corruption Perception Index, with 0 representing high corruption) and illicit deals meant that the South Sudanese public have yet to experience these anticipated benefits. Beyond such hopes, oil revenues provided a source

[72] Hunter, M., and Opala, K. (2023). Tarnished Hope - Crime and corruption in South Sudan's gold sector. Global Initiative Against Transnational Organized Crime. Available at: link.

[73] Haysom, S. et al. (2021). Black Gold - The charcoal grey market in Kenya, Uganda and South Sudan. Global Initiative Against Transnational Organized Crime. Available at: link.

[74] Garside, A. (2021). Weapon proliferation challenges biodiversity in South Sudan. Conflict and Environment Observatory. Available at: link.

[75] Magot, D. and Morris Mimbugbe, D. (2023). Why are wildlife crimes easily committed in South Sudan? InfoNile. Available at: link.

[76] Magot, D. and Morris Mimbugbe, D. (2023). Why are wildlife crimes easily committed in South Sudan? InfoNile. Available at: link.

[77] Weru, S. (2016) Wildlife protection and trafficking assessment in Kenya: Drivers and trends of transnational wildlife crime in Kenya and its role as a transit point for trafficked species in East Africa. Available at: link.

of personal enrichment and patronage for the ruling class, serving as a driver of conflict once this system came under pressure, both from those within and those excluded from that patronage.[78] Access to oil revenues is considered to have played a key role in the 2013-2018 civil war, and continues to act as the primary driver of inter-elite competition within the country's zero-sum political system. Whilst this has fuelled violence at the local level – as elites have mobilised local communities for violence (largely along ethnic lines) to displace rivals and access patronage from those in power – it has also at the same time helped avoid a return to national-level civil war by allowing those in power to use oil revenues to essentially buy the allegiance of would-be challengers.[79] Political leaders have used oil revenues to keep the patronage system running, neutralising threats from would-be rivals by giving them access to rents.[80] The recent decrease in oil production presents a major threat to this system, as demonstrated by the 2012 oil shutdown, which is thought to have set the foundations for the outbreak of civil war in 2013.

The government's plans to restore oil production to pre-civil war volumes may avert instability in the short-term, but also indicates a willingness among the elites to perpetuate the country's reliance on oil, and of course such an approach does not prioritise environmental sustainability and will likely bring further harm from an environmental perspective. This, in turn, suggests there is unlikely to be any major reforms to ensure oil revenues can better support South Sudan's broader economic development. According to South Sudan's Transitional Constitution (2011) and Petroleum Revenue Management Act (2013), the government should allocate respectively 2 percent and 3 percent of oil revenues to oil-producing states and communities, respectively.[81] These funds, however, seldomly reach their destination, as they are syphoned into the 'political budget' used to keep the patronage system running. Rather than oil revenues entering the national budget, according to a report published last year, Nilepet, the state oil company, directly diverts funds to South Sudan's security services and military/security-sector elites.[82]

Gold mining and conflict

In the Equatoria region, the Government of South Sudan is still engaged in armed conflict with NAS, with most armed clashes over the last five years concentrated in Central Equatoria State. Reports by the UN Panel of Experts report on South Sudan has shown that NAS has specifically sought to attack and control gold mines as a source of revenue. Control over mining sites has also been fuelling low-intensity conflicts between local community-based armed groups as well as between multinational companies and local communities, particularly when the former secure SSPDF protection.[83] This militarisation of gold mining has increased the risk of conflict, and whilst mostly localised, it has the potential to continue

[78] ICG. (2021). Oil or nothing: dealing with South Sudan's bleeding finances. International Crisis Group. Available at: link.

[79] Craze, J. (2023). Payday Loans and Backroom Empires: South Sudan's Political Economy since 2018. Small Arms Survey. Available at: link.

[80] Ibid.

[81] Reng, A., and Tiitmamer, N. (2018). The Petroleum Revenue Sharing Arrangement in South Sudan. The Sudd Institute. Available at: link.

[82] ICG. (2021). Oil or nothing: dealing with South Sudan's bleeding finances. International Crisis Group. Available at: link.

[83] UN Security Council. (2022). Final report of the Panel of Experts on South Sudan – S/2022/359, 28 April 2022. Available at: link.

fuelling the NAS insurgency, with implications for the stability of the national peace agreement. However, in some areas, there are reports of local peace agreements being struck by rival groups with a mutual interest in maximising profits from gold mining.[84]

III.c. Natural resource competition and localised conflict

Whilst oil has been a core driver of South Sudan's national political economy and conflict system, at the local level competition for resources remains a primary driver of conflict between and within communities. There has historically been conflict between different communities in South Sudanese territory over access to and use of natural resources, which have been determined by a combination of both environmental factors (e.g. rainfall, soil drainage and quality) and social, political, and economic factors (e.g. demographics, ethnic divisions, the cattle economy, and politicisation by national elites).[85] These include conflicts between pastoralist communities over access to grazing land; conflicts over access to land for grazing or farming between cattle keeping communities and farmers; and conflicts between communities over water sources for household consumption and livestock keeping.[86] As mentioned above, whilst environmental factors are not the sole driver of natural resource conflict, their interaction with wider conflict systems can mean that they play a significant role in contributing to the likelihood of conflict. For example, it is interesting to note that conflict trends often follow seasonal weather patterns, with research showing that conflict increases during the dry season and decreases during the rainy season when mobility is limited.[87]

There has been increasing research on the influence of climate change on conflict dynamics in South Sudan, largely due to the centrality of climate-sensitive natural resources to localised conflict in the country. Research by the Hague Centre for Strategic Studies and Climate-Diplomacy's Weathering Risk Peace Pillar has identified a number of pathways through which climate change has indirectly contributed to compounding conflict and its impacts, including by increasing competition for resources, driving population displacement, and forcing pastoralists to change established transhumance routes.[88] Returns of populations displaced by climate and conflict have also increased the risk of conflict by fuelling contestation of land ownership and other natural resources.[89] However, it is important to note that the result of such intersections do not necessarily automatically lead to more conflict. For instance, while tensions may be more likely to flare up in communities that already had pre-existing grievances, where there was a history of community coexistence or existing relationships, changes in migration or the onset of displacement were much less likely to result in conflict.

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[84] Hunter, M., and Opala, K. (2023). Tarnished Hope - Crime and corruption in South Sudan's gold sector. Global Initiative Against Transnational Organized Crime. Available at: link.

[85] Krause, J. (2019). Stabilisation and Local Conflicts: Communal and Civil War in South Sudan. Ethnopolitics, Vol. 5, No. 18. Available at: link.

[86] Wassara, S. (2007). *Traditional mechanisms of conflict resolution in Southern Sudan.* Available at: link.

[87] ACLED, 2014. The Rainy Season and Conflict in South Sudan. Available at: link.

[88] Sweijs, T., de Haan, M., and van Manen, H. (2022). Unpacking the Climate Security Nexus Seven Pathologies Linking Climate Change to Violent Conflict. The Hague Centre for Strategic Studies. Available at: link; Weathering Risk. (2024). Weathering Risk Climate Security Risk Assessment Methodology - Guide and Tools. Available at: link.

[89] Kuot, L. (2024). Farmers-Herders' Conflict Undermines Peace building Efforts in South Sudan. *International Journal of Humanities and Social Science Invention*, Volume 13, 1. Available at: link; Krause, J. (2019). Stabilization and Local Conflicts: Communal and Civil War in South Sudan. *Ethnopolitics*, Volume 18(5). Available at: link.

In other cases, even with an existing history of tension, the risk of conflict has been mitigated by community-led dialogue processes or coordination groups, in particular to manage tensions between IDP and host communities.[90]

The intersection of these dynamics is profoundly gendered. Women are particularly vulnerable to increased pressures and competition over natural resources, scarcity of potable water, wood for fuel or food, and may be more exposed to increased risks due to expectations as the primary providers of food and water and fewer alternative livelihood options. For example, increased risks may include domestic violence as they are blamed when crops fail or being forced to engage in risky activities such travelling further to access water, getting into debt, increased rates of child marriage or selling alcohol. At the same time, men and boys may be affected in specific ways – for example, masculinity may be linked to cattle herding and the loss of cattle due to disease, flooding or drought may affect the perceived social standing of young men and boys, and they may be at increased risk of being forced or coerced into other forms of organised violence linked to increased pressures on natural resources.[91]

Overall, such localised dynamics intersect closely with governance and citizen-state relationships. For example, top-down decisions around natural resources, which are based on the interests of elites without taking into account conflict or environmental sustainability, are more likely to impact negatively on local conflict dynamics, for instance through undermining existing conflict resolution mechanisms or natural resource sharing arrangements. While agriculture is seen as an area which is critical for South Sudan's economic development and for alleviating food insecurity, how this is approached will have significant ramifications for the risk of aggravating conflict or contributing to peace. For example, it will depend on how much it is based on market-led commercial agriculture or improving subsistence agriculture and food security, and the basis upon which such decisions are taken and who benefits.[92] Weak or opaque policy and legislative arrangements and their lack of clear implementation also impact on issues such as land tenure systems and land management, and can lead to heightened tensions and conflict over land grabbing. Above all, accountability to both South Sudanese citizens and the environment should be fundamental to governance and legal and institutional frameworks, particularly in a post-R-ARCSS era.

III.d. Regional and local tensions over water

Water has been a central driver of contestation within South Sudan and neighbouring states. In the 1950's an agreement was made between Sudan and Egypt to create the Jonglei Canal, in the Sudd wetland. The aim was to divert water that was being 'trapped' in the Sudd to increase the flow of water further downstream.[93] However, as mentioned above, the project

[90] Pech, K and Chan, N. (2024). Conflict-sensitive aid at the intersection of climate change, conflict and vulnerability in South Sudan. *Humanitarian Exchange Magazine, Issue 84.* Available at: link.

[91] CSRF. (2023) Climate change and conflict in South Sudan: Community perceptions and implications for conflict-sensitive aid. Available at: link.

[92] Cascão, A. (2013) Resource-based conflict in South Sudan and Gambella (Ethiopia): when water, land and oil mix with politics. In: *State and Societal Challenges in the Horn of Africa: Conflict and processes of state formation, reconfiguration and disintegration*. Lisboa: Centro de Estudos Internacionais. Available at: link.

[93] Wendi, K.A (2026). International Water Rights on the White Nile of the New State of South Sudan. *Boston College International & Comparative Law Review*. Available at: link.

was never completed[94] and was subject to much debate about its potential impacts. On one side, it was argued that the project would save water lost to evaporation and transpiration, increase grazing lands, reduce flooding for local communities, reduce the risk of vector-borne diseases, while creating economic opportunities.[95] However, others argued the project would have a detrimental impact on the flora and fauna of the Sudd region, including changing the path of animal migrations, impacting the water quality and increasing the regional aridity through halting the evaporation-precipitation cycle.[96] This is in addition to the impact it would have on the local population, including loss of livelihood (fishing) and possible displacement.[97]

In April 2022 the Minister of Water and Irrigation announced that South Sudan and Egypt had signed a cooperation agreement on dredging of the River Naam, however this was met with a strong response from activists who campaigned against the plans citing harmful environmental impacts. The debate intensified following the arrival of 21 dredging machines in Unity state from Egypt in June 2022, and the President subsequently suspended the dredging until an Environmental Impact Assessment could be completed. This was in turn met by protests from flood-affected communities in Unity state, who saw the dredging as a means of reducing flood risks. Face-to-face public consultations were conducted in July 2022, resulting in 14 recommendations, including calling for Environmental Impact Assessments (EIAs) before dredging could be initiated. However, the cabinet later secretly approved the proposal labelling it as 'cleaning' rather than dredging. The government announced in February 2024 that the 'cleaning' of the River Naam, which began in 2023, is about to be completed in Unity state.[98] Allegedly intended to enhance the country's river transport system and reduce flooding, the project has been met with criticism, due to the lack of studies investigating the environmental repercussions carried out before undergoing the project.[99] As mentioned, this was also equated with the resumption of the Jonglei Canal project in the media and public, which helped to further fuel fears due to conflation with historic opposition.

The importance of the Nile waters and their management has driven the potential for tensions at a regional level between upstream and downstream countries. Historically, downstream countries Egypt and Sudan have relied most on the Nile's water resources. In particular, the 1959 Nile Treaty – bilaterally signed by the then United Arab Republic and Sudan without signatory from the upstream riparians – allocated almost the entirety of the Nile's annual discharge to the two downstream countries. This reflects the dry climate and scarcity of water in these countries, as well as their historical position of power in the region. In recent years, upstream countries such as Uganda and Ethiopia have launched plans to construct hydro-power dams in the river which would have an impact on the flow of water downstream. The Nile Basin Initiative (NBI) has intended to negotiate a Cooperative Framework Agreement

[94] Allam M. M. et al. (2018). Jonglei Canal Project Under Potential Developments in the Upper Nile States. *Journal of Water Management Modeling*, 26. Available at: link.

[95] Ibid.

[96] Ibid.

[97] Machol D. (2022). Century-old canal project sparks opposition in South Sudan. *AP News.* Available at: link.

[98] Sudan's Post (2024). Controversial Naam River clearance nears completion, says VP Taban. Available at: link.

[99] Radio Tamazuj (2023). Q&A: Stop dredging Naam River before causing more damage and carry out studies'- Prof Elkhazin (Part 2). Available at: link.

(CFA) in order to "promote integrated management, sustainable development, and harmonious utilisation of the water resources of the Nile Basin, as well as their conservation and protection for the benefit of present and future generations." South Sudan has not yet signed the agreement.[100]

III.e. Opportunities for environmental peacebuilding

While much of the above focuses on the potential negative implications of the interaction between the environment and conflict, these linkages also present opportunities to contribute to peace and more positive combined outcomes. A conflict-sensitive approach to how strategies, interventions, activities, projects, policies, and investments may interact with existing conflict dynamics and environmental systems includes both taking action to mitigate the risk of contributing to conflict or environmental harm as well as maximising opportunities to contribute to peace and environmental sustainability. Environmental peacebuilding comprises "the multiple approaches and pathways by which the management of environmental issues is integrated into and can support conflict prevention, mitigation, resolution and recovery", and such approaches may offer valuable insights to inform how to address some of the interlinked challenges outlined so far.[101] The literature on environmental peacebuilding covers a wide typology of interventions, covering for example initiatives to increase cooperation between groups and facilitating the diffusion of transnational norms that cover both environmental and other societal norms that contribute to building and sustaining more peaceful and cooperative institutions over time.[102]

However, a key criticism of environmental peacebuilding has been that so far it has mainly been approached in the form of top-down, technical, short-term projects driven by international actors.[103] Better understanding of and space for bottom-up approaches, particularly based on specific local contexts and existing experience, may offer valuable lessons for how 'environmental peacebuilding' approaches could be particularly relevant as communities and societies deal with complex challenges at the intersection of climate change, environmental degradation and conflict. This has not been explored enough in the context of South Sudan, yet there are relevant examples that could inform such approaches in the country. These include experience from years of community conservation and management of Protected Areas, existing or historic ways of negotiating the sharing of natural resources or transhumance routes, and the role of grassroots activists in demanding accountability for pollution (e.g. in relation to oil) and better environmental governance. There may also be important lessons or innovative approaches from other contexts which may pave the ground for new approaches, particularly at a time of political transition for South Sudan, and given the growing sense of urgency in relation to the triple planetary crisis.

A key conclusion of South Sudan's 2018 State of the Environment report is that sustainable and equitable management of resources, such as forests, oil, water, and minerals, will

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[100] CSRF. (2023). Hydro-politics in the Sudd Wetland: The implications of past and current water development projects for South Sudan and the Nile Basin. South Sudan Conflict Sensitivity Resource Facility (CSRF). Available at: link.

[101] Ide, T., Bruch, C., Carius, A., Conca, K., Dabelko, G.D., Matthew, R. & Weinthal, E. (2021). The past and future (s) of environmental peacebuilding. *International Affairs*, 97(1), 1-16. Available at: link.

[102] Krampe, F., Hegazi, F. & VanDeveer, S. (2021). Sustaining peace through better resource governance: Three potential mechanisms for environmental peacebuilding. World Development, Volume 144. Available at: link.

[103] Sändig, J., Dalmer, N., Ide, T., & Vogler, A. (2024). From climate conflicts to environmental peacebuilding: Exploring local dimensions. *Environment and Security*, *2*(1), 3-20. Available at: Link.

contribute to peace and economic prosperity. Good environmental governance is at the core of a sustainable and peaceful future that supports resilient livelihoods and alternatives to violent pathways in the face of heightened challenges, therefore supporting strengthened environmental governance should be part of a long-term strategy for natural resource management.[104] This includes building trust and relationships and ensuring that adequate institutions, rule of law and, above all, a social contract is in place.

IV. Aid and the environment

Aid interventions interact with their natural environment in various ways and have the potential of contributing to pollution and environmental degradation. Research shows that aid operations can impact the environment through the use of polluting and non-renewable energy sources such as diesel-powered generators, the use of non-renewable materials such as plastic bottles and packaging materials for aid, and the unsustainable use of timber for construction.[105] However, aid agencies are often not able (or willing) to prioritise adopting more environmentally sustainable practices in their operations and programmes. As the country director of one humanitarian NGO stated, "The humanitarian prerogative to respond kind of trumps everything," limiting aid organisations' bandwidth on sustainability.[106] The current context of aid cuts amidst a humanitarian crisis is even less conducive for a shift to more sustainable practices. That said, there are also strong lessons to be drawn from the historic context before independence, in particular based on the experience of aid organisations in Darfur[107], and calls back in 2008 for a new approach to environmentally sensitive programming and peacebuilding[108].

In South Sudan, the French NGO ACTED is among the aid organisations which has explicitly made efforts to adopt more environmentally friendly practices. In 2018, ACTED conducted a carbon baseline assessment in 37 countries where it operates to monitor its carbon output, measuring things such as fuel used (for vehicles and generators), flights, and calculating the environmental impact of using plastic and other non-renewable items. The assessment found that South Sudan was the organisation's second-highest emitting operation, behind Syria, producing around 4,200 tonnes of carbon dioxide that year.[109] Another good example is the International Organization for Migration (IOM), which has increased its use of solar power across South Sudan, including installing and managing a hybrid solar plant that supplies electricity to the Humanitarian Hub in Malakal. The use of renewable solar energy reduces the carbon footprint of the Hub and has generated carbon credits which in turn funded a solar plant at the Malakal Teaching Hospital.[110] The UN Mission in South Sudan (UNMISS) has also

[104] Bromwich, B. (2014) Relationships and Resources: Environmental governance for peacebuilding and resilience livelihoods in Sudan. UNEP. Available at : link.

[105] UNEP. (2024). Environmental sustainability of humanitarian action. Available at: link.

[106] Mednick, S., 2019. Are aid groups ignoring South Sudan's climate crisis? Devex. Available at: link.

[107] Tearfund. (2007) Darfur: Relief in a vulnerable environment. Available at: link.

[108] Bromwich, B. (2008) Environmental degradation and conflict in Darfur : Implications for peace and recovery. Humanitarian Exchange Magazine, Issue 39. Available at: link.

[109] Mednick, S., 2019. Are aid groups ignoring South Sudan's climate crisis? Devex. Available at: link.

[110] IOM. (2020). A Green and Clean Future Beckons for South Sudan. International Organization for Migration. Available at: link.

increasingly turned its attention to environmental sustainability, supporting projects that repurpose plastic bottles as bricks for constructing houses, schools, and other infrastructure.[111]

In addition to efforts to mainstream environmentally sustainable practices into aid operations, there are also organisations in South Sudan dedicated to environmental conservation. Three of the main organisations leading efforts in the sector include Fauna & Flora International, African Parks, and the Enjojo Foundation. Their focus has been on supporting joint sustainable management of natural resources in specific protected areas, involving local communities as well as the Ministry of Wildlife Conservation and Tourism.[112] Furthermore, other humanitarian, development and peacebuilding organisations implement projects that are linked to the environment and natural resource management in different ways. Examples of these include community forestry activities,[113] awareness raising on housing, land and property rights,[114] dyke rehabilitation following flooding,[115] and peacebuilding activities aimed at farmers and cattle keepers.[116] However, it is important to note that one cannot assume that organisations working on environmental issues in their programming necessarily adopt environmentally friendly approaches in their operations. It is also important to emphasise that any best practices by individual agencies should be shared across the aid sector for greater impact.

Globally, this is an area which has received limited, yet rapidly accelerating attention in recent years. For example, a number of initiatives have contributed to steering the conversation towards a more targeted approach to environmental sustainability, such as the joint UNEP-OCHA Environment and Humanitarian Action Network, EHA Connect, the Nexus Environmental Assessment Tool (NEAT+), alongside new IASC guidance on 'Environmental Responsibility in Humanitarian Operations' which was issued in September 2023[117]. In addition, greater attention to early warning and anticipatory action with a strong focus on relevance for conflict affected contexts, and learning from resilience work which integrates a strong conflict lens, and cross-silo experience from HDP nexus approaches (e.g. which integrate climate adaptation) may also help to contribute to improved practice and policy.

V. Conclusions and recommendations

The analysis draws out some of the complex ways in which environmental degradation and conflict intersect in South Sudan, including how this may be exacerbated by the impacts of climate change. However, despite the country's growing number of environmental and climate laws and policies (which are partly contradictory) implementation is still lagging. International

[111] UN. (2024). Zero waste, more hope in South Sudan. UN News. Available at: link.

[112] Fauna & Flora. (2024). South Sudan: a biodiversity hotspot, in the midst of conflict. Available at: link.

[113] IGAD. (2013). South Sudan pilot community forestry project. Available at: link.

[114] HLP Technical Working Group. (2021). Housing, Land and Property (HLP) challenges in South Sudan, January 2021. Available at: link.

[115] WFP. (2023). Dyke repairs engineer hopes for people fleeing floods and facing hunger in South Sudan. World Food Programme. Available at: link.

[116] UN Peacekeeping. (2023). Peace begins with good farmer-pastoralist relations: UNMISS reaches out to cattle camps. Available at: link.

[117] IASC. (2023) IASC Guidance on Environmental Responsibility in Humanitarian Operations. Available here: link.

donors, UN agencies, and NGOs have been supporting a growing number of projects dedicated to climate adaptation and resilience, however, there is still a limited evidence base of examples in the country of programmes and initiatives which integrate climate, environmental sustainability and conflict from the outset, either through environmental peacebuilding approaches, based on growing lessons on climate security approaches, or with more rigorous commitment to conflict-sensitive climate adaptation. Furthermore, as seen above, aid actors have a mixed record when it comes to environmental sustainability. While aid actors may be increasingly considering issues of climate resilience in their programming, their operations often remain environmentally unsustainable, contributing to pollution and environmental degradation. This could potentially exacerbate conflict.

The central role of natural resources in South Sudan's overlapping political economy and conflict systems presents both a challenge and an opportunity. It is a challenge in the sense that short-term political calculations will continue to reinforce the prioritisation of the extraction of oil and the use of natural resources to shore up power over peacebuilding or environmental concerns. Maintaining the patrimonial system, which South Sudan's political economy is based on, will continue to be a dominant political priority. It is unclear how this trend will be affected in the run up to the expected elections in late 2024. In fact, there is a risk that fragile dynamics at this stage in the transition could exacerbate environmental degradation and conflict, by incentivising elites to use violence to amass as many resources as possible to shore up their political capital through, for example, cattle-raiding and logging with negative consequences for environmental degradation. In addition, economic or political incentives could drive the forceful acquisition of land or natural resources (e.g. to make short-term profit before losing positions of power or to make gains in or consolidate territory), or to find alternative avenues to attempt to generate quick profit, such as making deals regarding water resources. On the other hand, elections could give a new government legitimacy – and create space – to transform the neo-patrimonial structures in ways that unlock political and economic resources for sustainable development and green investment, integrating climate adaptation, environmental protection and conservation, and could herald new opportunities for long-term strategies for environmental sustainability and transparent natural resource management.

The centrality of natural resources to the country's political economy could also present an opportunity to use the incentive of sustainable and green development which reinforces peace and increases self-sufficiency, the benefits of conserving its rich biodiversity and potential for nature based solutions and the benefits of more sustainable natural resource management as an entry-point for political leadership and widespread changing of awareness, attitudes and behaviours. However, such approaches need to also strongly integrate conflict sensitivity given the complexity of social, political, economic and environmental dynamics, for example, unintended negative consequences of green energy projects or how conflict-blind approaches to conservation initiatives could exacerbate long-standing community divisions or tensions.

Crucially, within South Sudan's complex political and conflict context, especially in the run up to expected elections, it is fundamental that aid actors in the country understand the links between the environment, natural resources, and conflict – and how climate change is impacting these linkages. The following recommendations aim to provide guidance to aid

actors on conflict-sensitive engagement with environmental conservation and natural resource management in South Sudan:

International donors, UN agencies and all NGOs and civil society should demand that the Government of South Sudan and political leadership at state, payam and county levels take action to invest in South Sudan's future by prioritising environmental sustainability and transparent natural resource management as key measures which also can also play a role in conflict prevention. This includes the implementation of environmental legislation and policies that ensure environmental standards and safeguards, developing and implementing long-term strategies to protect the country's unique biodiversity and support sustainable livelihoods and investing in sustainable development and climate resilience. Recognising how environmental degradation and climate change may interact with conflict systems, this should be accompanied by application of conflict sensitive principles and practice, including learning from historic experience and existing practice. International donors, UN agencies, NGOs and civil society should also demand that the government prioritises sustainable natural resource management, particularly in mitigating the potential for adverse environmental impact and recognising how this can contribute to peace. A critical component of this includes greater transparency on revenues from the oil and mining sectors, water projects and potential renewable energy projects, ensuring assessment of environmental and social impact, accountability for environmental degradation and pollution and ensuring that the revenues are invested in public services and environmental protection.

Aid actors should integrate conflict sensitivity throughout programmes and processes, including ensuring that environmental impacts are considered as integral to assessments of whether programmes risk causing harm or may also contribute to positive outcomes that reinforce environmental sustainability and peace. Anticipatory action and early warning which are tailored for conflict settings and local contexts may help aid actors to better anticipate intersecting dynamics. Climate resilience, conservation and green energy initiatives may also benefit certain political or economic interests or contribute to reinforcing power imbalances and marginalisation of certain groups, therefore conflict analysis, community engagement and an adaptive approach are essential – overall conflict sensitivity principles need to be applied throughout the planning and implementation of such endeavours. More research and analysis is needed to increase understanding and awareness of the contextually specific ways that environmental degradation and climate change may interact with conflict systems.

Peacebuilding actors should increase understanding of how the impacts of climate change, environmental degradation and conflict insensitive natural resource management may negatively affect conflict systems and take action accordingly, including working closely with communities to identify key drivers of conflict and pressure points, supporting dialogue between relevant actors and adapting existing approaches. Environmental peacebuilding approaches may be particularly relevant for certain contexts (e.g. collaborative management or agreements on sharing of natural resources, community conservation, sustainable cooperatives, projects which combine climate adaptation, gender transformation and peace outcomes). It is important to note that specific grievances may build on existing localised conflicts and tensions. Peacebuilding actors also need to advocate with government, donors,

and environmental organisations/programmes for greater priority to be given to inclusive and participatory community engagement and accountability to citizens on matters relating to natural resources and environmental protection as a means to strengthen conflict-sensitivity.

International donors, UN agencies, and international and national NGOs should step out of their siloes and design contextually informed and integrated programming that take advantage of opportunities to integrate peacebuilding, climate resilience and natural resource management approaches. The design of such projects should place local knowledge of context and community agency at the centre, and include relevant authorities and groups including traditional authorities and women and youth groups, building on existing and historic natural resource management and dispute settlement approaches where relevant. Humanitarian and development agencies should evaluate their environmental footprint and prioritise environmentally sustainable good practice, for example based on guidance from the UNEP-OCHA Environment and Humanitarian Action Network and in accordance with IASC guidelines. Humanitarian, development and peace actors should seek to collaborate and coordinate much more towards collective objectives of peace, climate resilience and environmental sustainability. Aid efforts should also invest in developing local capacities, including South Sudanese nationals, institutions and community structures as champions for environmental management and conservation. More engagement and collaboration across aid and environmental sectors would enable better understanding of good practice and enable sharing of combined analysis and examples.