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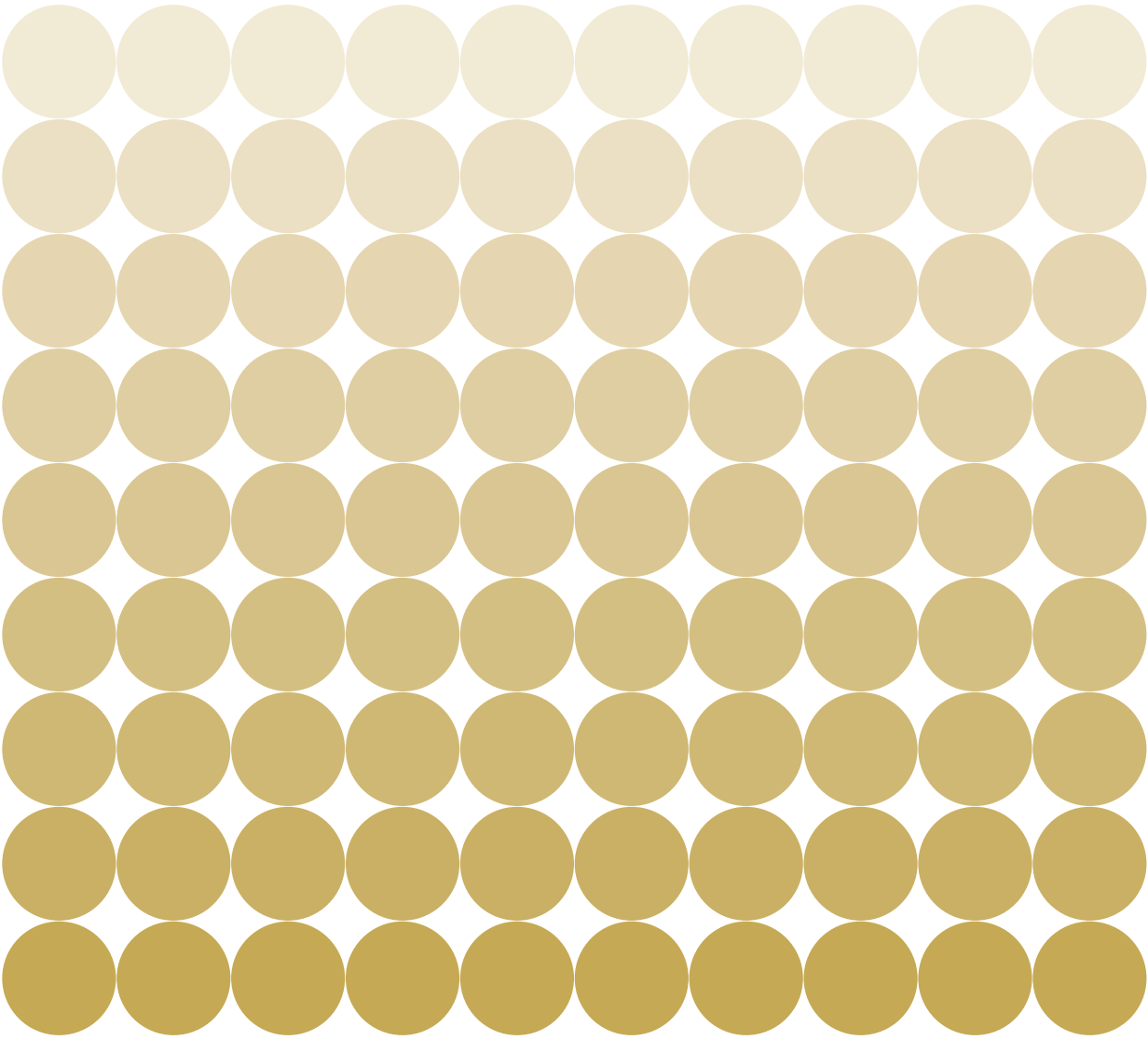
WATER SECURITY AND GOVERNANCE IN THE HORN OF AFRICA

FLORIAN KRAMPE, LUC VAN DE GOOR, ANNIEK BARNHOORN, ELIZABETH SMITH AND DAN SMITH



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SIPRI Policy Paper No. 54

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Preface

Water is a scarce, natural resource—a prerequisite for livelihood and survival. Increasing demand and simultaneously decreasing supply are intensifying the pressures on this precious resource on every continent. These pressures extend far beyond domestic borders, and their transboundary complexities are affecting entire regions, making them a matter of high-level regional politics. I witnessed this first-hand while visiting the Darfur region in Sudan, where access to water was part of the regional conflict and a trigger of the humanitarian emergency there. Climate change is further exacerbating these challenges through the increased severity and frequency of droughts and floods.

This SIPRI Policy Paper focuses on the Horn of Africa—one of many regions experiencing the interaction and confluence of challenges in terms of political, social, economic and environmental processes. Water and climate are essential aspects of these challenges. Although it is tempting to consider the management and development of water, agriculture, economy and infrastructure as largely technical, this would underestimate the highly political nature and strategic importance of these issues. This is particularly important when the management of water resources—as seen along the Nile through Egypt, Ethiopia and Sudan, for example—is involved.

The Horn's 230 million people are exposed to the impacts of climate change such as droughts and floods. If not well managed, the changes and challenges could affect regional peace and security. This policy paper attempts to equip the international community and regional organizations with adequate analysis to grapple with the many complex issues involved. It bridges the technical and political aspects of water security and governance in the Horn of Africa, providing a unique insight into the compounding challenges. By analysing these multidimensional challenges and political constraints, the study offers entry points for the international community to act upon.

The findings reflect my long-held conviction that water should be used as a catalyst for cooperation. The multidimensional challenge of water security and governance in the Horn of Africa region cannot be tackled alone. The paper stresses that there is a need to shift the regional narratives around water resources and their governance: from a source of competition and tension towards a narrative of shared problems and opportunities that need shared multilateral solutions. To be successful, water security and governance requires an all-hands-on-deck approach. As such, I believe contributions to the debate, such as this paper, should be of considerable interest to policymakers, practitioners and researchers alike.

Jan Eliasson
Chair, SIPRI Governing Board
Stockholm, March 2020

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Florian Krampe, Luc Van De Goor,
Anniek Barnhoorn, Elizabeth Smith
and Dan Smith

Summary

The Horn of Africa—here defined as the member states of the Intergovernmental Authority on Development—is highly vulnerable to the impacts of climate change such as droughts and floods. These impacts compound many of the region's social, political and economic challenges and result in increased migration and displacement as well as loss of life. These risks are domestic and transnational in character, and add to the probability of political tensions and violent conflict within and among countries. There is a need for countries in the Horn of Africa to better prevent and manage risks, and to find a multilateral response at the regional level.

This report presents a regional analysis of environment, peace and security linkages in the region with specific focus on water security and governance. It provides entry points for the international community to address the multifaceted risk landscape in the Horn of Africa.

Water security hotspots: The Nile and Juba–Shabelle rivers

The Nile and Juba–Shabelle basins are of core relevance for the Horn of Africa because of the interaction and confluence of several political, social, economic and environmental processes. The Nile River—with its two major tributaries, the Blue Nile and the White Nile—is a main source of water, energy and food. The Blue Nile is of key importance for Egypt, Ethiopia and Sudan. As such the Nile has been a source of social and political tensions and low-intensity conflicts for most of the 20th century.

Tensions related to transboundary water relations retain a potential for violent conflict. The key contentious issue is the construction of the Grand Ethiopian Renaissance Dam (GERD) on the Blue Nile. The tensions among Egypt, Ethiopia and Sudan around the building of the GERD have become part of the larger geopolitical playing field in the Horn of Africa. The tensions are likely to be further complicated by the compounding impacts of climate change. If unaddressed at a regional level, tensions may amplify societal stress and relations and negatively affect political dynamics at the communal, bilateral and regional levels.

Another complex set of security challenges is concentrated along the Juba and Shabelle rivers, shared by Ethiopia and Somalia and to a marginal extent by Kenya. Ethiopia and Somalia have the clearest domestic interests in the Juba–Shabelle Basin's water resources and their development. The region around the basin, marked by three decades of civil war and state collapse, is dependent on the river for agriculture, drinking water and hydropower. Despite the significance of water access, there has never been a bilateral agreement surrounding international cooperation over the rivers' usage. Domestic interests and interstate tensions—as well as Ethiopia's role in the Somali civil war and state-building process—inhibit the potential of transboundary water cooperation in the Juba–Shabelle Basin. Due to its interaction with socio-economic and political factors, climate

change will have a significant negative impact on water access, and subsequent multidimensional security in Somalia.

Political constraints and entry points

Two key constraints in the Horn of Africa are weak state institutions and capacity, and the effects of a long history of distrust among countries. These constraints negatively affect regional organizations, institutional arrangements and initiatives. They also limit the options for sustainable governance of water resources and for anticipating and pre-empting other climate-related security risks in the Horn of Africa. Acceptance of shared interests at a regional level is impeded by national agendas and ambitions. In a region that is dominated by important transboundary lifelines such as the Nile and Juba–Shabelle basins, a regional perspective should receive more attention and become a key priority. However, for any way forward it is important to keep in mind that solutions cannot be merely technical. There is a need for understanding and, where possible, to apply lessons learned from elsewhere.

Given the constraints and blockages, three key entry points for the international community are identified:

Change the narrative. There is a need to shift the regional narratives around water resources and their governance—moving from a narrative of competition and tension to one of shared problems and shared solutions. For this it is necessary to identify a trusted leader and mediator who can shape the narrative around water, energy and land, and raise this narrative to the highest political levels. It will be crucial to enable states to develop a joint vision for the region that stresses opportunities and implements cooperative solutions for the Horn of Africa.

Develop transboundary diagnostic analysis and a strategic action programme. There is a need for more solid, shared and jointly accepted information. Reliable data can guide policies and decision makers in dealing with the current challenges as well as better anticipate climate impacts and climate-related security risks. Transboundary diagnostic analysis can be used to develop a strategic action programme that supports actors in identifying clear priorities, identify reforms and resolve problems.

Establish a new institutional architecture. Despite many existing institutions, there is a need to consider the establishment of a new institutional architecture to manage water resources in the region. Currently, there is no suitable organization or framework that can address the regional water management and security challenges in the Horn of Africa. A critical reassessment of the objectives and structural set-ups of existing institutional frameworks and agreements is needed, including active learning from other regions and basins in Africa.

Abbreviations

AfDB	African Development Bank
AMISOM	African Union Mission in Somalia
AU	African Union
CEWS	African Union Continental Early Warning System
FAO	Food and Agriculture Organization of the United Nations
GERD	Grand Ethiopian Renaissance Dam
HOA-GWI	Horn of Africa-Ground Water Initiative Project
IDPs	Internally displaced persons
IGAD	Intergovernmental Authority on Development
IHP	International Hydrological Programme
ITCZ	Intertropical Convergence Zone
MASE	Regional Programme for the Promotion of Maritime Security
MSCC	Maritime Security Coordination Committee
NBI	Nile Basin Initiative
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
PERSGA	Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden
SAP	Strategic action programme
SWALIM	Somalia Water and Land Information Management
TDA	Transboundary diagnostic analysis
UAE	United Arab Emirates
UN	United Nations
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
WFP	World Food Programme
WB	World Bank
°C	Degree Celsius

1. Introduction

The Horn of Africa—defined here as the member states of the Intergovernmental Authority on Development (IGAD): Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, Sudan and Uganda—has a history of political instability and conflict. With a population of 230 million people, of which some 80 per cent are economically dependent on agriculture, this region is highly vulnerable to the impacts of climate change such as droughts and floods. These impacts compound many of the region's social, political and economic challenges. Worsening livelihood conditions have already resulted in increased migration and displacement. These risks are domestic and transnational in character, and add to the probability of political tensions and violent conflict within and among countries. There is, therefore, the need for African states to better prevent and manage worsening livelihood conditions and related risks, and to find a multilateral response at the regional level.

This report presents a regional analysis of environment, peace and security linkages in the region with specific focus on water security and governance. As such, it highlights dynamics within and among IGAD member states. As water governance and the effects of climate change are transnational in character, the analysis also includes states outside of IGAD. This is a focused report derived from extensive analysis and hotspot mapping (see appendix A, table A.1) that has been produced through desk study conducted by SIPRI between October 2019 and January 2020.

Initial hotspot mapping was conducted to gain an overview of the climate and political security context of the Horn of Africa and to identify focus areas. A combination of primary and secondary data has been collected and analysed. In addition, the study builds on conversations with regional experts to further deepen its insights. This mapping brings together key information about the social, political, economic and environmental processes and dynamics in the region, and it was done in a five-step process:

1. A holistic picture of the political, social and security context in the region was established through a literature review and consultations with regional experts.

2. Regional dynamics related to surface water resources, groundwater resources and marine resources were focused on; transnational dimensions were emphasized; and key environmental issues identified.

3. The holistic political and security landscape was linked to the socio-environmental dimensions—domestically and transnationally—to identify key environmental/climate security tensions in the focus areas. This was partly done through the literature review, and partly on the basis of thematic and regional expert consultations.

4. The focus issues identified in step 3 were used as the basis to identify existing governance mechanisms in the region that were designed to or could be able to mitigate security challenges related to climate change impacts and water security.

5. The key gaps that become apparent were identified. In a focus group discussion, the key priority area was established in terms of the security significance to the region.

The report first presents a brief background of the regional political and security context and a summary of climate-related security risks in the region. It follows with the two main cases that are seen as being of core relevance to regional peace and security challenges related to the environment with emphasis on water resources: the Nile Basin (especially the Blue Nile Basin of Egypt, Ethiopia and Sudan) and the Juba–Shabelle Basin. The report concludes with an analysis of the political constraints and potential entry points for action.

2. Background

Political and security context

IGAD notes that its member states are 'listed among the thirty-five most fragile countries in the World'.[1] Countries in the Horn of Africa are facing issues with regard to a complex mix of limited or uneven access to natural resources, social tensions among groups in society (regional, religious and ethnic), and poverty and economic inequalities. The weakness of state institutions to provide physical security, including the basic good of the survival of citizens, in combination with corruption, has resulted in ineffective governance, undemocratic practices, limited confidence, distrust in state authority and legitimacy, and insurgencies.[2]

The region is furthermore confronted with several 'megatrends' that will determine the peace and development of the region. These trends include:

- Population growth and youth unemployment
- Public demand for economic delivery and constitutional democracy with stiff electoral contestations
- Climate change and a surge in demand for water, food and energy security
- Fast information and technological connectivity and infrastructural development
- An increase in devolution and decentralization
- A rise in cross-border cooperation and mobility
- A surge in exploration and extraction of natural resources (oil, gas gold and minerals)
- Transboundary natural resource disputes
- Global geopolitical competition in the Red Sea strait[3]

Geopolitical security context

The Horn of Africa is increasingly susceptible to international and geopolitical developments. The Gulf states—Qatar, Saudi Arabia and the United Arab Emirates (UAE)—have invested heavily in the Horn of Africa, mainly in Ethiopia

[1] IGAD, *IGAD Regional Strategy: Volume 1 The Framework* (IGAD: Djibouti, Jan. 2019), p. 15.

[2] IGAD (note 1), p. 9.

[3] Maru, M. T., 'Evolving peace trends and regional integration: Opportunities for revitalizing Intergovernmental Authority on Development (IGAD)', Political Dynamics in the Horn of Africa: Nurturing the Emerging Peace Trends. A Collection of Policy Briefs, TANA Papers 2019, TANA Forum, Institute for Peace and Security Studies, Addis Ababa University, 2019.

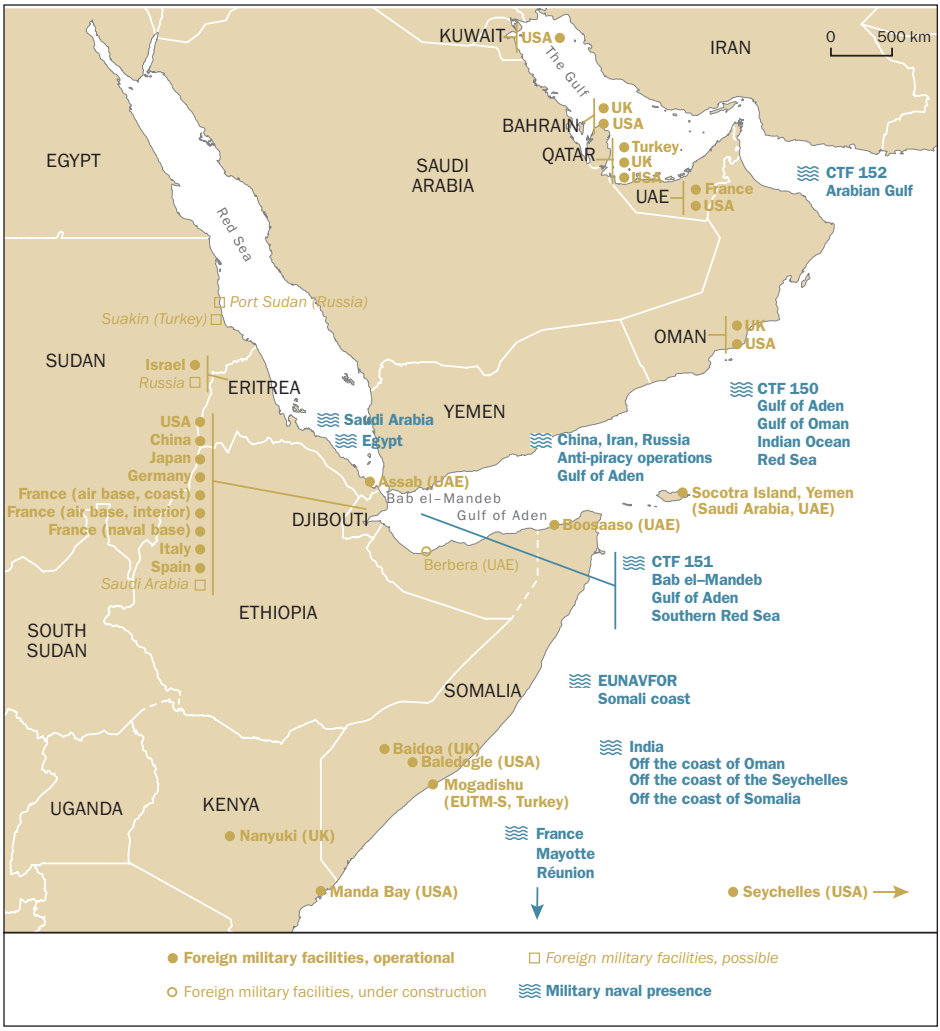

Figure 2.1. Distribution of foreign military forces in the Horn of Africa region

CTF = Combined Task Force; EUNAVFOR = European Union Naval Force; EUTM-S = European Union Training Mission in Somalia.

Source: Melvin, N. J., 'The new external security politics of the Horn of Africa region', SIPRI Insights on Peace and Security no. 2019/2, Apr. 2019.

and Sudan.[4] These investments range from agriculture and farmland (as investments in relation to food security) to manufacturing, transport and logistics, energy (for which demand in the Horn of Africa, in particular Ethiopia,

[4] Meester, J. et al., *Riyal Politik: The Political Economy of Gulf Investments in the Horn of Africa*, CRU Report (Netherlands Institute of International Relations 'Clingendael': Apr. 2018). See also Johnson, H. F., 'Gulf states are making their way to the Horn of Africa', 28 Oct. 2019.

will increase, especially for electricity) and infrastructure.[5] The Gulf states also provide a substantial labour market for the Horn and East African nationals.[6] In addition to these investments, the Gulf states have expanded their security presence in relation to anti-piracy efforts, as well as the civil war in Yemen (which started in 2014 and led to the involvement of Gulf states in 2015) and broader political objectives.[7]

Increased dependency is not limited to the Gulf states. Concerns over piracy and maritime insecurity led to the continued presence of foreign navies (from European and Asian countries) and arrests of pirates. In addition, the capabilities of (legal) institutions and marine forces to prevent safe havens, and to prosecute piracy, were developed by the countries contributing to the naval counter-piracy missions.[8] This was also a prelude to a scramble for ports and military bases. For economic and geopolitical reasons related to maritime commercial and military traffic, China, Japan, India, Turkey, the United States, the UAE and European countries invested in infrastructure such as commercial and dual-use ports and military bases (see figure 2.1). These developments introduced a new layer of international security considerations and interests that will affect the already complex political relationships and challenges of the region.[9]

Intraregional political and security context

In addition to significant geopolitical interest, ports and commercial maritime traffic are also relevant from a regional Horn of Africa perspective. The issue of access to ports is of particular interest to Ethiopia and South Sudan.[10] South Sudan gained independence as a landlocked state in 2011, and Ethiopia became a landlocked state in 1993 with Eritrea's independence. As a result, Ethiopia and South Sudan are dependent on their neighbours for maritime access to international markets. Ethiopia, together with Kenya, invested in the Lamu Port Southern Sudan–Ethiopia Transport Corridor. This corridor is important for Kenya, but also for Ethiopia and South Sudan.[11] In its search for outlets other than Djibouti, Ethiopia also joined the UAE in an agreement with the Somaliland

[5] Mondal, A. H. et al., 'Ethiopian energy status and demand scenarios: Prospects to improve energy efficiency and mitigate GHG emissions', *Energy*, vol. 149 (15 Apr. 2018), pp. 161–72.

[6] Zaghlami, L., 'Nurturing trade and investment in the Horn of Africa: The role of Gulf Cooperation Council and other countries', Political Dynamics in the Horn of Africa: Nurturing the Emerging Peace Trends. A Collection of Policy Briefs, TANA Papers 2019, TANA Forum, Institute for Peace and Security Studies, Addis Ababa University, 2019.

[7] For example, see Donelli, F. and Cannon, J. B., *Middle Eastern States in the Horn of Africa: Security Interactions and Power Projection*, Italian Institute for International Political Studies Analysis (Italian Institute for International Political Studies: 30 Apr. 2019); and Johnson, H. F., 'Gulf states are making their way to the Horn of Africa', 28 Oct. 2019.

[8] Joubert, L. et al., *The State of Maritime Piracy 2018. Assessing the Human Cost* (One Earth Future: Broomfield, 2018).

[9] Melvin, N. J., 'The new external security politics of the Horn of Africa region', SIPRI Insights on Peace and Security no. 2019/2, Apr. 2019; Melvin, N. J., 'Managing the new external security politics of the Horn of Africa region', SIPRI Policy Brief, Apr. 2019; and Melvin, N. J., 'The foreign military presence in the Horn of Africa region', SIPRI Background Paper, Apr. 2019.

[10] Melvin, 'The new external security politics of the Horn of Africa region' (note 9); and Melvin, 'Managing the new external security politics of the Horn of Africa region' (note 9).

[11] AUDA-NEPAD, 'Lamu Port Southern Sudan–Ethiopia Transport Corridor'.

Government to develop the port of Berbera in 2017. While this will allow Ethiopia to strengthen its economic development (and the ambition to become an export-oriented economy), the agreement de facto recognized Somaliland as an independent state. This weakened the Federal Government of Somalia (FGS), based in Mogadishu. Somalia's relations with the UAE have collapsed. However, relations between Ethiopia and Somalia are not under additional stress. Whereas Ethiopia previously applied a divide-and-rule approach with regard to Somalia, this changed when Prime Minister Abiy Ahmed took office in 2018 in Ethiopia. Now, Ethiopia supports the FGS.

Conflicts in the region

Aside from intrastate disputes and insurgencies (affecting all countries in the region, in particular Somalia), the Horn of Africa has a long history of interstate disputes, cross-border violence and border conflicts. Some are fairly recent, such as Kenya's and Somalia's maritime border dispute (2014) over which country may rightfully control the resource-rich section of the Indian Ocean. This issue has been brought to the International Court of Justice. A hearing is now set for June 2020. Both countries have support from different international actors (e.g. France and the USA support Kenya, and Norway and the United Kingdom support Somalia—all for reasons of relationships and access to claims), which complicates the situation.[12] Yet, it is interesting to note that such disputes notwithstanding, cooperation and neighbourliness are still considered key by both governments for guiding the relationship between Kenya and Somalia.[13]

Another border dispute is that between South Sudan and Sudan over territories rich in resources (oil and gas). The relationship between South Sudan and Sudan has been tense since South Sudan's independence in 2011. In addition to internal power struggles in South Sudan, the main challenge has been to find a solution for border issues. Uganda is a key player in this regard, as it has supported South Sudan throughout the conflict. However, the focus is shifting from security to economic issues. South Sudan is also still facing an internal dispute over the establishment of a unity government, which is part of the peace deal from 2018. However, it has proven difficult to get to an agreement. The November 2019 deadline was postponed by another 100 days. The risk of instability, with subsequent effects on the region, therefore, remains.

Additionally, disputes over resource allocation and access have also been significant in the region. For example, the struggle for eastern Nile waters—involving mainly Egypt, Ethiopia and Sudan—has a long history. The negotiation of fair and equitable terms for water distribution has become more difficult with Ethiopia's building of the Grand Ethiopian Renaissance Dam (GERD). The risk of escalation has led to offers for mediation by outside actors such as the USA. The case of the Nile River is analysed further below.

[12] License Round Somalia, 'License Round Open'; and Quartz Africa, 'Why the US, UK, France and Norway are taking sides in Kenya's maritime row with Somalia', 7 Nov. 2019.

[13] @AbdinurMAhmed, Twitter post, 22 Nov. 2019, 19:53.

However, there is also good news about relations in the region and attempts to solve conflicts. Ethiopia's Prime Minister Abiy Ahmed has brought change to the region and the country in terms of the potential to create new dynamics in domestic politics and regional relations, thus creating opportunities along with risks and challenges. Challenges with low-level conflict and displacement remain in Ethiopia, and critics of Abiy's plan to merge the Ethiopian People's Revolutionary Democratic Front into a single party are increasingly vocal. Abiy also invested in relationships in the region with the unexpected cessation of hostilities between Eritrea and Ethiopia and the signing of a Joint Declaration on Peace and Friendship. Another promising development was Eritrea's overture to normalize relationships with Djibouti and Somalia. Although Djibouti has not agreed to normalize relations with Eritrea yet, and some security challenges remain. It will be important to confirm a real change in regional politics with next steps, in a region where the political culture has often been characterized by the saying 'The enemy of my enemy is my friend'.[14] For now, issues around the border remain tense.[15]

These challenges notwithstanding, there are also opportunities for regional cooperation to tackle the megatrends mentioned above. Horn of Africa states are active in 11 multilateral organization: the African Union (AU), the Common Market for Eastern and Southern Africa, the Community of Sahel–Saharan States, the East African Community, the Gulf Cooperation Council, IGAD, the Indian Ocean Rim Association, the International Conference on the Great Lakes Region, the League of Arab States, the Nile Basin Initiative (NBI) and the Organization of the Islamic Conference. Together, they can create a range of forums and potential entry points for regional cooperation.[16]

Climate-related security risks

Climate-related security risks are increasingly transforming the security landscape in the Horn of Africa, with climate impacts directly and indirectly affecting the security of communities, and increasingly states and their international relations. The social and political contexts remain crucial in determining how climate impacts affect security.[17] However, the academic community and policymakers are increasingly acknowledging the impacts of the environment, natural resources and climate change on the region's conflict and security landscapes, and 'Disputes over who owns, controls or benefits from natural resources occur frequently'.[18]

[14] Keller, E. J., 'Rethinking African regional security', ed. Lake, D. A. and Morgan, P. M., *Regional Orders: Building Security in a New World* (Pennsylvania State University Press: Pennsylvania, 1997), pp. 296–317.

[15] Plaut, M., 'How the glow of the historic accord between Ethiopia and Eritrea has faded', *Mail & Guardian*, 8 July 2019.

[16] De Waal, A., 'Horn of Africa and Red Sea synthesis paper', 2017, p. 6.

[17] van Baalen, S. and Mobjörk, M., 'Climate change and violent conflict in East Africa: Integrating qualitative and quantitative research to probe the mechanisms', *International Studies Review*, vol. 20, no. 4 (2017), pp. 547–75.

[18] AU Panel of the Wise, *Report of the African Union Panel of the Wise on Improving the Mediation and Resolution of Natural Resource-related Conflicts across Africa*, 5th Thematic Report (AU Panel of the Wise: Nov. 2018), pp. 1–23.

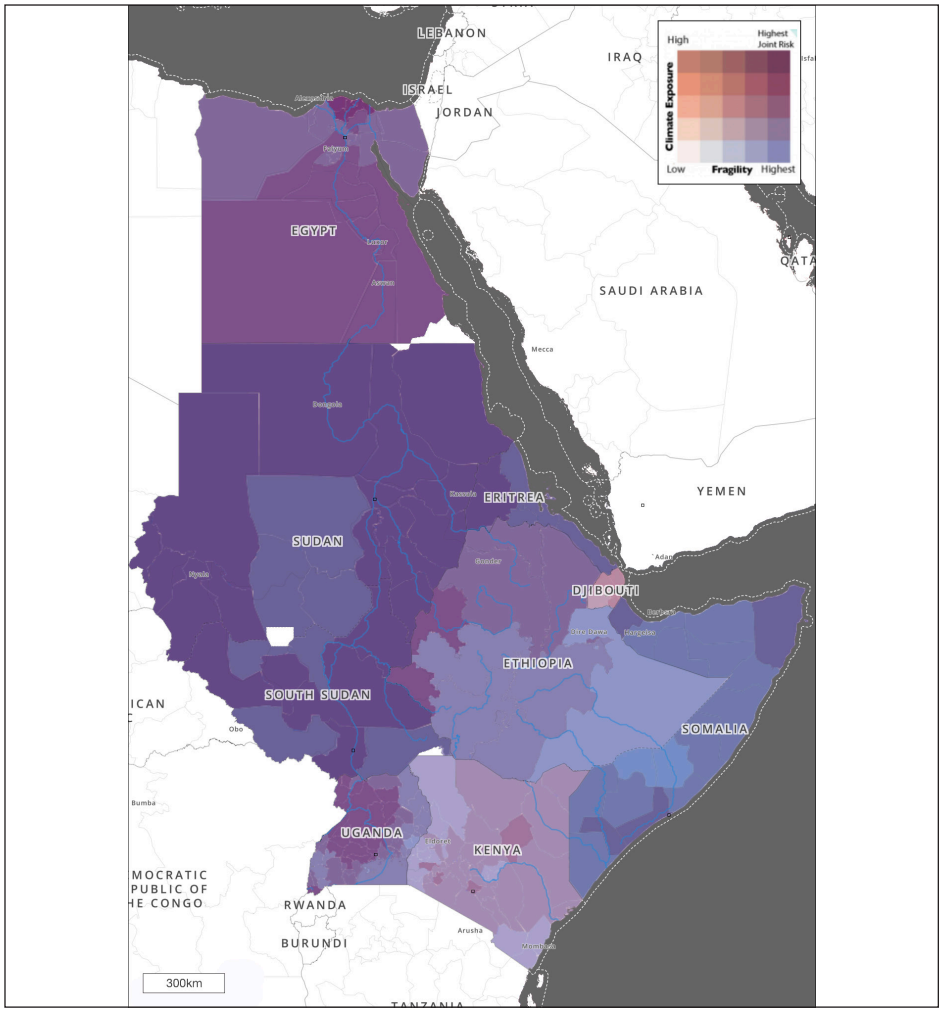

Figure 2.2. Correlation between climate exposure and political fragility in the Horn of Africa

Notes: The figure illustrates the intersection of political fragility and climate exposure in the Horn of Africa and highlights that the region is highly vulnerable to political fragility while at the same time also being highly exposed to climatic pressures.

Source: United States Agency for International Development, *The Intersection of Global Fragility and Climate Risks* (USAID: Washington, DC, 2018).

Credit: United Nations Environment Programme.

These disputes can occur among states over transboundary resources and also within states over the specific allocation of local resources such as water, land and energy. Water, land and energy are non-traditional security issues that are critical for human, environment and state security.[19]

[19] Krampe, F. et al., 'Environment and human security', ed. Matthew, R., *Routledge Handbook of Environmental Security* (Routledge: London, forthcoming).

Climate-related security risks facilitate new and exacerbate pre-existing socio-economic and political challenges and vulnerabilities. For example, climate change increases the likelihood of migration, creating human security risks for migrants and security issues for communities. This means that climate change is increasing the probability of tensions and violence.[20]

Given the size of the Horn of Africa, the climate differs throughout the region, and climate change has diverse impacts depending on context. Towards the east, between northern Kenya and Djibouti, conditions are arid and semi-arid. In contrast, the western highlands are cool and moist. The varying conditions are facilitated by distinctive topography and three main climatic process: the Indian Monsoon, the Intertropical Convergence Zone (ITCZ) and the El Niño–Southern Oscillation. These affect temperature and precipitation, which have changed during recent years. Temperatures have risen by approximately 0.28 degrees Celsius (°C) per decade since 1960, and rainfall patterns have become increasingly erratic and extreme, causing droughts and floods.[21] Overall, projections indicate significantly increased surface temperatures in East Africa, with the highest warming in Kenya. Between 2006 and 2100, temperatures will likely increase by 0.2–0.5°C per decade.[22]

The impacts of climate change are increasingly affecting the Horn of Africa, thereby amplifying pre-existing vulnerabilities such as food insecurity and political instability (see figure 2.2). The demographic, political instability, conflict, poverty and climate change trends of the countries in the region are structural challenges that interact and drive one another.[23] The region is experiencing rapid population growth. The population is projected to reach almost 440 million by 2050 from its current estimate of a little over 230 million. It is also experiencing more frequent food insecurity while degrading its natural resources for fields, livestock, water and energy, and destroying potential current and future options for resilience. As previously indicated, there is a high level of political instability. This instability, in combination with weak governance, puts stress on food security. Droughts and floods exacerbate the problem.[24] For example in 2017, political instability, war and drought resulted in widespread food insecurity, particularly in South Sudan.

Climate-related security risks in the Horn of Africa will require special attention by local, regional and international actors. This needs to be reinforced because a large percentage of the region's population relies on rain-fed agriculture as its primary livelihood.[25] Rainfall patterns are becoming more variable across the region, and drought cycles are growing shorter. It is, therefore, expected

[20] van Baalen and Mobjörk (note 17).

[21] United Nations Development Programme, 'Eastern Africa'.

[22] Muhati, G. L. et al., 'Past and projected rainfall and temperature trends in a sub-humid Montane Forest in Northern Kenya based on the CMIP5 model ensemble', *Global Ecology and Conservation*, vol. 16 (Oct. 2018).

[23] Inter-agency Regional Analysis Network, *East Africa and the Horn in 2022: An Outlook for Strategic Positioning in the Region* (Inter-agency Regional Analysis Network: 2017).

[24] Earth Observatory, 'Food shortages in the Greater Horn of Africa', Feb. 2017.

[25] Camberlin, P. et al., 'Major role of water bodies on diurnal precipitation regimes in Eastern Africa', *International Journal of Climatology*, vol. 38, no. 2 (July 2017), pp. 613–29.

as temperatures rise that agroecological zones will shift southward, and also leave areas of the north increasingly unsuitable for agriculture. The demand on available water is expected to increase, correspondingly increasing susceptibility to water stress in large parts of the region.[26] These trends will further securitize access to and usage of water, and the risks will play out on the domestic and transnational levels.

Domestic risks

Four pathways have been identified specifically for East Africa that illustrate the relationship between environmental change and violent conflict in the region: (*a*) worsening livelihood conditions, (*b*) increasing migration and changing pastoral mobility patterns, (*c*) tactical considerations and (*d*) exploitation by elites.[27] These are explained in the following paragraphs.

Worsening livelihood conditions. Due to the detrimental effects of changing weather patterns on agriculture and livestock, socio-economic hardships are unavoidable for farmers and herders. The high dependence on natural resources for food and income forms various grievances that create territorial tensions, which can lead to territorial disputes. Worsening livelihood conditions can additionally push people towards joining armed groups and resorting to violence with the aim of resolving conflicts in the region. This is illustrated in the case of Somalia where abnormally high temperatures and drought are resulting in herders selling more livestock than under normal conditions. The oversupply of low-quality animals is triggering economic price shocks, and the population is consequently more prone to livestock raiding and more susceptible to recruitment by armed groups.[28]

Increasing migration. Environmental challenges and associated socio-economic hardships result in people moving towards areas with higher endowments of natural resources. The most common migration hotspots concern internal climate migration and particularly internal rural to urban migration.[29] As migratory patterns bring together people of diverse backgrounds and ethnicities, there is a likelihood for tensions to heighten and escalate if they are not well managed.[30] For instance some areas in Darfur have seen increased precipitation together with thicker vegetation cover resulting in higher quantities of permanent and seasonal migration towards areas that have more favourable conditions.[31] This also includes

[26] Aqueduct, 'Aqueduct Beta country rankings'.

[27] For detailed references to each of the pathways, see van Baalen and Mobjörk (note 17).

[28] van Baalen, S. and Mobjörk, M., *A Coming Anarchy? Pathways from Climate Change to Violent Conflict in East Africa* (Stockholm University: Stockholm, 2016); and Maystadt, J.-F. and Olivier E., 'Extreme weather and civil war: Does drought fuel conflict in Somalia through livestock price shocks', *American Journal of Agricultural Economics*, vol. 96, no. 4 (2014), pp. 1157–82.

[29] The World Bank, *Groundswell: Preparing for Internal Climate Migration* (The World Bank: Washington, DC, 2018).

[30] De Juan, A., 'Long-term environmental change and geographical patterns of violence in Darfur, 2003–2005', *Political Geography*, vol. 45 (Mar. 2015), pp. 22–33.

[31] van Baalen, S. and Mobjörk (note 28); De Juan (note 30); and Mohammed, A. 'The Rezaigat camel nomads of the Darfur region of western Sudan: From co-operation to confrontation', *Nomadic Peoples*, vol. 8, no. 2 (2004), pp. 230–40.

changing pastoral mobility patterns, as climate change is forcing herders to move beyond traditional seasonal migration patterns towards new livestock and agricultural strategies.[32] As a result, 'in many cases pastoralists have ended up in unfamiliar territory in search of pasture and water for their livestock, for example in bordering countries'.[33] The changing and unpredictable trekking routes further contribute to tensions over land among pastoralists and between herders and farmers. For example, changing mobility patterns are experienced in northern Kenya where pastoral violence is more frequently found in close proximity to well sites and near open sources of water. In these cases, raiding is profitable due to the high concentration of people and animals. People are susceptible to surprise attacks by raiders due to the landscapes in which the wells are located.[34]

Tactical considerations. Armed groups can 'choose conflict locations with regard to their strategic ambitions and objective constraints such as geographical distance, terrain, infrastructure, military strength and the spatial distribution of resources'.[35] In Ethiopia, Kenya and Uganda communal violence for instance commonly follows wet periods.[36] Armed groups can also use climate impacts and the resultant humanitarian needs to their advantage, as seen in Somalia with al-Shabab taxing aid and increasing its power by presenting itself as a de facto state actor.[37]

Exploitation by elites. Political elites frequently exploit their power by occupying land after floods or droughts have displaced weaker marginalized groups.[38] A key example of how elites can exploit local grievances is illustrated in the case of South Sudan and Sudan. After the war between the northern and southern part of Sudan began at the start of the 1980s, the population, which was politically and ethnically divided, was also affected by the deep drought.[39]

Transnational risks

Climate change also exacerbates potential transnational security challenges, including those related to water management. According to data from the United Nations Environment Programme (UNEP), Africa has 63 international transboundary river basins and 15 principal lakes that cross the political

[32] Njiru, B. N., 'Climate change, resource competition, and conflict amongst pastoral communities in Kenya', ed. Scheffran, J. et al., *Climate Change, Human Security and Violent Conflict* (Springer-Verlag: Berlin, Heidelberg, 2012), pp. 513–27.

[33] Njiru (note 32), p. 516.

[34] van Baalen and Mobjörk (note 28); and Detges, A. 'Close-up on renewable resources and armed conflict: The spatial logic of pastoralist violence in northern Kenya', *Political Geography*, vol. 42 (2014), pp. 57–65.

[35] Detges (note 34), pp. 59–60.

[36] Clionadh, R. and Kniveton, D., 'Come rain or shine: An analysis of conflict and climate variability in East Africa', *Journal of Peace Research*, vol. 49, no. 1 (2012), pp. 51–64.

[37] Krampe, F. and Eklöw, K. 'Climate-related security risks and peacebuilding in Somalia', SIPRI Policy Paper no. 53, Oct. 2019.

[38] van Baalen and Mobjörk (note 17); and Krampe and Eklöw (note 37).

[39] van Baalen and Mobjörk (note 28); and Chavunduka, C. and Bromley, D. W., 'Climate, carbon, civil war and flexible boundaries: Sudan's contested landscape', *Land Use Policy*, vol. 28, no. 4 (2011), pp. 907–16.

boundaries of two or more countries.[40] The Nile Basin extends over 11 countries, and the Nubian Sandstone Aquifer System is shared by 4 countries; both are of high relevance for states in the IGAD region. The expected variability in water availability requires cross-country collaboration. However, it also causes regional tensions. The political tensions between Egypt and Ethiopia (and Sudan to some extent) around the GERD exemplify the security risks of cross-boundary resource sharing against a backdrop of changing climatic, geopolitical and economic conditions.

With climatic impacts such as droughts and floods increasing in intensity, frequency and duration, the Horn of Africa is suffering from vulnerabilities contributing towards increased pressures on natural resources in the region. Although not all disputes and tensions escalate into violent conflict, climate-related security risks increasingly pose a challenge to the broader peace and security context in the Horn of Africa. Most risks stemming from climate impacts can be mitigated through effective and sustainable resource governance. State institutions capable of increasing the resilience of communities to climate impacts are also crucial. For instance, research has illustrated that 'lacking access to groundwater is associated with a higher risk of communal violence' and conditioned by precipitation levels, population density and, importantly, state presence. A state's ability to mitigate the human security consequences of resource shortages can lessen the effects of constrained access to groundwater on communal violence.[41] However, sustainable management of groundwater resources is critical, in addition to sustained access. While groundwater access can reduce the risks of conflicts, the risk of overexploitation is high, and effective monitoring and management are highly dependent on social, institutional and political factors.[42] In addition, research on water scarcity and conflict has largely neglected groundwater; future research should hence include groundwater, surface water and precipitation, and further explore the relationship between groundwater scarcity and conflict, as well as conflict resolution.[43]

Relationships among countries in the region have been tense and have long histories of disputes and even conflict. Climate-related developments can add to tensions in this complex security context. There is a need for confidence building, and some positive developments have recently taken place. Yet, there are water-related challenges that have been negotiated for a long time without a positive or satisfying result for the parties involved. The Nile, Juba, and Shabelle rivers are cases in point. That these rivers run through large parts of the region, and therefore many countries, indicates the need for an agreement on water sharing, especially in view of the uncertainties and vulnerabilities stemming from climate change.

[40] UNEP, *Africa Water Atlas* (UNEP: Nairobi, 2010).

[41] Döring, S., 'Come rain, or come wells: How access to groundwater affects communal violence', *Political Geography*, vol. 76 (2020), 102073.

[42] Burke, J. et al., 'Groundwater management and socio-economic responses', *Natural Resources Forum*, vol. 23, no. 4 (1999), pp. 303–13.

[43] Döring (note 41).

Building on initial analysis (see appendix A, table A.1.) of the region's surface water (the Nile Basin, Juba–Shabelle Basin and Lake Turkana Basin), as well as groundwater and marine resources (ports and fisheries), the Nile Basin and the Juba–Shabelle Basin have been identified as two critical security challenges in the Horn of Africa.

3. The Nile and Juba–Shabelle basins

The Nile Basin

Physical trends

The Nile is considered the world's longest river and all IGAD states, except Somalia and Djibouti are riparian states to the river basin (see figure 3.1). The Nile covers one-tenth of the African continent with a catchment area of 3 400 000 cubic kilometres that is unevenly distributed throughout the region. The Nile Basin is directly and indirectly a source of livelihood for one-fifth of Africa's population—some 300 million people.[44] Indeed, the Nile represents the only substantial water resource for Egypt and Sudan. While Egypt accounts for less than 10 per cent of the area of the Nile Basin, it holds almost one-third of the population of the Nile Basin—most of it concentrated around the lower Nile (see figure 3.1).[45]

The river basin has two major tributaries, the Blue Nile and the White Nile. The much shorter Blue Nile emerges from the Ethiopian highlands; it is the main water supply of the Nile and a crucial source of water, energy and food for Egypt, Ethiopia and Sudan. Originating in Burundi, the White Nile flows through Tanzania, Lake Victoria, Uganda and South Sudan and is fed by a small stable flow of water from the mountains.[46] The two tributaries converge close to Khartoum, Sudan.[47]

The Nile's tributaries span multiple climate zones ranging from humid equatorial and tropical climates in Central Africa, to Sahelian (semi-desert) and desert climates in the south. These great extremes divide the riparian states into net users of water (states that use more water than they receive) and net contributors of water (states that receive more water than they use). Important net water users include Egypt and Sudan. Ethiopia is the key net contributor, contributing more than half of the total water budget of the Nile River. The Blue Nile has a high average variability of precipitation and run-off with water from the Ethiopian highlands, fluctuating greatly between wet and dry seasons (see figure 3.1). This has significant implications for Egypt, which, as a large net water user with an annual average of around 10 millimetres of rain and substantial evaporation in Egypt's desert heat, is highly dependent on the water from the Nile.[48]

Security trends

As an essential resource for economic and everyday life in the region, the Nile has been a long-standing source of social and political tensions for most of the 20th

[44] Nashwan, M. S. and Shahid, S., 'Spatial distribution of unidirectional trends in climate and weather extremes in Nile river basin', *Theoretical and Applied Climatology*, vol. 137, no. 1–2 (July 2019), pp. 1181–99.

[45] UNEP (note 40).

[46] Swain, A., 'Ethiopia, the Sudan, and Egypt: The Nile River dispute', *The Journal of Modern African Studies*, vol. 35, no. 4 (Dec. 1997), pp. 675–94.

[47] Alhamshry, A. et al., 'Prediction of summer rainfall over the source region of the Blue Nile by using teleconnections based on sea surface temperatures', *Theoretical and Applied Climatology*, vol. 137, no. 3–4 (Aug. 2019), pp. 3077–87.

[48] UNEP (note 40).

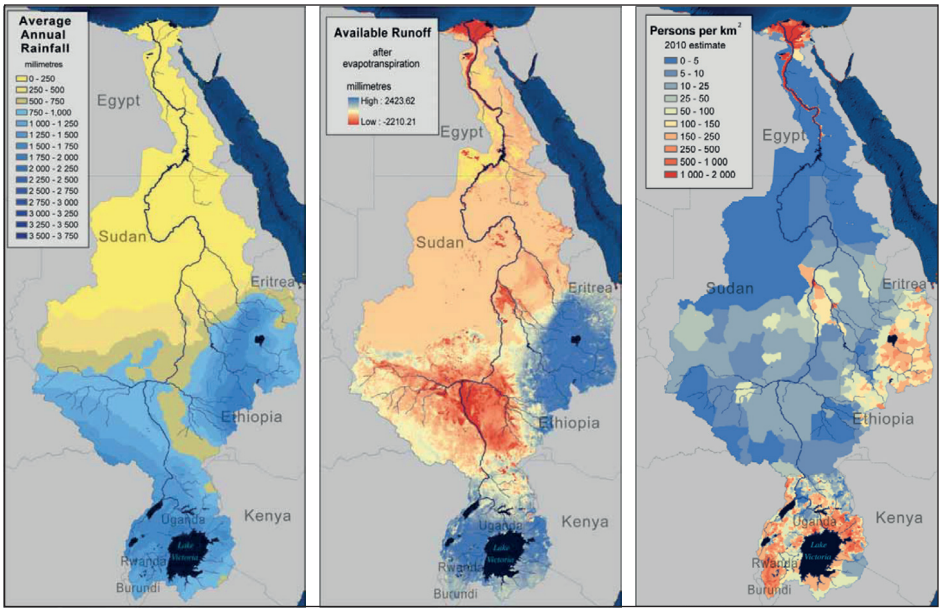

Figure 3.1. Nile Basin precipitation, run-off and population maps

Notes: The maps depict the average annual precipitation (left); the modelled available run-off (centre); and the population density (right). Population density (right) is graded on a colour spectrum with red representing areas with high population density and blue representing areas with low population density. The maps are from 2010 and therefore exclude South Sudan.

Source: United Nations Environment Programme, *Africa Water Atlas* (UNEP: Nairobi, 2010).

century. Transboundary water relations have not translated into armed violence so far. However, there have been continuous fears that the disputes will result in violent conflict if not resolved peacefully.[49]

The Nile Waters Agreement was originally signed in 1929 between Egypt and Great Britain. Great Britain signed the agreement on behalf of Sudan, together with other British colonies. The agreement included volumetric water allocations to institutionalize the natural and historic rights that Egypt and Sudan believe they have. The agreement stipulated that any claim to the Nile by other riparian states would have to be addressed by Egypt and Sudan. As Ethiopia was not party to the agreement, the country refused to acknowledge its validity. Kenya, Tanzania and Uganda also contested its validity after their independence in the 1960s as they believed it to be a colonial agreement.[50]

Thirty years later, in 1959, after disagreements between Egypt and Sudan over sharing the Nile and ahead of Egypt's plans to build the High Aswan Dam, the volumetric water allocations of the agreement were renegotiated. With upstream states again not included in the agreement, the divide between the

[49] Jägerskog, A. et al., 'Water security–international conflict and cooperation', Volume Two of *Water Security* (SAGE Library of International Security: 2014).

[50] Cascão, A. E., 'Changing power relations in the Nile River Basin: Unilateralism vs. cooperation?', *Water Alternatives*, vol. 2, no. 2 (Jan. 2009), pp. 245–68.

upper and lower riparian states of Egypt and Sudan became greater. The agreement consolidated the perception among upstream states as being powerless and unable to develop the use of their water resources in light of the influence of the powerful downstream countries.[51]

Ethiopia experienced a gradual increase in political power in the wake of the 'global war on terrorism' that increased US support (e.g. during the Ethiopian military intervention in Somalia in 2006). This development, together with the power vacuum left in Egypt following the Arab Spring, provided Ethiopia with a strategic opportunity to independently develop its water resources, notably through facilitating construction of the GERD in early 2011. Although the foundation work of the GERD began slightly before Egypt's revolution during the Arab Spring, the period of turmoil in Egypt gave Ethiopia an opportunity to make the project public, thereby minimizing the risk of an immediate response by Egypt.[52] The subsequent tensions among Egypt, Ethiopia and Sudan over transnational water allocation from the Blue Nile have become the critical security challenge in the region. As the main contributor of water in the Nile, providing 86 per cent of the yearly flow, the Blue Nile is key because rapid population growth and increasing food demands are putting greater pressures on governments in the region.[53]

The tensions around the unilateral building of the GERD have increasingly become part of the larger geopolitical playing field in the Horn of Africa. Ethiopia finds construction of the GERD essential for its national development, as its use would immediately double Ethiopia's power output. This would provide energy to its population and enable it to sell surplus energy to neighbouring countries. However, construction of the dam is perceived as a threat to the water supply of Egypt and Sudan. Egypt has regularly threatened to use military power to protect its share of the Nile.[54] Egypt fears that the construction of the dam will give Ethiopia more power and control over the water supply, thereby weakening Egypt's historical powerful role in the region. Nevertheless, some studies suggest that Egypt could benefit from the dam as it would trap sediment upstream, thus protecting major reservoirs in Egypt, and profit from purchasing surplus electricity generated by the water held in the reservoir.[55] If not well managed, dams and increased extraction of groundwater can increase the risks posed by sea-level rise in vulnerable areas such as the Nile Delta in Egypt.[56] Moreover, the topography of the area around the GERD is more suitable for storing the water than the desert terrain downstream with its higher rate of evaporation. With the dam slowly nearing completion and becoming a reality, political tensions have

[51] Cascão (note 50).

[52] Regional expert, Telephone interview with authors, Stockholm, Dec. 2019.

[53] Swain, A., 'The Nile River Basin initiative: Too many cooks, too little broth', *SAIS Review*, vol. 22, no. 2 (2002), pp. 293–308.

[54] Swain, A., 'Challenges for water sharing in the Nile basin: Changing geo-politics and changing climate', *Hydrological Sciences Journal*, vol. 56, no. 4 (July 2011), pp. 687–702.

[55] Farah, I. and Opanga, V., 'Hydro-politics of the Nile: The role of South Sudan', *Development*, vol. 59, no. 3–4 (Dec. 2016), pp. 308–13.

[56] Walton, B., 'Rising seas threaten tens of millions more people with inundation, study says. Even that may underestimate the impact', circle of blue, 1 Nov. 2019.

increasingly centred on the plans to operate the dam and the time frame to fill the reservoir. Egypt has proposed that Ethiopia fill the reservoir over a 12–21 year period, while Ethiopia suggests 6 years.[57] The time it takes to fill it has implications for the quantity of water that flows downstream: the longer it takes, the higher the quantity of water required.[58] This has resulted in an open and heated dispute over sharing the water resources among Nile Basin countries.[59]

While the key issue is currently among Egypt, Ethiopia and Sudan, past attempts to govern the Nile aimed to include the entire basin.[60] The first cooperative and intergovernmental partnership was the NBI (see box 3.1). The 2015 Declaration of Principles on the Renaissance Dam between Egypt, Ethiopia and Sudan marked a turning point in relations among the countries over the Blue Nile after several years of tensions. However, the declaration sparked controversy. There is no reference to historical water rights, and the previous storage capacity of the GERD reservoir remains. Thus, Egypt was understood to make a loss from the declaration.[61]

After a series of meetings at the end of 2019 and start of 2020, there are several new developments. In October 2019, negotiations again reached a deadlock after Ethiopia rejected a proposal by Egypt to operate the dam.[62] This marks the third time that negotiations have broken down since 2014.[63] Nevertheless, the dispute appears to be entering a new phase with offers from external mediators: Russia and the USA.[64] This is not necessarily a positive development, as it may introduce geopolitical ambitions. At the start of December 2019, the water ministers of Egypt, Ethiopia and Sudan met in Cairo at the second meeting in a series of four designed to reach an agreement by mid-January.[65] If unsuccessful, Egypt and Ethiopia may consider mediation with the USA and the World Bank as observers.[66] However, Ethiopia's commitment to external mediation seems to be less strong than that of Egypt. A role for South Africa, as the incoming AU chair, should also not be excluded. While reaching an agreement over the GERD during the fourth and final meeting failed, officials from the three countries announced that an initial deal was reached in Washington, DC, in mid-January. The joint statement from the officials announced that several issues, including the schedule for filling the reservoir, have been agreed on for signing by the end of February.[67] The outcome of this initial deal and how the situation between the countries progresses remain to be seen in the months ahead.

[57] Mutahi, B., 'Egypt-Ethiopia row over River Nile dam', BBC News, 7 Nov. 2019 and 13 Jan. 2020.

[58] Mutahi, B. (note 57), 13 Jan. 2020.

[59] Swain (note 54).

[60] Swain (note 53).

[61] Tawfik, R., 'The Declaration of Principles on Ethiopia's Renaissance Dam: A breakthrough or another unfair deal?', The Current Column, Mar. 2015.

[62] Abdelaziz, K. and Mourad, M., 'Egypt says talks over Ethiopia's Nile dam deadlocked, calls for mediation', Reuters, 5 Oct. 2019.

[63] Magdy, S., 'Egypt's options dwindle as Nile talks break down', Associated Press, 22 Oct. 2019.

[64] Harb, I. K. 'River of the dammed', *Foreign Policy*, 15 Nov. 2019.

[65] Al Sherbini, R., 'Talks on Ethiopia's Nile dam open in Cairo', *Gulf News*, 3 Dec. 2019.

[66] Mutahi (note 57), 7 Nov. 2019.

[67] Al Jazeera, 'Ethiopia, Egypt, Sudan to sign dam agreement by end of February', 1 Feb. 2020.

Box 3.1. The Nile Basin Initiative

The Nile Basin Initiative (NBI) was formulated in 1999 and includes all 11 riparian countries to the Nile, with Eritrea acting as an observer. Together with its subsidiary institutions, the NBI was created as a forum to consult and coordinate among basin states on sustainable management and development and to function as a transitional arrangement to create a long-term legal and institutional framework.[a] The initiative moves beyond addressing water management, and incorporates climate variability and change directly into several programme activities and tools throughout water-related sectors.[b] To achieve the desire of a permanent Nile Basin Commission, NBI attempted to formulate a Cooperative Framework Agreement. A draft agreement was concluded in 2007.[c] However, it has still not been ratified, as Egypt and Sudan oppose it because it would take away their historical priority to the Nile.[d] With tensions highest regarding the Blue Nile among Egypt, Ethiopia and Sudan, experts increasingly focus international efforts on facilitating an agreement over the Blue Nile before addressing the White Nile. Tensions over the Blue Nile run the biggest risk of securitization and military build-up and therefore require a process that allows for a political solution.

[a] Nile Basin Initiative, 'Who We Are'.

[b] Earle, A. et al., 'The Nile River basin', *Transboundary Water Management and the Climate Change Debate* (Routledge: New York, 2015).

[c] Since 2010, 5 out of the 7 countries have signed the Cooperative Framework Agreement (Burundi, Ethiopia, Kenya, Rwanda and Tanzania) and three countries have ratified it (Ethiopia, Rwanda and Tanzania). The independence of South Sudan in 2011 further complicated the matter as it is now officially a riparian country that is able to sign and ratify the Cooperative Framework Agreement. Regional expert, Telephone interview with authors, Stockholm, Dec. 2019.

[d] Swain, A., 'Challenges for water sharing in the Nile basin: Changing geo-politics and changing climate', *Hydrological Sciences Journal*, vol. 56, no. 4 (July 2011), pp. 687–702.

Part of the backstory to these developments has been Sudan's changing allegiance from Egypt to Ethiopia; the Sudanese Government has warmed to the utility of the GERD. This has further created movement in the region's stalemate, challenging Egypt's role.[68] An additional challenge complicating the security context is the dependence on external funding. With China emerging as a financier for dam building in the basin, and a variety of states—including China, India and Saudi Arabia—increasing land grabbing, the situation and geostrategic utility of the GERD and other Ethiopian dam-building projects have become further complicated.

Climate impact and social and political implications

As climate change is altering weather patterns, the region will experience higher climate diversity with rainfall and temperatures varying significantly. Countries of the Nile Basin are projected to have substantial changes to precipitation and temperature (see figure 3.2). Although annual mean precipitation in the region is expected to increase in many parts, the tendency for more erratic and severe rainfall and the projected increase in temperature are unlikely to alleviate water insecurity in the region.

[68] Earle, A. et al., 'The Nile River basin', *Transboundary Water Management and the Climate Change Debate* (Routledge: New York, 2015).

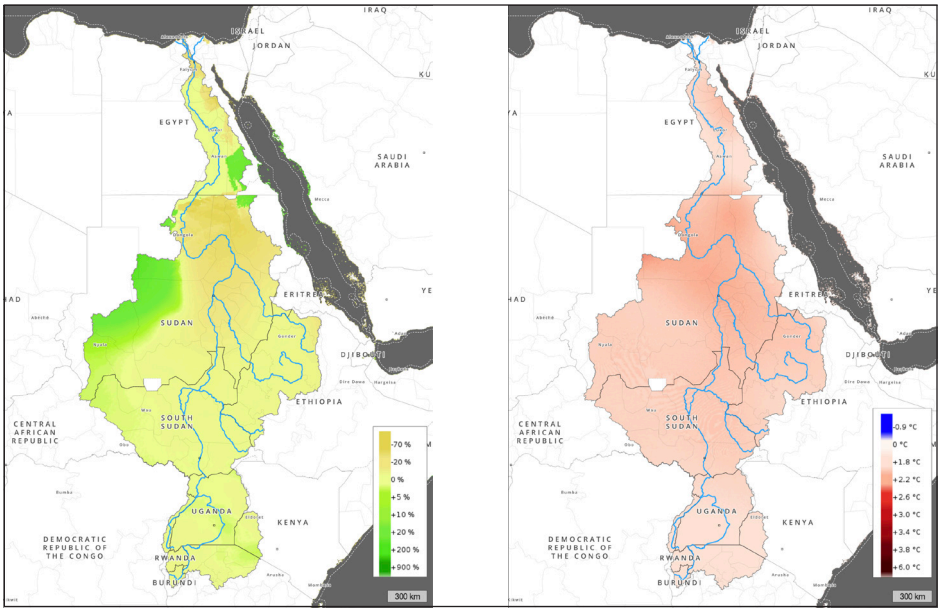

Figure 3.2. Nile Basin precipitation and temperature anomaly maps

Notes: The figure illustrates the precipitation and temperature anomalies as a percentage between the annual mean precipitation and temperature data for the period 1979–2013 (under Coupled Model Intercomparison Project phase 5) and the projected data for 2041–60 (under Representative Concentration Pathway scenario 4.5). The average precipitation anomaly map (left) illustrates that precipitation is predicted to increase in certain areas but decrease in other areas. The temperature anomaly map (right) illustrates that temperatures are predicted to increase in the entire region by 1–2°C.

Source: Karger, D. N. et al., 'Climatologies at high resolution for the earth's land surface areas', *Scientific Data*, vol. 4, no. 170122 (Sep. 2017).

Credit: United Nations Environment Programme.

The *Nile Basin Water Resource Atlas* stresses that 'Climate change is not necessarily a threat for the water supply, however the uncertainty is very large'.[69] Climate change directly affects hydrological patterns in the basin and indirectly affects energy, food and agricultural production in the region.[70] A recent study shows the far-reaching implications that different climate scenarios would have: a 10 per cent decrease in precipitation is expected to lead to 19 per cent less run-off in the tropical zone and 30 per cent less run-off in the arid zones. In contrast, a 10 per cent increase in precipitation would lead to 14 per cent more run-off in the tropical zone and 22 per cent more run-off in the arid zone.[71] Located in the ITCZ, the Blue Nile Basin has highly erratic and seasonal rainfall. While future temperature and sediment load is predicted to increase, rainfall and streamflow

[69] NBI, *Nile Basin Water Resource Atlas* (NBI).

[70] Gelete, G. et al., 'Impact of climate change on the hydrology of Blue Nile basin, Ethiopia: A review', *Journal of Water & Climate Change* (2019).

[71] Hasan, E. et al., 'Runoff sensitivity to climate change in the Nile River Basin', *Journal of Hydrology*, vol. 561 (Apr. 2008), pp. 312–321.

is predicted to decrease. These predictions are severely problematic as the Blue Nile is the major water supplier of the Nile, on which Egypt and Sudan are highly dependent.[72]

The high dependence on water resources to meet the demands by the rapidly growing population, which is heavily reliant on agriculture for its livelihood, will further raise pressures on water in the future.[73] As a region where 80 per cent of the population in the Nile Basin depends on irrigation, the intensification of climatic variability will compound current social and political tensions. Changing farming cycles make it difficult for farmers to plan when they plant crops.[74] Climate pressures and resource mismanagement have amplified migration of groups in the region. Internal power struggles related to climate change include worsening livelihood conditions and increased migration.[75] Climate pressures are thereby likely to further fuel domestic grievances, which have previously spilled over to the national level and undermine the capacity and legitimacy of states.[76] Examples of domestic grievances include the rivalries among the more than 80 ethnic groups located in Ethiopia, which increased after Prime Minister Abiy Ahmed took office in 2018. In April 2019, 3.2 million people were internally displaced, about 2 million of which were displaced after Abiy took office. The government initiated the voluntary return of internally displaced persons (IDPs) from April 2019, and reported that 1.8 million had returned as of June 2019.[77]

With almost all countries in the region already experiencing drought and food insecurity, these conditions will worsen and thereby further contribute to communal, bilateral and regional tensions.[78]

Conclusion

For a region that shares one water basin with 11 countries, the hydropolitical complexity and the long history of political and diplomatic tensions in the Nile Basin do not come as a surprise.[79] For most of the 20th century these have resulted in tensions among the three major riparian countries (Egypt, Ethiopia and Sudan).[80] This challenge is exacerbated further by climate variability and increasing pressures, with the population of the Nile Basin expected to double within the next 25 years.[81] The increasing social, political, agricultural and environmental pressures on water resources will test the relationships among riparian states

[72] Gelete et al. (note 70).

[73] For seasonal calendars and interlinkages of weather patterns and livelihoods, see the Food Early Warning System, <https://fews.net/livelihoods>.

[74] Farah and Opanga (note 55).

[75] van Baalen and Mobjörk (note 17).

[76] See for instance Krampe and Eklöw (note 37).

[77] UNOCHA, 'Ethiopia humanitarian access situation report October–December 2019', Dec. 2019; and IOM, *Ethiopia National Displacement Report, Round 18: July–August 2019* (IOM: 22 Oct. 2019).

[78] Farah and Opanga (note 55).

[79] Earle et al. (note 68).

[80] Swain (note 59).

[81] Nashwan and Shahid (note 44).

to the Nile even more significantly in years to come.[82] In avoiding escalation, it is essential to establish a permanent legal institutional framework that enables equitable utilization and cooperative management to foster development in the region and to be a catalyst for peace and cooperation. Barriers towards achieving this include the disagreement about the way that climate change should be addressed—not whether climate change should be included in national water strategies.[83] The challenge to a suitable governance arrangement thereby lies with cooperation.[84] Such a governance arrangement should acknowledge the value of upstream and downstream riparian states while addressing the major grievances among Egypt, Ethiopia and Sudan, as well as national and local dimensions of insecurity.

The Juba–Shabelle Basin

Physical trends

The Juba and the Shabelle are Somalia's main rivers. They generate fertile floodplains, sustain essential agriculture and crop production, and supply Mogadishu with water. Ethiopia, Kenya and Somalia share the Juba–Shabelle Basin, with Somalia being the lower riparian (see figure 3.3).[85] Both rivers emerge in the Ethiopian highlands, and over 60 per cent of the catchment area is located upstream within Ethiopia.[86] Ninety per cent of the rivers' flow originates in Ethiopia.[87] In Ethiopia, the Juba (also known as the Genale Dawa River) has three main tributaries: the Genale, Webi Dawa and Webi Gestro.[88] These tributaries meet before the border between Ethiopia and Somalia to form the Juba River within Somalia. The Juba Basin is roughly 452 000 square kilometres and includes the Laag Dheera sub-basin, located mainly in Kenya.[89] The Shabelle meets the Juba within Somalia and is fed by the Fanfan and Webi Shabelle tributaries within Ethiopia.[90] High levels of rainfall in the Ethiopian highlands contribute to the basin run-off.[91] While the average annual rainfalls for the Juba and Shabelle have

[82] Cooperation in International Waters in Africa and the World Bank Group, *Cooperation in International Waters in Africa: Annual Report FY2019* (Cooperation in International Waters in Africa and the World Bank Group: 2019).

[83] Earle et al. (note 68).

[84] Swain (note 53).

[85] UNEP (note 40).

[86] Michalscheck, M. et al., 'Impacts of rising water demands in the Juba and Shabelle river basins on water availability in south Somalia', *Hydrological Sciences Journal*, vol. 61, no. 10 (2016), pp. 1877–89.

[87] Food and Agriculture Organization of the United Nations (FAO), 'The Juba and Shabelle rivers and their importance to Somalia'.

[88] Basnyat, D. and Gadain, H., *Hydraulic Analysis of Rivers Juba and Shabelle in Somalia: Basic Analysis for Irrigation and Flood Management Purposes*, Technical Report no. W-13 (FAO Somalia Water and Land Information Management (SWALIM): Nairobi, 2009).

[89] Elmi, M. A., 'Managing shared basins in the Horn of Africa–Ethiopian projects on the Juba and Shabelle Rivers and downstream effects in Somalia', *Natural Resources and Conservation*, vol. 1, no. 2 (2013), pp. 35–49.

[90] Basnyat and Gadain (note 88).

[91] Sebhat, M. and Wenninger, J., 'Water balance of the Juba and Shabelle river basins in the Horn of Africa', *International Journal of Agricultural Policy and Research*, vol. 2, no. 6 (2014), pp. 238–55.

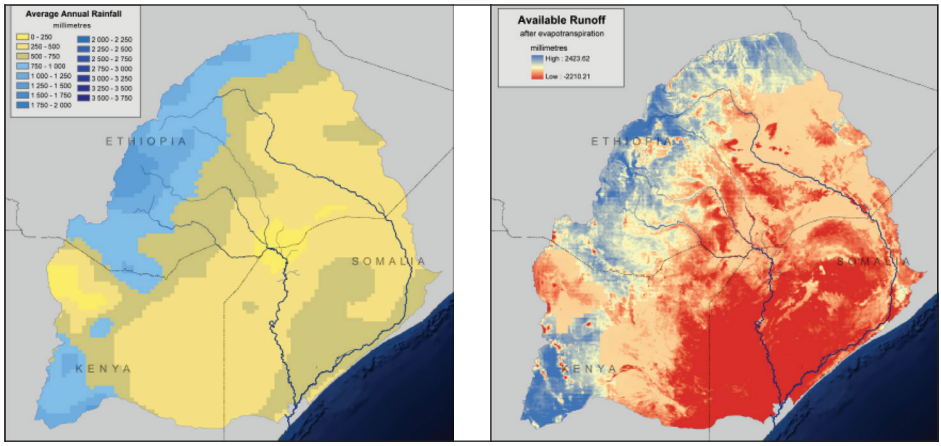

Figure 3.3. Juba–Shabelle Basin rainfall and run-off maps

Note: The maps depict the average annual precipitation (left) and the modelled available run-off (right). Precipitation levels (left) are graded on a colour spectrum with yellow representing areas with low amounts of rainfall and blue representing areas with high amounts of rainfall. Run-off levels (right) are graded on a colour spectrum with red representing areas with low amounts of run-off and blue representing areas with high amounts of run-off.

Source: United Nations Environment Programme (UNEP), *Africa Water Atlas* (UNEP/GRID-Sioux Falls, 2010).

been approximately 550 millimetres and 455 millimetres, respectively, the levels of rainfall are significantly higher upstream in the headwaters of the two rivers in the Ethiopian highlands (see figure 3.3).[92]

The Juba and Shabelle basins geographically encompass approximately one-third of the total land areas of Ethiopia, Kenya and Somalia, with the least developed areas in Kenya and Somalia.[93] Of the approximately 20 million people populating the basin as of 2010, about 13 million resided in Ethiopia.[94] The Juba and Shabelle are Somalia's only two perennial rivers, and the basins encompass an area of 174 000 square kilometres, occupying highly populated and economically important areas within the country.[95] While the Shabelle has the least amount of run-off of these rivers, it is a crucial source of water for Somalia. Approximately one-third of the Shabelle Basin is located within the country, with almost two-thirds in Ethiopia. The Shabelle Basin is also a source of natural gas, petroleum and minerals, although these are largely unexploited.[96] In Somalia, the Juba accounts for the greatest amount of run-off. Despite the greater population of Ethiopia, ethnic Somalis in both countries are the main users of the river basins in the two countries.[97]

[92] Houghton-Carr, H. A. et al., 'An assessment of the surface water resources of the Juba–Shabelle Basin in southern Somalia', *Hydrological Sciences Journal*, vol. 56, no. 5 (2011), pp. 759–74.

[93] Elmi (note 89).

[94] UNEP (note 40).

[95] FAO (note 87); Elmi (note 89); and Michalscheck et al. (note 86).

[96] Elmi (note 89).

[97] Elmi (note 89).

Security trends

Of the three riparian countries in the Juba–Shabelle Basin, Ethiopia and Somalia have the clearest domestic interests in the basin's water resources and their development. Kenya has arguably fewer interests in the basin due to its geographical position—its side of the Laag Dheere Basin is comparatively drier with subsequently fewer significant uses for the surface water.[98] The region around the basin, marked by civil war and state collapse, is economically highly dependent on agriculture and has a need to increase water usage for drinking water, as well as for the production of food and hydropower. While each country has its own interests and needs, there has never been a bilateral agreement surrounding cooperation over the rivers' usage.[99] The potential of transboundary cooperation regarding the water resources of the Juba–Shabelle Basin has been, and continues to be, shaped by domestic interests and interstate tensions, and moreover by the effects of three decades of civil war in Somalia. The possibility of interstate conflict due to these tensions is currently low because of Ethiopia's comparatively hegemonic military, economic and diplomatic influence, and upstream geographic position.[100]

The decisions of the riparian countries surrounding basin development and potential transboundary cooperation regarding the Juba–Shabelle Basin have been influenced by domestic interests and interstate tensions since the 1980s. On a transnational level, these country-level decisions have interacted with the policies of different governance actors related to the construction of projects on international waterways. The multilateral actors with the most influence on these dynamics are notably financial institutions, specifically the World Bank. Early efforts by the World Bank to negotiate use and development of the basin cited the 1968 African Convention on the Conservation of Nature and Natural Resources.[101]

Somalia completed a master plan in 1989 for the development of the Juba Valley, which included the Baardheere Dam on the Juba River. This dam would regulate the flow of the river and was intended to assist in promoting the production of energy and ensuring food security.[102] After Somalia applied for funding from the World Bank for the dam in 1983, the bank stated that due to its policy on funded projects for international waterways that may have harmful impacts on other riparians, the country would have to inform Ethiopia and Kenya of its intentions. Due to tensions with Ethiopia, Somalia requested the bank to convey its actions, which it did in 1986.

While Kenya did not respond, Ethiopia subsequently raised objections to the dam, citing lack of consideration of Ethiopia's future use of the basin.[103] These objections indicated concern that Somalia's development of the basin would

[98] Elmi (note 89).

[99] Elmi (note 89); and Michalscheck et al. (note 86).

[100] Elmi (note 89).

[101] Salman, M. A. S., 'The Baardhere Dam and Water Infrastructure Project in Somalia—Ethiopia's objection and the World Bank response', *Hydrological Sciences Journal*, vol. 56, no. 4 (2011), pp. 630–40.

[102] Elmi (note 89).

[103] Salman (note 101).

increase its claim to the water resources in the event of future negotiations.[104] Additionally, the Ethiopian Government proposed negotiations with Somalia concerning use of the Juba River. The Somali Government rejected the World Bank's subsequent proposal of negotiations with Ethiopia for several reasons, but notably because the Juba crosses the Ogaden region, which is the contested area on the border of the two countries that Somalia had claimed since its independence. Research suggests that as negotiations would recognize a border and give Ethiopia more opportunity in the dispute, Somalia was unwilling to negotiate.[105]

Due to the unwillingness of the two countries to negotiate, the World Bank commissioned independent experts to issue an external opinion to help resolve the issue. This opinion was meant to gauge the bank's assessment that the project would not cause harm to other riparians.[106] The experts concluded that the development, and whatever rights it may establish for Somalia, were equitable and reasonable in relation to Somalia's share of the river's resources, and would not harm future use for upstream Ethiopia. They cited the fact that both countries were party to the 1968 African Convention on the Conservation of Nature and Natural Resources. This convention required member states to coordinate, consult and cooperate on the development of water resource projects, and initiate interstate commissions to address problems due to joint use of resources. However, the security situation in Somalia stalled funding, and the 1991 civil war outbreak prevented the dam from going ahead.[107]

Ethiopia began planning its own water resources development within the Juba–Shabelle Basin in the early 2000s. Ethiopia's domestic interests and capacity to develop the basin to produce hydropower and for irrigation purposes affects Kenya's ability to develop water resources, as well as Somalia's resource development and overall economic well-being. Ethiopia has two different master plans for the Wabi Shabelle and Genale Dawa sub-basins within the Juba–Shabelle Basin. These two sub-basins are the most water scarce in Ethiopia and have the greatest levels of food insecurity; consequently, they have low levels of economic and social development. The plans for the Wabi Shabelle and Genale Dawa, respectively finalized in 2005 and 2007, identified different irrigation schemes and hydropower structures to be constructed.[108] The nine dams planned along the Genale Dawa would produce approximately 1300 megawatts of hydropower, which Ethiopia could sell to neighbouring countries.

The dams and irrigation projects within both these plans have the potential to use all available water resources, with consequences that will likely be hugely problematic for Somalia, and which will also affect Kenya's ability to access water resources in the basin.[109] The Genale Dawa III Dam, funded by the China

[104] Elmi (note 93); Salman (note 101); and Salman, M. A. S., 'Downstream riparians can also harm upstream riparians: The concept of foreclosure of future uses', *Water International*, vol. 35, no. 4 (2010), pp. 350–64.

[105] Elmi (note 89).

[106] Salman (note 101).

[107] Salman (note 101).

[108] Elmi (note 89).

[109] Elmi (note 89).

Gezhouba Group Company, is set to be operational in 2020. The dam would have a reservoir capacity of 2.57 billion cubic metres.[110] Of note is a difference between the Ethiopian and Somali reports on average river flows for the Juba and the Shabelle, with Ethiopian master plans estimating higher transboundary river flows than Somali measurements.[111]

While these constructions may have less impact on Kenya, whose side of the basin is relatively dry, they will likely have significant negative impacts on Somalia. Somalia is highly economically dependent on the alluvial plains of the Juba–Shabelle Basin, which is known as the country's 'breadbasket'.[112] The conflict context has affected Somalia's ability to develop the basin's resources and potential transboundary cooperation with Ethiopia. Ethiopia did not notify Somalia of its intention to build certain projects because Somalia did not have a government to notify at the time.[113] Somalia's conflict and subsequent lack of governance affected the potential of negotiations. Additionally, in the absence of an international agreement surrounding the water resources, Ethiopia argued that its ability and right to construct the projects should not be constrained.[114] Both countries need to access and develop the water of the Juba–Shabelle Basin to meet their own needs and demands, but the circumstances are challenging. Ethiopia's dams and their impact on river flows would likely force Somalia to rely completely on rain-fed agriculture instead of irrigation.[115] Rain-fed farming primarily works towards meeting the subsistence needs of individual rural households, and is common in places where irrigated agriculture is unavailable. In addition to the upstream construction of dams, irrigated agriculture in Somalia, found primarily along the banks of the Juba and Shabelle rivers, already faces significant challenges. For example, irrigation and flood control infrastructure used before the civil war fell into disrepair due to consistent insecurity. Two of the main crops—sesame and dry lemon—are exported. As of 2018 irrigated farming accounted for 10 per cent of cultivable land, and supported approximately 4000 families. The World Bank estimates that Ethiopia's upstream dams may reduce the flow of the Shabelle River by over 80 per cent, putting irrigated farming at risk.[116]

The Food and Agriculture Organization of the United Nations (FAO) has worked to assist Somalia in addressing the water scarcity it experienced after the civil war and the deterioration of its water resource infrastructure by establishing the Somalia Water and Land Information Management (SWALIM) project in 2001. SWALIM aims to empower the people of Somalia and help them protect their

[110] Ethiopia News Agency (ENA), 'Genale Dawa Hydropower Project to be operational after 2 months', 2019.

[111] Michalscheck et al. (note 86).

[112] FAO (note 87).

[113] Elmi (note 93); and *Genale-Dawa River Basin Integrated Resources Development Master Plan*, Volume II, Main Report (Lahmeyer International and Yeshi-Ber Consult: Aug. 2007).

[114] Elmi (note 89).

[115] Elmi (note 89).

[116] World Bank Group and FAO, *Rebuilding Resilient and Sustainable Agriculture in Somalia* (World Bank Group and FAO: 2018).

natural resources while improving their lives and livelihoods.[117] The programme identified ongoing insecurity, missing or limited data on water resource management in Somalia, lack of financial resources, and limited information sharing on the river flows between Ethiopia and Somalia as challenges to developing the basin and reviving the agricultural sector.[118]

Ethiopia and Kenya have been politically and militarily involved with Somalia to varying extents after its civil war.[119] Ethiopia militarily intervened in 2006 with the support of the US Government.[120] Kenya militarily intervened in 2011 to secure its border zone after raids by al-Shabab.[121] Kenya became incorporated into the AU Mission in Somalia (AMISOM) in 2012, while Ethiopia joined in 2014.[122] As of 2018 the AMISOM force commander was from Ethiopia, and Ethiopia has expressed interest in extension of the mission.[123] The political relations between Ethiopia and Somalia have improved, with the Ethiopian prime minister, Abiy Ahmed, and the Somali president, Mohamed Abdullahi Mohamed (known as 'Farmajo'), agreeing in 2018 to strengthen relations and remove economic and trade barriers.[124] This may be conducive to increased cooperation on this issue.

Ethiopia's upstream projects, the civil war in Somalia and general regional security issues have also affected Kenya's capacity to develop water resources in the basin for irrigation and other internal uses. Kenya would like to develop the Dawa tributary, along with the Merti groundwater aquifer. The Merti is non-replenishable and runs below Kenya and Somalia.[125] Local populations and Somali refugees in the Daadab area rely on this aquifer for drinking water. Development of this aquifer would require a transboundary management arrangement between Kenya and Somalia, which has not occurred.[126] The IGAD Inland Water Resource Management Programme has recently carried out a project on the aquifer to improve management, water security and drought resilience.[127] While Kenya has fewer significant interests than Ethiopia and Somalia in the basin due to its geographical position, it has demonstrated willingness in the past to work with Ethiopia and Somalia over shared water resources.[128]

[117] FAO SWALIM, 'About us', 2019.

[118] FAO (note 87).

[119] Elmi (note 89).

[120] Menkhaus, K., 'Somalia', *The RUSI Journal*, vol. 154, no. 4 (2009), pp. 6–12.

[121] Branch, D., 'Why Kenya invaded Somalia: The opening of an aggressive new chapter', *Foreign Affairs*, 15 Nov. 2011.

[122] AMISOM, 'Kenya–KDF', 2019; and AMISOM, 'Ethiopia–ENDF', 2019.

[123] AMISOM, 'New force commander takes over at the helm of AMISOM military', 2019; and UN, 'Unanimously adopting Resolution 2431 (2018), Security Council extends mandate of African Union Mission in Somalia, authorizes troop reduction', 30 July 2018.

[124] Maruf, H., 'Ethiopia, Somalia agree to strengthen "brotherly" relations', Voice of America News, 16 June 2018.

[125] Mumma, A. et al., *Kenya Groundwater Governance Case Study* (World Bank Water Partnership Program: June 2011); and Elmi (note 89).

[126] Elmi (note 93); and Mumma et al. (note 125).

[127] International Groundwater Resources Assessment Centre, 'MAR Project in Kenya successfully carried out by IGRAC', June 2011; and International Groundwater Resources Assessment Centre, 'IGAD MAR', 2014.

[128] Elmi (note 89).

The World Bank's Cooperation in International Waters in Africa programme has worked with the African Development Bank (AfDB) and the European Union to sponsor constructive dialogues among the three riparian states, including on transboundary water cooperation. No agreements surrounding transboundary water resources have yet been concluded.[129]

Climate impact and social and political implications

The climatic conditions for the Juba–Shabelle Basin are generally arid or semi-arid, with mean annual temperatures ranging from 25°C to 30°C. The conditions are facilitated by the airflows of the ITCZ and the Intertropical front. Minimum and maximum temperatures range from approximately 17°C in January to 41.3°C in March.[130] Climate change has, and will continue to have, an impact on countries in the Juba–Shabelle Basin region with annual mean precipitation and temperature difference projected to increase (see figure 3.4). In its Fifth Assessment Report, the Intergovernmental Panel on Climate Change reviews how monsoonal precipitation from June through to September has declined in the Horn of Africa over the past six decades due to changing sea-level pressure. Additionally, over the past 50 years, research has found a rise in mean seasonal temperatures within Ethiopia and Kenya. Warming across all four seasons in Ethiopia will likely cause higher rates of evaporation and heatwaves.[131]

Ethiopia, Kenya and Somalia are among the countries in East Africa increasingly affected by climate change.[132] In 2019, the FAO, the United Nations Children's Fund (UNICEF) and the World Food Programme (WFP) stated that 11.4 million people were suffering from food insecurity throughout the three countries and Uganda, and the situation was predicted to worsen due to forecasted droughts.[133] Somalia is susceptible to extreme weather events such as droughts and floods, which are estimated to continue to occur.[134] In October 2019, flooding displaced over 250 000 people.[135] The Shabelle overflowed, submerging parts of the town Belet Weyne and inundating hectares of farmland.[136] Recent research on the modelling of future impacts of climate change on streamflow in the Horn of Africa projects there will be significant flow reductions in major rivers in Ethiopia, subsequently affecting water in the country and the transboundary basin. The

[129] Cooperation in International Waters in Africa and the World Bank Group (note 82).

[130] Sebhat and Wenninger (note 91).

[131] Niang, I. et al., 'Africa', ed. Barros, V. R. et al., *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press: Cambridge and New York, 2014), pp. 1199–1265.

[132] Bhalla, N., 'Act now to avert disaster in drought-hit East Africa, aid agencies say', Reuters, 25 July 2019.

[133] FAO, UNICEF and WFP, *Horn of Africa: A Joint Call for Action Before a Major Regional Humanitarian Crisis*, Joint Position Paper (FAO, UNICEF and WFP: 2019).

[134] Federal Government of Somalia, *National Adaptation Programme of Action on Climate Change (NAPA)* (Federal Government of Somalia: 2013); and Krampe and Eklöw (note 37).

[135] Associated Press, 'Somalia struggles after worst flooding in recent history', 14 Nov. 2019.

[136] FAO SWALIM, 'Somalia floods update', 31 Oct. 2019.

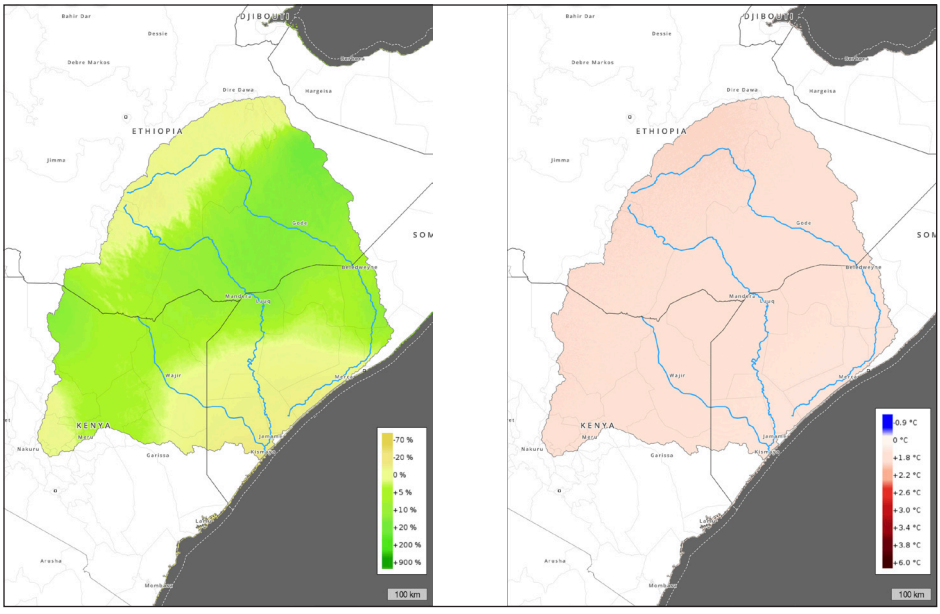

Figure 3.4. Juba–Shabelle Basin precipitation and temperature anomaly maps

Note: The figure illustrates the precipitation and temperature anomalies as a percentage between the annual mean precipitation and temperature data for the period 1979–2013 (under Coupled Model Intercomparison Project phase 5) and the projected data for 2041–60 (under Representative Concentration Pathway scenario 4.5). The precipitation anomaly map (left) illustrates that precipitation is predicted to increase in a significant area with some other areas seeing stable or slightly reduced precipitation. The temperature anomaly map (right) suggests that temperatures are predicted to increase by 1–2°C.

Source: Karger, D. N. et al., 'Climatologies at high resolution for the earth's land surface areas', *Scientific Data*, vol. 4, no. 170122 (Sep. 2017).

Credit: United Nations Environment Programme.

simulations suggest that the river flows in Ethiopia would decrease by a mean of 10–25 per cent by the 2080s.[137]

Due to its interaction with socio-economic and political factors, climate change will have various domestic and transnational sociopolitical implications for Ethiopia, Kenya and Somalia. Domestically, increasing temperatures and extreme precipitation events coupled with other factors, including governance challenges, will affect multidimensional security within each country. Food and water security, livelihood challenges, migration and communal conflict due to impacts on resource access and traditional livelihoods are all issues that may

[137] Hirpa, F. et al., 'Streamflow response to climate change in the Greater Horn of Africa', *Climatic Change*, vol. 156, no. 3 (2019), pp. 341–63.

be exacerbated by climate change.[138] Furthermore, the effects of insecurity and conflict can also be compounded by climate change impacts.

Recent research has found that climate-related impacts negatively affected the UN Assistance Mission in Somalia and AMISOM peacebuilding efforts in Somalia. These spurred the multilayered conflict in the country, by increasing conflicts between pastoralists and farmers, affecting insurgent group recruitment and intergroup competition over land resources. As of August 2019 the effects of violence, compounded by climate change, had led to the internal displacement of approximately 2.6 million Somalis. Further, the UN Office for the Coordination of Humanitarian Affairs (OCHA) stated that the extremist group al-Shabab made significant efforts to recruit children; as a result, families would leave their homes and move to IDP camps for safety. Nevertheless, children were still exposed to recruitment in IDP camps. In 2018 the highest number of children recruited and used in armed conflict across the globe was in Somalia. IDP camps in Somalia became active recruiting grounds for al-Shabab, which significantly targeted young and unemployed men.[139]

Thus, in the context of the Juba–Shabelle Basin, rising temperatures, increasing drought frequency and diminished river flows in Ethiopia, which is already one of the most drought-prone countries in the world, will have transnational effects. These climatic changes and their impacts on river flows will affect local livelihoods and security in the country, as well as in countries downstream of Ethiopia's rivers. Conversely, increased levels of drought in Somalia can affect Ethiopia. As of November 2019 the Government of Ethiopia reported that the number of Somali refugees entering Ethiopia due to the compounding effects of drought and conflict increased sevenfold compared to the previous year.[140] In general, research observed increased levels of transnational migration in East Africa due to drought, which may further stress already fragile and resource-insecure contexts.[141]

Conclusion

In the Juba–Shabelle Basin, climate change, coupled with construction of dams in Ethiopia, will have a significant negative impact on water access and the subsequent multidimensional security in Somalia. However, there are no regulatory agreements surrounding access and use of the basin's resources among the three riparian countries. Challenges surrounding this cooperation are complex and intersect with decades of interstate tensions. In addition to addressing challenges between Ethiopia and Somalia, a transboundary management plan

[138] World Meteorological Organization, 'Poor rainfall threatens food security in Greater Horn of Africa', 2019; Ginneti, J. and Franck, T., *Assessing Drought Displacement Risk for Kenyan, Ethiopian and Somali Pastoralists* (Norwegian Refugee Council and Internal Displacement Monitoring Centre: 2014); UN, 'Unprecedented impacts of climate change disproportionately burdening developing countries, delegate stresses, as Second Committee concludes general debate', 8 Oct. 2019; and van Baalen and Mobjörk (note 17).

[139] Krampe and Eklöw (note 37).

[140] ENA, 'Drought, conflict increase Somali refugees entering Ethiopia by 7 Folds: ARRA', 2019.

[141] Owain, E. L. and Maslin, M. A. 'Assessing the relative contribution of economic, political and environmental factors on past conflict and the displacement of people in East Africa', *Palgrave Communications*, vol. 4, no. 47 (2018).

surrounding the Merti Aquifer may be necessary between Kenya and Somalia.[142] The World Bank has been a significant actor in governance of the basin, with AfDB, FAO and IGAD taking on roles in domestic and transboundary work. The increasing impacts of climate change render it crucial to work towards cooperation. Conventions such as the UN Watercourses Convention and the African Convention on the Conservation of Nature and Natural Resources advocate for joint management of shared resources through shared commissions or institutions. The Watercourses Convention could be a potential framework to promote equitable and reasonable use through acknowledging different social and economic needs and challenges for each actor.[143]

Somalia's lack of state capacity since its civil war has been a challenge to reaching a treaty or negotiation over the Juba–Shabelle resources.[144] Additionally, lack of shared data and individual state plans for basin management are problems surrounding transboundary cooperation.[145] However, the political relations between Ethiopia and Somalia, and Kenya and Somalia, are potentially strengthening, possibly paving the way for more effective cooperation around the basin.[146] While Ethiopia has the most established presence in the basin due to its upstream position, area, population and infrastructure projects, water allocation cannot be decided based on the interests of one riparian country. While climate change and the construction of dams and other infrastructure upstream of the Juba–Shabelle Basin are important for agriculture and economic development in Somalia, the compounding effects would be highly problematic. Negotiations involving other issues surrounding economic integration—such as exchanging access to ports along the Somali coastline for Ethiopia with undisturbed river flows for irrigation in Somalia—may be a potential avenue for increasing cooperation.[147]

[142] Elmi (note 89).

[143] Stranc, K., 'Managing scarce water in the face of global climate change: Preventing conflict in the Horn of Africa', *Hofstra Law Review*, vol. 39, no. 1 (2010).

[144] Stranc (note 143).

[145] Elmi, M. A., 'Sharing water in Africa: Comparative analysis of the Limpopo and Orange-Senqu River Basins in SADC and the Juba and Shabelle River Basins in the Horn of Africa', PhD thesis, TRITA LWR, June 2014.

[146] Ahmed, M. O., 'Kenya, Somalia agree to normalize relations amid border dispute', Bloomberg News, 15 Nov. 2019.

[147] Elmi (note 145).

4. Political constraints and possible entry points

Constraints and blockages

While there are multiple arrangements and initiatives to govern freshwater and marine resources, constraints limiting natural resource governance and related climate resilience in the Horn of Africa remain. These constraints are often political. If not mitigated, they can result in increased tensions and enhance the potential for conflict and contribute towards increased human insecurity. Two key constraints in the Horn of Africa are weak state institutions and institutional capacity, and the historically high-level of distrust among countries. These factors limit the opportunities for regional approaches. In combination, and with a myriad of regional organizations, they provide opportunities for countries to use different options to promote their interests.

The issue of *weak state institutions and institutional capacity* is a key constraint for the region as a whole. In combination with limited means to develop and implement preventive and forward-looking policies, this affects the capacities of countries to deal with the challenges of climate change and environmental degradation. Within countries, governance-related issues lead to lack of confidence in governments. This is a particular issue for dealing with climate-related security risks. To tackle such issues related to climate change, it is necessary for governments to provide and plan for livelihood alternatives. Additionally, it is crucial that governance structures allow for development of coping mechanisms at the national or international levels. Yet, weak state institutions and institutional capacity can affect the social and economic structures of countries and subnational groups (e.g. ethnic, religious and regional groups), who are, or feel, marginalized in their access to resources and services. Also, relationships and cooperation among countries can become subordinate to the importance of governments staying in power. In some cases the focus on internal stability within countries, or power relationships among countries, complicates the development of international initiatives for dealing with problems at a regional level.

Interference in internal affairs in other countries has resulted in a *historically high-level of distrust among countries* in the Horn of Africa. It has also contributed to difficulties in water governance and regional cooperation on water resources. Water has been a political tool for over a century in the Nile Basin; it is particularly important in a region that is highly dependent on the Nile for water and that is known for countries interfering in conflicts in other countries. The decisions of different countries—on issues of water access and governance resources on their territory—have potentially negative (social, political, economic and environmental) effects on other states.

Examples of such effects are as follows:

- The decision of Ethiopia about the port of Berbera undermines the position of the Somali Government as it leads to de facto recognition of Somaliland
- The Somali and Kenyan governments are unilaterally pursuing their interests in the Indian Ocean and have proceeded with licences for exploration based on their claims of the maritime boundary, which is still an unresolved dispute
- The decision of Ethiopia to build the GERD affects the potential water consumption of Egypt and Sudan
- The independence of Eritrea immediately made Ethiopia a landlocked state in dire need of access to port outlets for commercial and security purposes
- The development of (regional) initiatives will lead to questions of who should be invited to the negotiation table
- Some countries (e.g. Eritrea) demonstrate little interest in multilateral initiatives, thereby blocking regional solutions for regional challenges

These effects are background conditions that define the regional political relations and the room to manoeuvre on issues related to water and climate. All these elements need to be incorporated into regional analyses. The picture is further complicated by increasing regional (in particular, the Red Sea) and extra-regional geopolitical interests. The investments of Gulf states, in particular Saudi Arabia and the UAE, in the Horn of Africa are substantial. They relate to investments in logistical and commercial infrastructure (e.g. ports and dams) and industrial-scale farming. The dependence on external financial resources and funding has opened the door to new investments. The scramble for ports and military presence in the Red Sea region is one example that brings money and new commercial activities. These new investments necessitate exerting political influence by the external actors in order to protect them. Together with high levels of development assistance, this offers external actors the means of influencing regional political-, economic- and security-related developments. Similarly, important is the introduction of disputes originally external to the region (e.g. Saudi Arabia and the UAE versus Iran or Qatar, or China versus India and USA). This creates new challenges that also constrain sustainable natural resource governance and climate resilience.

Regional organizations and cooperation

It is in this context that regional organizations operate. Given the number of organizations, sometimes with overlapping mandates and divergent composition of member states, countries in the region can pick and choose different

organizations to address issues. Important regional organizations, including the AU and IGAD, are experiencing challenges in this area. While IGAD, as a regional economic community, would be best positioned to take on several issues related to the effects of climate change, the organization is limited in its financial and political capacity. In a way, IGAD has developed interesting and potentially effective tools to assess political- and conflict-related risks with the Post-Conflict Reconstruction and Development and the Conflict Early Warning and Response Mechanism. Yet, the follow-through is limited in terms of putting issues on the agenda, and its dependence on donors is a substantial constraint to building sustainable mechanisms.[148] IGAD's capacity was for a long time constrained because of Ethiopia's role in leading the organization as its chair. Under Abiy, Ethiopia has opened the way for further institutional development by giving up its position as IGAD chair. The organization resumed the rotating chair position by electing Sudan as its chair. However, Ethiopia remains a dominant actor within IGAD through the new Executive Secretary, Ethiopian Workneh Gebeyehu Negewo.[149] This may provide new opportunities for regional cooperation.

The lack of clear mandates, roles and tasks of organizations in the region—in particular for the AU and IGAD—also contributes to limited effectiveness. The current set-up is not conducive for reaching swift agreements on actions or even strategies for action. A clear separation of tasks among the organizations to facilitate adequate levels of devolution of power, as well as complementarity, would be welcome.

Notwithstanding the availability of several institutions, new organizations are being suggested as a way forward. However, as was already concluded with regard to existing organizations, they need to be inclusive with regard to the key players. Otherwise, new exclusions could diminish diplomatic options at the regional level. For example, foreign ministers from Djibouti, Egypt, Eritrea, Jordan, Saudi Arabia, Somalia (not Somaliland), Sudan and Yemen signed a charter for a Council of Arab and African Coastal States of the Red Sea and Gulf of Aden (the Red Sea Council) at a meeting in Riyadh on 8 January 2020.[150] However, neither Ethiopia nor the UAE have been invited: while the UAE is apparently supportive, Ethiopia's position with regard to this new initiative is not yet clear, .[151] As such, the opportunity for water-sharing agreements between Egypt and Ethiopia could be indirectly inhibited. In the meantime, IGAD has established a task force to discuss Horn of Africa regional engagement with the Red Sea Council and the shape of the regional agenda, as it emerges.[152] However, it is clear that the wider Red Sea/Gulf of Aden region is increasingly becoming important in terms of regional competition and cooperation, security dynamics and geopolitics. This

[148] Krampe, F. et al., 'Responses to climate-related security risks: Regional organizations in Asia and Africa', SIPRI Insights on Peace and Security no. 2018/2, Aug. 2018.

[149] IGAD, 'Communiqué of the 13th ordinary summit of IGAD heads of state and government', 29 Nov. 2019.

[150] The National, 'Red Sea and Gulf of Aden border countries form council', 6 Jan. 2020.

[151] UAE Ministry of Foreign Affairs & International Cooperation, 'UAE welcomes establishment of Council of Arab and African States bordering the Red Sea and Gulf of Aden', 6 Jan. 2020.

[152] IGAD, 'IGAD establishes taskforce on the Red Sea and the Gulf of Aden', 4 Apr. 2019.

region also includes much of the Nile Basin and the Juba–Shabelle Basin. It will, therefore, become increasingly important to also focus on cross-regional institutions and the role they can play.

All these different issues mean there is a substantial challenge in finding entry points for dealing with the challenges related to natural resource governance—including water—and enhancing resilience. Whereas no country has gone to war over water, it is also clear that no organization seems to be capable of dealing with the issues on its own. Further deterioration of relations and securitization of issues could be the result.

Not just technical solutions

The situation indicates there is limited room for purely technical solutions. The overview of issues indicates that an effort to address transboundary water challenges in this region must be grounded in political analysis. In particular the high political value of water in the region suggests the need for high-level political engagement geared towards cooperation.

While approaches must take political interests and issues into consideration, defining the issues in terms of 'problem solving' and 'confidence building' at the national, bilateral and regional levels will be key. Where possible, lessons learned from elsewhere should be identified and used in providing the region with a way forward. It is also important to build on what is already available; improving and living up to already agreed upon decisions, frameworks and structures is the best way forward. New arrangements should be inclusive in terms of membership and complementarity in relation to existing mechanisms.

Entry points

Given the constraints and blockages identified, three key political entry points are proposed: (*a*) change the narrative from narrow national perspectives to future regional interests and regional cooperation, (*b*) develop and strengthen transboundary diagnostics and strategic action programmes and (*c*) strengthen and improve the institutional architecture.

Change the narrative

The problems of today are most likely small compared to the problems of the future. The analysis above on water security and governance within the two river basins indicates a need for a different narrative focusing on shared problems and, therefore, shared solutions. Challenges revolve around natural resources including water, land and energy, which are relevant for the integrity of ecosystems and also for social and economic stability. Political leadership is required to overcome the current issues and provide a foundation of trust, as well as solutions for dealing with the basins, which will be required for any future steps in terms of cooperation.

It is, therefore, necessary to identify a trusted leader and mediator who can create an agenda around water, energy and land and lift the debate to a higher

level that requires more cooperation. This lead person may, for example, be an accepted political leader who is capable of acting beyond national interest. The task would be to facilitate the development of a joint vision for the region that allows for cooperative solutions for the Horn of Africa.

A regional vision with regard to cooperative solutions may alleviate the lack of confidence among countries, which has proved to be an obstacle for regional cooperation. This lack of confidence may be partly due to the need to focus on highly sensitive and political issues for which no direct solution may be possible. To build confidence with a regional vision, broadening the scope of topics would allow for different dialogues in several areas, ranging from security (borders and cross-border problems) to environmental, economic (resources and their management, and a vision for economic development for the region) and cultural issues. Incorporating environmental security and the challenges around water, land and energy is essential for such a platform to identify trade-offs and opportunities to promote livelihood opportunities and safeguard security. Working on confidence-building measures may be a practical and necessary way forward in the Horn of Africa context. IGAD could be one of the platforms for assisting in regional dialogues. This may have potential spillover effects in terms of the effectiveness of IGAD as an actor facilitating cooperative solutions.

Develop transboundary diagnostic analysis and a strategic action programme

Although leadership is important, there is also a need for more solid, shared and jointly accepted information. Data is sensitive for the countries, the region and governments. Data is often available only nationally, and not shared, nor regionally validated; this complicates a broader dialogue. There is a need for reliable data that can guide policies and decision makers in dealing with the challenges of climate change and climate-related risks. *Transboundary diagnostic analysis* (TDA) is a methodology and approach that has been used by UNEP in the past in other parts of the world (e.g. the Mediterranean) and by other organizations in many different contexts.[153] It would help to provide more solid and shared scientific and technical analyses of the status and impacts of the environment in the Horn of Africa, and also in specific geographic areas. This information should be used to develop a *strategic action programme* (SAP)—a negotiated policy document that establishes clear priorities for action and identifies policy, legal and institutional reforms as well as investments needed to address and resolve priority problems of transboundary waters in particular.

Step 1: Lead and coordinate. To prepare and set up a TDA/SAP will require a political process that involves different stakeholders. Given the sensitivities in the region, this process needs to be led by an independent actor who can facilitate full stakeholder participation, joint fact-finding and transparency, intersectoral policy development and stepwise consensus building, risk management, inclusion of partnerships, and aligned actions and government commitment.

[153] UNEP, *Transboundary Diagnostic Analysis (T.D.A.) for the Mediterranean Sea* (UNEP: 2005).

Step 2: Build and share knowledge. A new narrative could allow for the organization of a series of consultations and collaboration meetings among the stakeholders. The preparation phase is essential for providing and building consensus, starting with information sharing. Such a process will require follow-up activities of a concrete and practical nature, such as:

- Appointments of regional and national coordinators, as well as teams
- Information and data collection and analysis to provide references for preparing the TDA
- Impact assessment to analyse the relative importance of different impacts on the region, and identification/prioritization of transboundary problems related to the environment and climate change
- Stakeholder analysis to verify interests of groups and individuals
- Institutional analysis of what exists and how formal and informal mechanisms of actual decision making can be used in a process of change
- Legal and policy analysis to provide the basis for recommending legal and policy reforms, in particular on a regional level

Step 3: Define the key risks and responses. For this to work, and to change the narrative:

- A review of the priority transboundary issues related to climate change and risk should be made and approved by the regional coordinators and teams, to be used as reference material for establishing the vision statements for the priority environmental problems
- Regional policy objectives, indicators and targets to define the strategic programme actions for mitigating the environmental problems should be established
- Joint feasibility studies should be carried out to identify the best feasible options for managing the identified problems
- Identification and expression of intent to implement selected feasible options by the governments and other relevant actors should be formally expressed and noted

Technical consultations should be carried out and reported at the political level, to set and agree on the short- and medium-term operational objectives, to identify the required national and regional institutional frameworks, and to identify

jointly accepted monitoring and evaluation indicators for implementation of the SAP.

Step 4: Build confidence. Ideally, these activities should result in incremental partnerships on the basis of agreed, joint benefits in environmental management. In parallel with these technical and political processes, the TDA/SAP should also be used to identify financial needs and potential financing mechanisms. Furthermore, investing in public consultation and international partnerships is key.

Establish a new institutional architecture

Notwithstanding earlier comments on the number of organizations, the establishment of new institutional architecture to manage water resources in the region is a third tentative entry point that needs to be considered. While certain organizations, such as the World Bank, are heavily involved, there is currently no suitable organization or framework that can comprehensively address the identified water management and security challenges in the Horn of Africa. A critical reassessment of the objectives and structural set-ups of existing institutional frameworks and agreements may be required. Lessons could be learned from other regions and basins in Africa, for example, the Zambezi Watercourse Commission on a regional management strategy, or the Organisation pour la Mise en Valeur du Fleuve Sénégal as an example of one of the most successful river basin models. It would be up to a lead agent to set up a structure to share and evaluate elements and potential added value of this model for the river basins in the Horn of Africa. Joint evaluation and information sharing could lead to a better understanding of the challenges in terms of water management from national perspectives and contribute to further confidence building.

There are constraints and opportunities related to this process-oriented approach. Financial constraints are a challenge for improving the situation. Additional funds will be required for establishing new river basin commissions that can collect, monitor, evaluate and validate data using joint methodologies. The AU Continental Early Warning System (CEWS) provides an opportunity in terms of analysis. The existing data and analyses of CEWS may already include environmental and climate-related indicators, or this data may be added. CEWS already exists, and is developed and accepted by the region. Using it would allow for linking and integrating climate-related security risks and issues to a commission in the continental peace and security architecture. This primarily requires the willingness of member states to change the use of this data. The AU Permanent Representatives Committee is the CEWS mandated audience.

The identification of CEWS data related to climate risk can for instance provide input for different types of dialogue on how to manage the impact on a national or a regional scale. This may also imply the need to identify new funding sources that enable going beyond the current frameworks. The Juba–Shabelle Basin is an interesting area and entry point as it currently lacks such a framework. But also finding cooperative solutions for the Blue Nile, and, in the long run, the Nile Basin,

would require the will to finance a new river basin commission that involves Egypt, Ethiopia and Sudan.

The suggested method is again the four-step approach, as mentioned above, of working from jointly gathered, shared, validated and accepted data for decision making, and it should include measures that will build confidence with a clear lead role from a non-partisan actor.

Appendix A. Hotspot mapping

Table A.1. Hotspot mapping of water security and governance in the Horn of Africa

Hotspot	Environmental issues	Political tensions/ security implications	Countries	Governance framework	Gaps
Nile Basin (surface water)	Sensitivity to climate change and high uncertainty of implications of climate change (ranging from floods to droughts) on water resources	*Transnational* Resource sharing among 11 countries with particular tensions between Egypt and Ethiopia (including concerns over the GERD) *Domestic* Cultural and historical significance in the collective memory of people to mobilize political support	Burundi, Democratic Republic of the Congo, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, South Sudan, Sudan, Tanzania and Uganda	Various transboundary attempts including the NBI across all 11 countries	A suitable legal or institutional governance framework addressing political tensions among riparian countries (in particular Egypt, Ethiopia and Sudan, as well as external actors)
Juba–Shabelle Basin (surface water)	More frequent drying of the Juba and Shabelle rivers, resulting in land degradation, deforestation and desertification in addition to water scarcity in Somalia	*Transnational* Power imbalance between Ethiopia and Somalia; Ethiopia and Kenya have political, military and peacebuilding presences in Somalia	Ethiopia, Kenya and Somalia	Support to Somalia by the WB and the FAO for transboundary water management including the Somalia Water and Land Information Management initiative	Transboundary cooperation between Ethiopia, Kenya and Somalia, with a specific focus on Ethiopia and Somalia

Hotspot	Environmental issues	Political tensions/ security implications	Countries	Governance framework	Gaps
		Domestic Unilateral dam building by Ethiopia and possible implications of climate change for national peacebuilding efforts			
Lake Turkana (surface water)	Seasonal variations and reduced run-off shrinking Lake Turkana and shifting the delta (from Ethiopia to Kenya)	*Transnational* Implications of the delta shifting and dam building on the Omo River (Gibe cascade) for Kenya *Domestic* Local implications of migration and reduced livelihoods from the affected fishing industry	Ethiopia, Kenya, South Sudan and Uganda	Ethiopia's national 'villigization' programmes	Management of dam construction and irrigation schemes; transboundary approach to food insecurity and migration
Nubian Sandstone Aquifer System (groundwater)	High rates of groundwater extraction from aquifer systems with medium to low rates of annual recharge	*Transnational and domestic* Limited/latent political and security risks not yet sufficiently examined due to the limited amount of available data and monitoring	Chad, Egypt, Libya and Sudan	HOA-GWI and the IHP of UNESCO	Control and monitoring of groundwater supply, consumption and recharge as well as regional cooperation on groundwater resources

Dawa/Juba Aquifer/ Shabelle Aquifer (groundwater)	High rates of groundwater extraction from aquifer systems with medium to low rates of annual recharge	*Transnational and domestic* Limited/latent political and security risks not yet sufficiently examined due to the limited amount of available data and monitoring	Dawa and Shabelle Aquifer: Ethiopia, Kenya and Somalia; Juba Aquifer: Ethiopia and Somalia	HOA-GWI and the IHP of UNESCO	Control and monitoring of groundwater supply, consumption and recharge as well as regional cooperation on groundwater resources
Red Sea (seawater)	Climate change increasing pressures on marine resources such as ports and fisheries	*Transnational* Scramble for marine ports and marine fishing by foreign fleets (including piracy) and role of international actors *Domestic* Implications on domestic trade and local income-generating opportunities	Djibouti, Egypt, Eritrea, Saudi Arabia, Sudan and Yemen	Various institutions, for example, PERSGA, MSCC, MASE and the FAO	Transboundary governance among all parties involved to address marine concerns in the Red Sea (e.g. Red Sea Forum) and to address external influences by foreign powers

Hotspot	Environmental issues	Political tensions/ security implications	Countries	Governance framework	Gaps
Indian Ocean (seawater)	Climate change increasing pressures on marine resources such as ports and fisheries	*Transnational* Scramble for marine ports and marine fishing by foreign fleets (including piracy) and role of international actors *Domestic* Implications on domestic trade and local income-generating opportunities	Kenya and Somalia	Various institutions, for example, PERSGA, MSCC, MASE and the FAO	Transboundary governance among all parties involved to address marine concerns in the Red Sea (e.g. Red Sea Forum) and to address external influences by foreign powers

FAO = Food and Agriculture Organization of the United Nations; GERD = Grand Ethiopian Renaissance Dam; HOA-GWI = Horn of Africa Ground Water Initiative Project; MASE = Regional Programme for the Promotion of Maritime Security; MSCC = Maritime Security Coordination Committee; NBI = Nile Basin Initiative; PERSGA = Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden; WB = World Bank.

Source: Authors' own compilation.

WATER SECURITY AND GOVERNANCE IN THE HORN OF AFRICA

Climate-related security risks are increasingly compounding existing political, social and economic challenges worldwide, with natural resources like water posing risks for geopolitical tensions and violent conflict. This report presents a regional analysis of environment, peace and security linkages in the Horn of Africa, with a specific focus on water security and governance. It provides entry points for the international community to address the multifaceted risk landscape in the region.

The Horn of Africa is highly vulnerable to the impacts of climate change such as droughts and floods. The transboundary water resources of the Nile and Juba–Shabelle river basins are of core relevance for the Horn of Africa because of the interaction and confluence of several political, social, economic and environmental processes. The tensions surrounding transboundary water resources retain the potential for geopolitical tensions and violent conflict within and among countries in the region.

Posing challenges to peace and development in every continent, water security and governance can no longer be left unaddressed by the international community. This report identifies political constraints and possible entry points for the international community to act on in addressing the multidimensional challenge of water security and governance in the Horn of Africa.

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