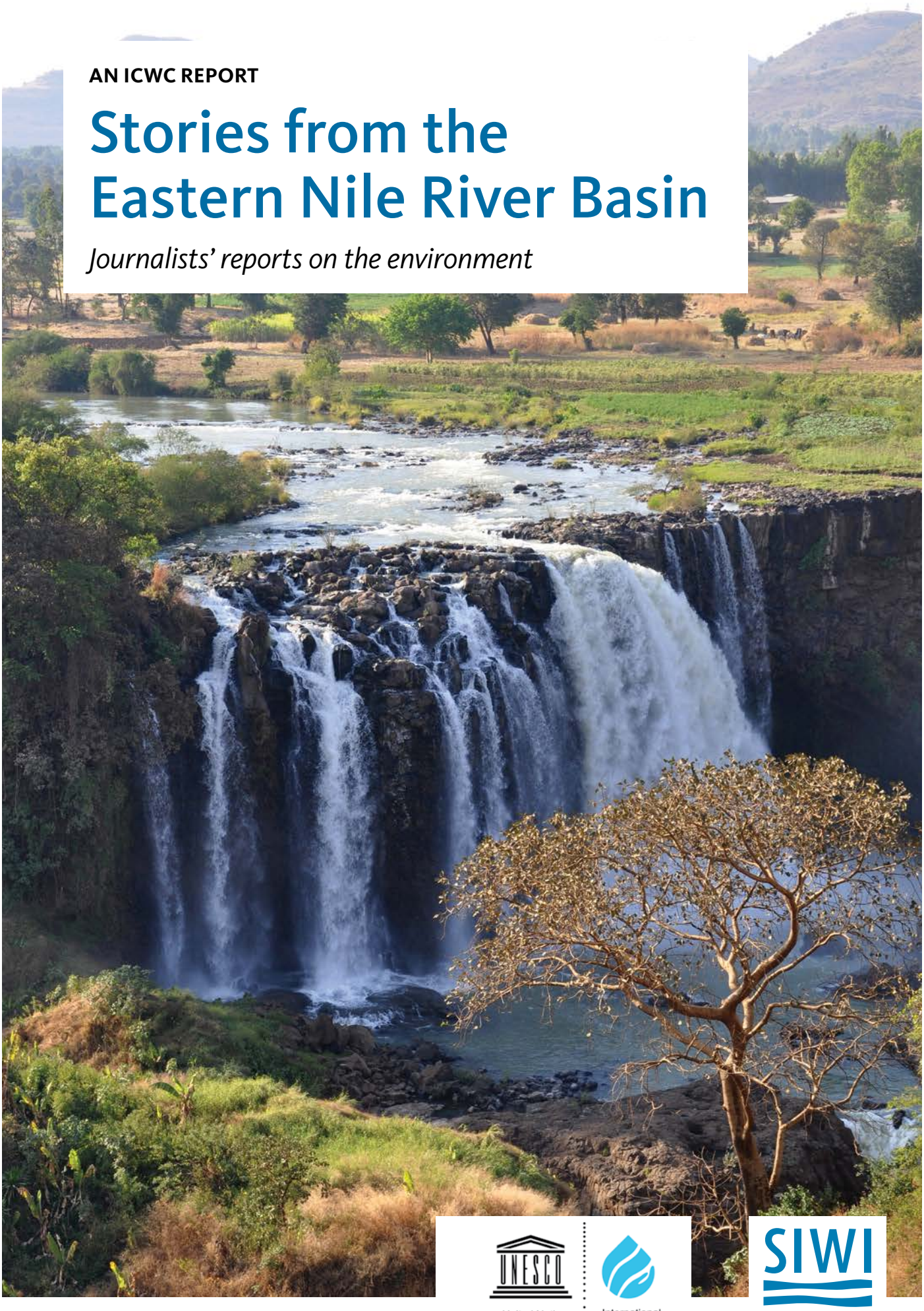
AN ICWC REPORT

Stories from the Eastern Nile River Basin

Journalists' reports on the environment



United Nations Educational, Scientific and Cultural Organization

International Centre for Water Cooperation

SIWI

This report features 10 articles on water, environment, and politics in the eastern Nile river basin. They are written by journalists from Egypt, Ethiopia, South Sudan and Sudan, being part of the Eastern Nile Journalists' Network, facilitated by Kerry Schneider and Alexandra Said. Design and editing of the report is by Mats Eriksson, Alex Macbeth and Said Sadat.

Cover photo: Blue Nile Falls, Ethiopia. Photo: Alexander Narraina/Shutterstock

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Foreword

The important work undertaken by journalists worldwide has gained increased interest and focus in recent years. We live in an information society, where we are flooded with news day and night. Nowadays, any important event will reach the entire world within much less than 24 hours, regardless of which remote corner where the event may have taken place. Social media have opened new avenues for information to travel fast, and have also enabled the consumer of the information to react and respond to the information provided.

While the new information and communication landscape has opened opportunities for increased transparency and participation, it has also contributed to the increase in spreading of misleading or false information. The new media landscape puts additional pressure on credible media sources to provide balanced and fact-based reporting, and counteract the spreading of mis- and disinformation. This trend can, over time, also threaten the long-term viability of professional journalism and may undermine citizens' trust in both mainstream media and social media.

The Stockholm International Water Institute (SIWI), through its Shared Waters Partnership programme and the International Centre for Water Cooperation (ICWC), hosted by SIWI under the auspices of UNESCO, has supported and facilitated improved transboundary dialogues and cooperation initiatives in the Nile river basin for more than a decade. The basin, with its 11 riparian states and crucial water resources, provides a challenging geopolitical situation for transboundary cooperation and joint ventures. The media does its part in reporting on both advancements and shortcomings linked to the planning, development, and governance of the important water resource that is the Nile. However, it is not uncommon that reports are biased towards the national perspective and fail to present facts with impartiality and neutrality, and hence to follow established journalism codes of ethics. Clearly, reports with balanced views, highlighting the potential added value and win-win solutions that may lie in cooperative planning and development of the shared resource, have the potential over time to contribute to greater cooperation in the region.

SIWI has a long tradition of working closely with the media. Since 2016, SIWI has organized joint regional workshops and supported transboundary interaction among journalists in the eastern Nile river basin (Egypt, Ethiopia, South Sudan, and Sudan). The Grand Ethiopian Renaissance Dam (GERD) has been one of several important matters for discussion. The purpose of the workshops has been to facilitate communication between journalists across borders, to provide a platform for exchange of information, and to increase the understanding of diverse perspectives. As a result, workshop participants have developed a strong network where they interact regularly, exchanging information and perspectives as well as helping each other to fact-check articles.

Recently, the journalists provided a leading example of collaboration as they joined hands issuing a joint statement, asking for higher transparency from governments in reporting from regional negotiations as well as encouraging journalists to provide impartial and balanced reporting. At SIWI, we are highly encouraged by the efforts and commitment of the Nile journalists and are looking forward to continuing our collaboration to help the Nile basin population gain access to balanced and factual information about their shared water resources.

This report is produced by ICWC under the auspices of UNESCO. ICWC is hosted by SIWI and facilitates research, capacity building, and policy advice on transboundary water management in connection with peace, conflict, and regional development.

Maria Vink

Director,
International Centre for Water Cooperation, SIWI

Stockholm, September 2020

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1. Introduction

The Nile basin is shared among 11 countries and coordinated management is crucial for maximizing the benefits of the water for all riparians. Although cooperation has come a long way since the Nile Basin Initiative was established in 1999, there are many challenges remaining. The Stockholm International Water Institute (SIWI) has closely followed the Nile cooperation over the years and, on a demand basis, has supported and facilitated activities with the purpose to encourage and improve increased interaction, exchange of experiences, joint learning, and cooperation linked to the Nile basin water resources. This work has been carried out in collaboration with the Nile Basin Initiative (NBI) and many other partners and entities linked to the regional development and the international development community. SIWI is also collaborating with national governments and civil society entities in riparian countries, supporting their efforts in transboundary water cooperation.

During the last decade, the world's attention has been directed to the Eastern Nile river basin and the construction of the Grand Ethiopian Renaissance Dam (GERD). Being one of the largest water infrastructure investments in Africa with the purpose to produce hydropower for Ethiopia and neighbouring countries, it will bring substantial opportunities for increased regional cooperation in the eastern Nile basin in particular, and in the Horn of Africa largely.

However, the construction of the dam has also brought concerns over the impact on downstream countries during the filling of the dam as well as over the management of the Nile water resources once the dam is operational. These concerns have given rise to a heated debate between upstream and downstream countries, bringing the different needs and interests of the countries to the forefront as well as the prevailing mistrust between the involved parties. There is, however, a range of win-win opportunities in reach related to the water-energy-food nexus, but to unlock such potentials, close regional cooperation will be necessary. Once cooperation gains traction, the region will increase its possibility to advance socially and economically.

Mutual trust is key for long-term sustained cooperation and it can only be built over time. The regional geopolitical situation in the eastern Nile river basin is affected by many challenges, and politics at national level in the riparian countries also entail a wide range of different issues, thereby affecting the entire population in the region. The question of how the shared water resources, being the most fundamental resource in the region, should be governed and managed regionally and nationally cannot be disentangled from other social and economic matters of great importance. To this end, the role of the media in shaping the views and opinions of the general public, and policy- and decision-makers alike, cannot be underestimated. The media have the power and means to portray matters for discussion in more positive or negative dimensions, and they can be more or less balanced and impartial in communicating different views. Thus, it is crucial that the media can carry out their work in an objective manner and with the highest possible access to facts and science-based knowledge.

SIWI has, since 2016, regularly supported capacity-building of journalists in the eastern Nile basin countries through organizing media training workshops and by inviting individual journalists to participate in different events. The purpose has been to expose journalists to the latest scientific knowledge related to water and environment in the basin, and to facilitate an increased cross-border interaction, exchange of information and experiences, and increased cooperation.

The latest media training workshop was organized outside Addis Ababa in Ethiopia in December 2019. The topic for this workshop was 'Climate, Water and Human Security in the eastern Nile river basin' and the intention was to educate participants on how climate-driven water hazards have a direct impact on human security, including water and food security, displacement, migration, and conflicts. Linkages between climate and security have risen on the international agenda in the last few years and the Nile basin is one region where this interlinkage is manifested. The ongoing negotiations related to GERD also have clear linkages to human security dimensions, nationally as well as regionally. The media have a pivotal role to report and inform the public on all these aspects.

Following the workshop in December 2019, participants were invited to submit short stories on environmental matters of interest in the basin. The purpose of this publication is to feature these stories, framed in a basin environmental context. Furthermore, the journalists have continued to interact and exchange views across borders using social platforms. This interaction, among other things, resulted in the journalists writing a joint statement in which they stress the importance of science-based reporting, and call for increased transparency in the ongoing GERD negotiations in order to prevent fake news, false reporting, and rumours gaining traction.

2. Journalists' joint statement

A call to action from journalists of the Nile

On this day, 25 May 2020, we, journalists from the Nile Basin stand in support of our respective governments of Sudan, Ethiopia, and Egypt who are collectively shaping the futures of millions of people through their efforts to find a cooperative solution to the filling and operation of the Grand Ethiopian Renaissance Dam (GERD). As journalists and citizens of the Eastern Nile, we have supported the willingness of our governments to prioritize diplomacy in finding a win-for-all solution and we remain hopeful that our governments will soon find a way to return to the negotiating table. We strongly believe that a cooperative outcome is possible, and we are united in the hope that a peaceful and constructive conclusion to the GERD negotiations may illuminate the path towards cooperation more broadly across our region.

As journalists, it is our mandate and privilege to ensure that our people remain informed about the issues that impact their lives and the lives of future generations. Since news first broke that there would one day be a Grand Ethiopian Renaissance Dam, millions of people have waited with baited breath to learn how our leaders will overcome the political and technical hurdles that stand in the way of cooperation over our most precious resource.

In following the GERD negotiation process we note that access to information and transparency is vital. Where transparency is lacking, unfounded assumptions prevail – often leading to dangerous polarization and hostility that can serve no fruitful outcome. It is our hope that our leaders will return to the negotiating table and provide journalists with the necessary access to facts and insights required to perform our duties.

Additionally, we call upon our fellow journalists to pursue truth at every corner and to observe the long-held journalism code of ethics of presenting the news impartially and with balance. We must avoid framing issues related to the Nile through only a nationalistic lens that ignores our shared struggles or concerns for the future. Regardless of our nationalities, our accountability as journalists is to the public and it is incumbent upon all of us to put the interests of the public above our own.

An informed public will understand the value of cooperation and the importance of finding win-for-all solutions to these complex problems. Anything less would be a disservice to the peoples of Sudan, Ethiopia, and Egypt and indeed to millions of others whose lives are dependent on the Nile river. We should stand to foster trust between and among riparian countries, rather than perpetuating mistrust and a hardening of positions.

This call seeks to encourage the governments of Sudan, Ethiopia, and Egypt to pursue a cooperative outcome to the negotiations over the Grand Ethiopian Renaissance Dam (GERD). We urge Nile governments to be more forthcoming to journalists and to the public with regards to the progress already achieved and any remaining hurdles to concluding an agreement. We urge all our fellow journalists to support this process through their impartial and fact-based reporting, understanding that anything less may inspire division amongst our countries and fuel unnecessary conflict. We envision a Nile basin which serves the needs of all, through cooperation and shared values, which can only be reached through a common effort of political leaders, media, and an informed public.

In friendship and partnership,

Khalid Eltigani Elnour
Abiy Hailu
Mohamed Hamid
Elzahraa Jadallah
Amira Sayed Ahmed
Mohamed Abdelaziz
Mohamed Wadie
Achol Kur Marial
Tesfa-Alem Tekle
Rehab Abdalmohsen
Sarah El-Sheikh
Majak Kuany Alier
Addis Getachew
Yosra Mostafa
Emmanuela Erasto
Emmanuel Joseph

This statement was first published on www.siwi.org on 28 May 2020: https://www.siwi.org/latest/a-call-to-action-from-journalists-of-the-nile/

3. The Eastern Nile river basin

Kevin Wheeler, Oxford University, United Kingdom

The Nile river basin is one of the greatest and most historically rich regions of the world, providing natural resources and giving birth to human civilizations since time immemorial. Often considered the longest river in the world, the river stretches approximately 6,700 km from its headwaters to the Mediterranean Sea. The river is formed by two primary tributaries, the Blue Nile and White Nile; and one smaller tributary, the Atbara river.

The Blue Nile begins in the highlands of Ethiopia with runoff flowing into Lake Tana. As the river pours from the lake, the river descends clockwise from the Ethiopian plateau into a deep gorge where the Blue Nile – which is called the Abay in Ethiopia – collects water from the tributaries of the Cheye, Weleka, Jema, Guder, Finchaa, Didessa, Dabus, and Beles rivers before flowing into Sudan. Downstream of the border, the

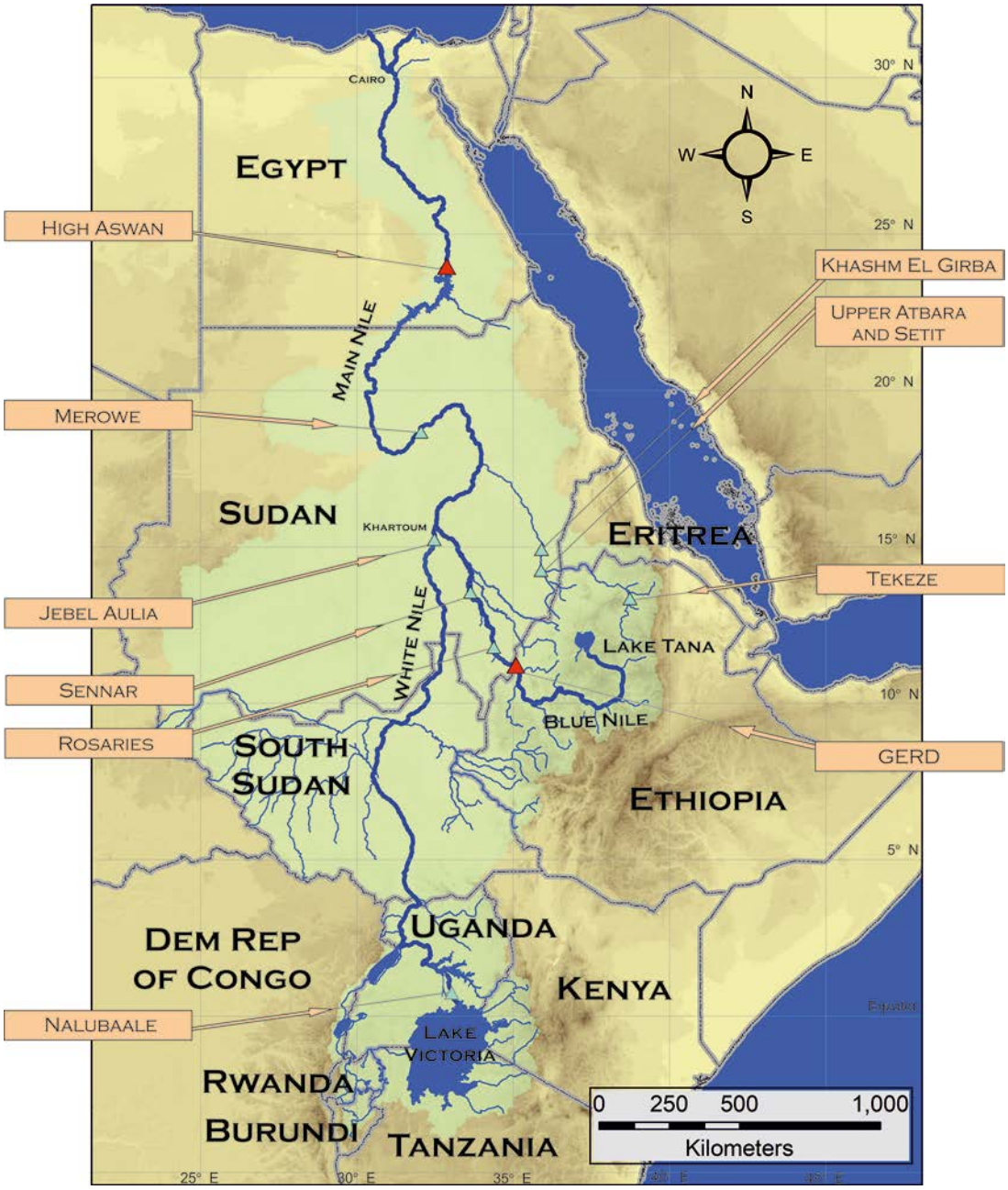

Figure 1. Map of the Nile basin indicating major dam constructions

Blue Nile continues across Western Sudan through the Roseires and Sennar reservoirs, collecting the Dinder and Rahad tributaries, before reaching the capital city of Khartoum.

Meanwhile the White Nile tributary begins as inflows into Lake Victoria from portions of Burundi, the Democratic Republic of Congo, Kenya, Rwanda, Tanzania, and Uganda. From a lake outlet at Jinja in Uganda, the river passes the Nalubaale dam and cascades as the Victoria Nile through Uganda's Lake Albert and into South Sudan. As the river passes through the Sudd wetlands, it joins with the Bahr el Ghazal and enters Sudan as the White Nile, which flows northward to Khartoum.

The two great tributaries – the Blue Nile and White Nile – merge in the centre of the city of Khartoum and the river continues its journey as the main Nile. North of this confluence, the main Nile collects the waters of the major tributary of the Atbara river, which originates from rainfall on the Ethiopian highlands as the Tekeze river and collects a minute portion of runoff from Eritrea. This Tekeze-Atbara sub-basin contains three reservoirs, one in Ethiopia formed by the Tekeze dam and two in Sudan formed by the Khasim El Girba dam and the dual Upper Atbara and Setit dam complex. Downstream of the confluence of the Tekeze river with the main Nile, the river winds through the Nubian desert and passes through the Merowe dam, which is the largest in Sudan, before turning northwards once again and entering Egypt. At the point where the Nile crosses from Sudan to Egypt, it enters what is called Lake Nubia in Sudan and Lake Nasser in Egypt, which is formed by the High Aswan dam (HAD). Northward from the HAD, the river flows through the entire length of Egypt, supplying water to the city of Cairo and vast agricultural areas along the river valley and the expansive delta prior to pouring into the Mediterranean Sea.

The Blue Nile contributes approximately 57 per cent of the average annual flow of the river, while the White Nile and the Atbara contribute 30 and 13 per cent respectively. The region referred to as the Eastern Nile river basin is a sub-region of the Nile river basin and includes the countries of Egypt, Ethiopia, South Sudan, and Sudan.

The seasonality of the Nile flows is notable, with two distinct climatology regimes. Heavy rainfall over the Ethiopian highlands from June to September provides the majority of the water through the Blue Nile and Atbara rivers, while rain over the Victoria Lakes region peaks from March to May and again from September to December. The Sudd wetlands then buffers the flows of the White Nile, providing a steady base flow throughout the year.

GERD is located on the Blue Nile immediately upstream of the Ethiopia–Sudan border. Approximately 53 per cent of the water that enters Egypt crosses this location, with the remaining 47 per cent unaffected by GERD. When complete, GERD will form a reservoir with a storage capacity of 74 billion cubic metres (bcm), which is less than half of the volume of Egypt's High Aswan dam at 162 bcm, and larger than Sudan's Merowe dam with 12 bcm of storage. This hydropower dam is expected to generate approximately 16 terrawatt hours (TWh)/year of electricity, compared to 10 TWh/year from the HAD and 5.5 TWh/year from the Merowe dam.

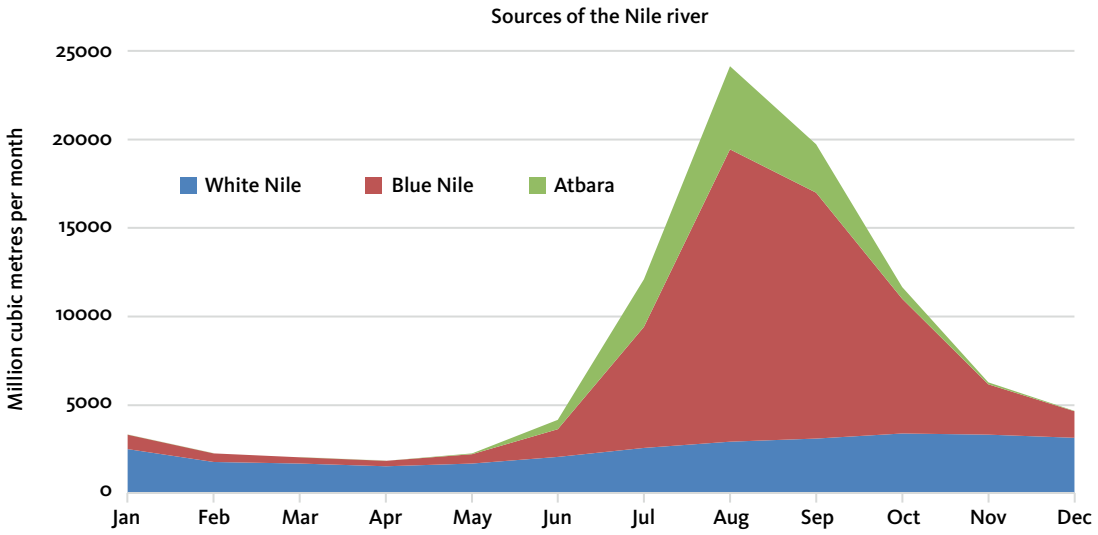

Figure 2. The Nile has a highly seasonal flow regime. Reproduced from: Gebrehiwot, S.G., Ellison, D., Bewket, W., Seleshi, Y., Inogwabini, B-I., Bishop, K. (2019). The Nile Basin waters and the West African rainforest: Rethinking the boundaries. *WIREs Water*, **6: e 1317.**

4. Introduction to the journalists' stories from the Nile

The following 10 articles - authored by 11 journalists from Egypt, Ethiopia, South Sudan, and Sudan – highlighting water, climate, and environmental aspects in the Eastern Nile basin, provide a flavour of important, even urgent, topics that deserve increased attention. The phenomena described are all transboundary in their nature, although the articles focus on national or local examples.

Starting from upstream, in Ethiopia, *Abiy Hailu* reports on the spread of Prosopis, an invasive plant species that threatens people's livelihoods, not only in the Ethiopian highlands but throughout the Horn of Africa and beyond. Awareness of its threat to communities has to a large extent been flying under the radar, and an increased knowledge on its status, nature, and impact on societies and economies would benefit from regional dialogues and joint studies covering the extended region.

A topic of great importance and concern is gender aspects related to natural resources management in general, and climate change vulnerability and adaptation in particular. *Yulia Mekonnen's* report from a visit to a village in the Ethiopian highlands act as an example on these issues and calls for a higher degree of understanding on how the impact of climate change has hit very unevenly on different parts of a population, with women, children, and elderly being particularly vulnerable.

Increased magnitude and frequency of floods and droughts is the most important climate change-driven stress factor impacting nature and society in the basin, and with clear linkages to human security. *Achol Kur Marial* illustrates how the 2019 and 2020 floods in South Sudan have had a tremendous impact on agriculture and livestock in several counties. Impact on food security, with severe food shortages, hunger, and loss of livelihoods is expected. *Emmanuela Erasto* further reports how women bear the brunt of flood devastation in South Sudan. In Sudan, *Elzahraa Jadallah* and *Mohamed Abdelaziz* point to the fact that prolonged and repeated droughts have been an important underlying factor for the escalation of the Darfur crises. Climate-driven water stress is seldom the sole reason for conflicts, but in many cases the added stress provides a crucial enhancement of existing tensions, possibly leading to tipping points being surpassed.

Sea-level rise is a different type of climate change impact compared to those linked to the hydrological cycle, but a most frightening climate-change-induced stress. The impact on coastal areas may be of catastrophic nature if the melting of mountain glaciers and ice sheets increases in rate, and the Nile river delta is no exception. *Amira Sayed* and *Mohamed Wadie* highlight how sea-level rise triggers coastal erosion and saltwater intrusion in soils and upstream in the river. It will cause loss of valuable agricultural land and may trigger unprecedented forced migration. Egypt, having most of its food production coming out of the Nile river delta, is particularly in the endangered zone.

Four articles by *Rehab Abdalmohsen*, *Yosra El-Zoghby*, *Addis Getachew*, and *Elzahraa Jadallah* jointly provide insight into the ongoing negotiations between Egypt, Ethiopia, and Sudan related to the filling and operation of the GERD. Following the negotiations is like following a moving target, and the articles provide snapshots of the negotiations during 2020. The articles shed light on different country-specific angles of the struggles in the deliberations and show how the entrenched views from different parties contribute to the slow progress towards reaching an agreement. However, hope is also expressed with anticipated future cooperation finally becoming a winner, replacing the current locked positions.

4.1 Prosopis invasive species aggravating climate stress in Ethiopia and the region

Abiy Hailu, Ethiopia

The invasive plant continues to spread across Ethiopia, destroying vital grazing lands for pastoralists while reducing biodiversity and water supply. Local communities want to get rid of it. But how?

As one journeys deeper and deeper into the Awash basin and the Afar State of Ethiopia, the preponderance of a small green tree gives the illusion of a green, lush landscape – despite the volcanic or often barren terrain. Yet the ever propagating *Prosopis juliflora* has become a major source of conflict between pastoralists and farmers and a headache for governments in many African countries.

The thorny plant invades grazing lands but only makes cattle ill. It displaces native plant species and reduces the abundance and diversity of birds and animal species. Its pollen is a major allergen. In some cases, villages have been abandoned after the arrival of Prosopis, according to research by the Centre for Agriculture and Bioscience International (CABI). In more economically deprived areas, the invasive plant spawns conflict due to the diminished resources. The plant was imported to create fuelwood and windbreaks, but it has become a major threat to the communities it was supposed to serve.

"In Ethiopia, Prosopis was introduced in the late 1970s through collaborative efforts of governments and international development organizations to rehabilitate degraded soils, to supply firewood and fodder, and to combat desertification," according to researchers at Maddawalabu University.[1] Yet the invasive species is causing social, economic, and environmental harm to the communities it was designed to support.

Prosopis has been shown to reduce biodiversity, grazing potential, and water supply, thereby causing significant impacts on the provision of key ecosystem services for (agro-) pastoralists. As a result, Prosopis has become a source of conflict among pastoralist groups in Ethiopia due to the resulting dwindling grazing land.[2]

Between 1986 and 2017, the weed spread at a rate of 31,127 hectares per year while grassland and bush-shrub-woodland declined at a rate of 19,312 hectares and 10,543 hectares per year respectively in the Awash basin. This has resulted in estimated losses of USD 602 million in ecosystem service values in 31 years, according to the same study.

"The primary negative impact is that, although it was intended to easily grow in arid areas, Prosopis prefers fertile and wet areas to grow," Tena Alamirew, one of the authors of the report and a researcher at the Water and Land Resource Center (WLRC) at Addis Ababa University, told our correspondent. "The small tree invades grazing lands. This means there is no grass growing beneath. As a result, the whole cattle population has been significantly affected," adds Mr Alamirew.

"Negative net changes were found for grassland, bare land, bush-shrub-woodland, and natural forests as a result of the Prosopis spreading so rapidly," says Hailu Shiferaw from WLRC and another author of the report. About 50 per cent of the lost grassland is now dominated by Prosopis.

In areas where the invasive species prevents indigenous plants from growing, cattle have little else to graze on. Not without consequence: the pods are extremely sweet and stick to animals' teeth. Cattle are suffering from severe tooth decay; camels are contracting diabetes.[3] The Prosopis also offers shelter to wild animals that attack cattle. Cattle meanwhile support the propagation of the plant, considered one of the worst weeds in the world by experts, by spreading the seeds in their dung as nomadic communities move from one place to another. "If you have good grazing land, they will automatically carry the seeds in their dung and drop it there. After one to three years, the whole Prosopis grows again," says Mr Alamirew.

Governments in the region have proposed several policies to alleviate the distress caused by the invasive species, albeit with little impact so far. The Afar regional government proposed a strategy to remove the plant from 1.2 to 1.6 million hectares of land. "But because of the government restructuring, it is difficult to single out which body is coordinating or leading the effort," comments Mr Alamirew.

1 Abdulahi et al. (2017). *Prosopis juliflora L*: Distribution, impacts and available control methods in Ethiopia. *Tropical and subtropical agroecosystems*, 20: 75-89.

2 Shiferaw, H. (2019). Implications of land use/land cover dynamics and Prosopis invasion on ecosystem service values in Afar Region, Ethiopia. *Science of the Total Environment*, 675: 354-366.

3 Schwartzstein, P. (2019). An invasive, thorny tree is taking over Africa – can it be stopped? *National Geographic*, April 2019.

"We have been encouraging the utilization of the tree for various social and economic purposes. But it has not been successful at the desired level," Zebediyos Selato, Director of the Plant Protection Directorate at Ethiopia's Ministry of Agriculture, told our correspondent. Mr Selato adds that the best option is to adopt a biological method – natural enemies – by reproducing insects that consume its seeds. The Ethiopian Agricultural Research Institute council secretariat is also coordinating stakeholders and higher learning institutions to come up with a solution. Local communities have used bulldozers to simply remove the plant.

"One can generalize that if they get the opportunity, the Afar community would prefer for the Prosopis to be totally removed," says Mr Alamirew. "According to local voices, the two major challenges they are facing currently are water shortage and Prosopis."

WLRC has been experimenting with the use of a chemical to remove the plant. "What is coming is selling the idea to the government that this method is effective in highly invaded areas. But I think getting the licence to import those chemicals is going to take some time," says the WLRC's Mr Alamirew.

Besides removal, stakeholders are still exploring ideas to find an effective use for the invasive plant. The Metals and Engineering Corporation (METEC) and Dire Dawa National Cement in Ethiopia have proposed generating electricity from the biomass, but this has not yet materialized.

On the positive side, Arne Witt, coordinator of Invasive Species South at CABI, said that "the biomass can be used for fuelwood or charcoal production. The pods can be ground and used as livestock fodder – they can also be used as flour. Despite these benefits, the costs of invasion are far higher – this is largely based on socio-economic surveys where communities affected said they would be far better off without Prosopis."

The Prosopis problem has already spread to Kenya and from there to Tanzania. The plant was reportedly introduced by accident to Tanzania by cross-border traders in the late 1980s. It has since taken over

Prosopis juliflora, an invasive species contributing to land degradation in the Awash basin, Ethiopia. Photo: Rajavel P/Shutterstock

swathes of the country near the north-eastern border with Kenya, according to researchers at CABI.

A 2018 study of Prosopis in Djibouti by the United Nations Food and Agriculture Organization (FAO)[4] argues that the real benefits of Prosopis are yet to be explored. "Prosopis species can be huge assets capable of supporting tree-based enterprises and livelihoods, and providing conservation benefits," states the FAO report, adding that efficient use of Prosopis biomass can help meet domestic energy demand in Ethiopia's neighbouring country Djibouti.

FAO's continued enthusiasm for Prosopis contrasts with the opinions of other experts, perhaps because of the role FAO allegedly played in introducing the plant to some African nations. "The FAO has promoted this species – in fact they are responsible for its introduction to many parts of the world. The affected communities in Kenya once took the FAO to court for introducing and promoting Prosopis – they (the FAO) claimed that United Nations agencies are above the law," says CABI's Mr Witt, suggesting the organization continues to try and argue the positives of Prosopis, despite contrary evidence. The head office of FAO in Rome declined to comment.

Enthusiasm for the invasive species remains largely absent among communities and experts in Ethiopia. "We have really lost substantial land in Afar. The plant is also emerging in southern Ethiopia, for instance in Lower Omo area and Borena," says Mr Alamirew. "I think it would be important to organize a kind of a task force that will properly understand the threats to come up with feasible solutions." For now, the invasive species continues to propagate across many nations in East Africa.

Stopping the spread of the plant is as important as a multi-pronged approach to removing it, argues CABI, stating: "Integrated management, using a combination of physical, chemical, and biological control, may be most cost-effective." Affected communities can only hope removal strategies catch up soon with the problem.

4 Gianvenuti et al. (2018). *Using* Prosopis *as an energy source for refugees and host communities in Djibouti, and controlling its rapid spread*. Rome, Food and Agriculture Organization of the United Nations (FAO).

4.2 Women and climate change – important linkages

Yulia Mekonnen, Ethiopia

In the Amhara region, pressure on forest resources from the collection of firewood and other needs have resulted in accelerating land degradation. Cooking on open fires is also hazardous to health. Since women are the main custodians of such natural resources, the ambition to replace firewood with biogas and electricity will have the dual benefit of reducing pressure on degraded lands and improving women's health.

Ethiopia's contribution to global climate change is insignificant. However, the country is nevertheless suffering from its negative impact. Global warming causes the temperature in the region to increase. This cause changes to the hydrological cycle resulting in more and more severe droughts and even rendering some parts uninhabitable because of the increasing heat. Most alarming is the negative impact on agriculture. As a result, more people migrated from villages to towns. The impact is particularly destructive on the part of the population that is already suffering from poverty.

Women in developing countries are particularly vulnerable to climate change because they are to a higher degree than men highly dependent on local natural resources for their livelihoods. Women charged with securing water, food, and fuel for cooking and heating face the greatest challenges.

Impacts from climate change make women's lives more difficult in many aspects. Impacts have direct bearing on women's tasks related to food production, natural resource and biodiversity management, community management, education of children, and family care. Women are the main collectors of fuel and water, and the main users of energy to prepare food as well as caring for sick family members. Of particular importance is the substantial work they do in agricultural production, a fact that is particularly valid in developing countries.

For this article I visited Gola Amba village, located in North Wollo in the Amhara Regional State. The village

Woman making coffee on open fire in the Amhara Region, Ethiopia. Photo: Av Artush/Shutterstock

is surrounded by mountains and a large river named Ali Amba passes nearby. The village looks beautiful, situated in a very green, lush area compared to most other lowland areas. I interviewed women from the village about climate change impacts, availability of water, and their general living conditions.

Teamir Addis said that this area more than 20 years ago was covered by trees, rich in biodiversity with many different animal species present and with ample access to water in springs. Over time, people have been cutting trees for house construction, for firewood, and for expansion of agricultural land. Gradually, as the forest has been cleared, the mountain slopes remain bare without the tree cover. Ms Addis also reported of perceived temperature increase, and a decrease in agricultural productivity and water availability. "In general, life has become more difficult, especially for us women," she said.

With Ms Addis, I walked a long distance, approximately an hour, to the place where villagers collect water. She showed me the spring for water collection. At this point we were standing for more than an hour waiting for the water jar to be filled. She said the village had used this spring for very long time, but nowadays the flow is not like before, being very small in present days. She believed changes to seasonal rainfall and increase of droughts are the main causes for diminishing water resources.

Some years ago, the regional government of Amhara announced to close the area to human and animal use in order to protect the deforested land from further degradation. Since then the forest has started to revive, trees are growing, and indigenous species are returning. It gives future hope to again have springs full of water, improved agricultural production, and a more suitable living environment.

Moreover, the Government of Ethiopia is also promoting biogas for cooking and lighting. This will hopefully help villagers to save their health and allow more time for other important social and economic activities. Thus, working on improving environmental matters also means working for an improved situation for women. Since women are important custodians and managers of natural resources, it is important to encourage women to participate in, and benefit from, nature conservation and climate change adaptation.

4.3 Over 3 million livelihoods affected in the severe 2019 and 2020 floods in South Sudan

Achol Kur Marial, South Sudan

Floods in the South Sudan region of Jonglei State, Malakal, and Greater Equatoria in late 2019 severely exacerbated an already existing humanitarian crisis. As South Sudan and the international aid community were still grasping with this disaster, the 2020 monsoon season gave rise to an even worse flood situation, further aggravating the already precarious situation. Widespread food shortages are now a reality in South Sudan.

In South Sudan, floods occur annually for a variety of reasons. The problem emerges when intense rainfall surpasses the ability of a land areas to effectively drain the water, particularly when infrastructure is not constructed adequately, including poor drainage systems and sub-standard road construction. In addition, many disadvantaged families out of necessity resort to living in flood-prone areas where there are few other options. This makes them particularly vulnerable when heavy rains hit the areas they live in.

In 2019, severe floods between July and December affected nearly 1 million people in South Sudan, creating one of the worst food security crises since independence in Africa's youngest nation (independence gained in 2011). Following this disaster, the 2020 floods destroyed additional crops and livelihoods and affected and displaced over 3 million people, taking the crisis to an alarming level.

The 2019 and 2020 floods provide an insight into the potential future impacts of climate change in South Sudan. Projections by United Nations Development Programme (UNDP) in 2017 "indicate that in South Sudan, global warming will be felt 2.5 times more than the global average". South Sudanese livelihoods are heavily affected by changes in the climate: "Up to 95 per cent of people in South Sudan, or more than 11 million people, depend on climate sensitive sectors, including agriculture, forestry and fisheries for their livelihoods," states the report.

In 2019, "floods hit Duk Padiet, Duk Pagak, Duk Panyang, and Duk Payuel counties before the harvest season," Jonglei State Minister of Agriculture, John Dut Kuch told Radio Jonglei in December 2019. "All farmlands were destroyed. In parts of Greater Twic and Greater Bor, the effect from the floods on livelihoods was a disaster," he added.

The minister said the 2019 floods were less destructive compared to the 2020 flooding situation. At that time the citizens managed to completely evacuate to the areas of Terekeka, Juba, and Nimule of the central Equatoria region with their remaining animals and belongings.

After the 2019 floods, the minister warned of looming hunger due to flood-induced crop failure to occur in parts of the state the following year if emergency measures were not taken to alleviate the predicted famine. Indeed, harvests of essential food staples like sorghum, groundnut, and vegetables such as okra have been dramatically reduced in 2020. The latest United Nations estimates on food security in South Sudan state that 5.5 million South Sudanese could face food shortages this year.

According to a post-disaster needs assessment conducted by The National Ministry of Humanitarian Affairs and Disaster Management and the United Nations Development Programme, the 2019 floods, which mainly hit Jonglei State northeast of the capital Juba, destroyed 73,000 metric tons of potential sorghum harvests nationwide, a vital crop for local residents. In addition, tens of thousands of cattle and goats, upon which people depend for survival, were wiped out.

"I had 27 cows and 25 died," Ghai Chaw John, chief of Duk county, told us. Mr John added that all his relatives lost most of their livestock due to the unusually heavy floods in 2019.

"All the counties of Jonglei State, like Greater Duk, Twic, and some parts of former Bor county were seriously affected by the flooding," says Jonglei's Acting Relief and Rehabilitations Coordinator, Jacob Mawut. Nearly 20,000 people residing in 3,189 households were identified as severely affected or displaced by the floods in 2019.

In 2020, heavy rainfall further heightened the humanitarian crisis. This year, in Jonglei State, the White Nile caused flooding in Bor South, Twic East, Duk, and Ayod counties. The acting governor Mabior Atem estimated that over 3 million people have currently been displaced in South Sudan. Thousands of homes have been reportedly destroyed, along with crops and livestock.

Flooding struck in Bor town in Late July when a dyke along the White Nile collapsed. The United Nations office in Bor, Jonglei State reported that more than 200,000 people were displaced in Bor town, capital of the state. Since then, flooding along the Nile has affected wide areas of Twic East, Duk, and Ayod counties.

Meanwhile the overflowing of the Akobo river, which runs along the country's border with Ethiopia, has caused flooding in Pochalla county in the greater Pibor administrative area. Crops have been destroyed and families displaced, according to the United Nations Mission to South Sudan.

The floods have not only damaged crops and livestock and caused further internal displacement, they have also acted as barriers to resettlement of South Sudanese internally displaced persons and refugees displaced by former conflicts and natural disasters.

"If animals are dying like this without treatment, then people in camps will not return [to their original homes]," said Minister Dut. "In Jonglei State, people rely on cattle and crops. People will not return if they see that citizens here are dying." Nearly 2 million people are currently internally displaced in South Sudan according to the United Nations High Commissioner for Refugees (UNHCR).

Local and national authorities have called on aid agencies and emergency relief providers to intervene to stave off a famine in 2020. Speaking on behalf of the World Food Program (WFP), Jonglei State's Relief and Rehabilitation Coordinator said in late February 2020 that 19,000 metric tons of food has already been provided to victims of the flood – an investment of USD 40 million. WFP has been distributing food staples like sorghum, as well as shelters and other non-food essentials to victims in Bor, capital of Jonglei State.

Several national and international agencies are now trying to provide humanitarian assistance to flood-affected people across the country. In mid-September, the International Organization for Migration and Joint Aid Management International started registration of displaced people from the villages of Twic, Duk, Ayod, and Akobo in the state capital Bor in order to plan for assistance. As this text is being drafted, a disaster is still in the making.

In 2020 the levels of the Nile in Khartoum were the highest recorded since 1912. Photo: lier4life/Shutterstock

4.4 Women bear the brunt of flood devastation in South Sudan

Emmanuela Erasto, South Sudan

Floods in South Sudan in 2019 left nearly 1 million people homeless, according to the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA). South Sudanese journalist Emmanuela Erasto reported on the devastation wreaked in Boma state, with a focus on how the lives of women were affected.

Heavy rains and severe floods devastated a large area in the western part of former Boma state, especially in the counties of Gumuruk, Lekuangole, Pibor, and Vertet, between September and November 2019. The heavy rains caused floods across South Sudan, pushing President Salva Kiir to declare a state of emergency in 27 areas. In 2020, the situation was aggravated further, leading to the worst flooding experienced in 60 years.

I flew 470 km south-east of Juba to interview some of the flood survivors from Pibor, capital city of former Boma state.

In Boma, the local airport runway had become inaccessible and food parcels had to be air-dropped. Overland traders who normally brought goods from the capital, Juba, found roads cut off. The few remaining accessible thoroughfares became targets for ambushes, discouraging the usual flow of goods. As the airport began to resume capacity, prices of basic commodities like sugar soared as traders were forced to charter flights to supply the flood-hit state.

Major telecommunications operators had still not restored the lines at the time of writing. The lucky few who have access to United Nations or non-governmental organization (NGO) offices can perhaps ask for a message to be related to loved ones or access the Internet. The only source of information for more than 250,000 people in Boma state comes from Radio Miraya, a United Nations radio station based in Juba. Radio Tamazuj, the local Pibor radio station, was off-air at the time of writing due to its antenna being destroyed by the floods.

"The floods in Boma state affected many communities. An estimated 18,000 people were staying in government compounds and more than 6000 cattle died," Boma's Minister of Physical Infrastructure, Water Resources and Irrigation, Abraham Torit, told me. "We are appealing to the national government or NGOs to assist us to rebuild many boreholes damaged after the floods. We don't have clean water at all."

Only 5 million South Sudanese (41 per cent of the population) have access to safe drinking water and only 10 per cent of the population has access to adequate sanitation services, according to figures released by the United Nations Children's Fund (UNICEF) at a press conference in Juba in 2020.

The floods caused the regional government in Boma to decide to relocate the state capital to Labarap, on higher terrain, a move that is still pending. It remains unclear which other state the former Boma state will be annexed to, further complicating the recovery process. "The floods that started in September in all 14 counties were the first of this level historically," Minister of Local Government and Law Enforcement, Achon John, told our correspondent.

"There are challenges to relocating with regards to water because people need water and that area has no drinking water," says John. "It has a seasonal river that dries during summertime. Our plans are to work with NGOs on the ground to dig wells, but in case we fail to relocate this year for any reason that may arise, we also have strategic plans of raising public awareness on how to open some water drainages to avoid recurrence of floods," adds the regional minister.

In Boma I found a devastated landscape. The displaced people lost crops, livestock, health facilities, schools, the main market and all personal belongings, as properties were destroyed by the floods. Women were busy on the streets selling tea at the riverside. Others were carrying wood or water on their heads with children on their backs. Children meanwhile were selling fresh fish to businesswomen at Pibor restaurants. Everybody was engaged in a daily routine to fight the hardship.

Maria Lila, a parent of six children and in her early 40s, is a trader at Pibor's main market. She stands resolutely before her bundles of pumpkins that she sells for 100 Sudanese Pounds. "The situation before was good in terms of production and sales. I used to plant different kinds of vegetables – tomatoes, kudura, dodo – but now what I can farm has been reduced because of the floodwater where I cultivate," says Lila. "During the flooding, we were in a miserable condition, we were food insecure," she stresses.

Maria Lila has been able to start farming again since the river waters started lowering, but she is struggling to find seeds. "The products that I bring to the market aren't enough to meet the needs of my family," she says.

In Lukurnyang, a short ferry ride across the flooded river from Pibor, farmers use an iron pump to fetch water from the river for farming. The authorities fear this could complicate what is an already critical condition in terms of water and sanitation.

In the oil-producing states of Upper Nile and Unity, clean water is still the biggest challenge. The local population continues to use water contaminated by oil leakages, a major threat to people's health.

Women and girls continue to walk for long distances or to the riverside to fetch water for different home uses, brewing local alcohol and mixing mud to build their homes, among others. This makes women feel unsafe, and makes them targets or vulnerable to abduction, attack, or even rape. South Sudan is a society that often fails to recognize the essential rights of women. Only 58.9 per cent of young girls were enrolled in primary school in 2017, according to United Nations Educational, Scientific and Cultural Organization (UNESCO) figures.[5] In some cases, parents allow potential suitors to begin to pay a dowry in cattle to them from when their daughters are only five years old. According to UNICEF figures from 2018, 52 per cent of women aged 20 to 24 in South Sudan were first married or in union before the age of 18.[6] Climate and water insecurity merely exacerbate the many issues women face in South Sudan.

In Gudele, just west of Juba, Mary Kiden, a pregnant woman in her early 30s who lives with her husband and five children, is preparing dinner for her family on an open fire under a tree outside her house when I meet her. Her daughter is fetching water from an open well. Kiden says water is scarce throughout the year.

"I dig the ground to get water that comes down from the mountain. The water is unclean but we drink it like that, what can we do?" says Kiden. "We don't have roads to fetch water. When we go to the authorities and tell them we want boreholes, nothing is done. We have been asking the government for boreholes since 2005."

The lack of widespread basic water infrastructure plays into the hands of the private sector, making water an expensive commodity. "Selling water is a good business," says Thomas Khamis, a water tanker driver who delivers water to the president's office. He is one of the few South Sudanese in such a job: most tanker owners and drivers are Ethiopian.

"The water I fetch is not for sale, it is for our office, I also take it to the army," says Khamis. "Of course, this

Woman collecting drinking water from an unsafe water source in Juba, South Sudan. Photo: Vlad Karavaev/Shutterstock

job is good because anyone who is thirsty needs water and there is no water. Only water tankers provide it to people." Khamis says the situation is not ideal, but until the government provides widespread taps, tankers like the one he commands are one of the only options available to people.

More expected floods and famine in 2020 loom, but the silver lining is the work of activists like Edmund Yakani, Executive Director for community empowerment at the civil society organization Progress. Yakani launched a national climate change campaign, called Climate Talks – under the slogan 'My climate is my life' – in February 2020. "Its aim is to amplify climate risk and the demand for our communities to be proactive in responding with best practices. It promotes attitudes that contribute to better mitigation of climate change issues," says Yakani.

"Climate change poses a threat to our lives and our surroundings. Silence about climate issues is no longer an option. It is better we begin with serious action-oriented and citizen-centred climate talks across the country. Climate really has direct implications on our lives. We are obliged to have better behaviours, attitudes, and practices on climate."

South Sudan is a member of the United Nations, which recognizes the human right to water and sanitation, or more specifically: "The right to water entitles everyone to have access to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic use."[7]

This requires signatory countries to progressively achieve and respect all human rights, including those related to water and sanitation. A right that many South Sudanese have not yet enjoyed, and will not enjoy, until the government ratifies the draft bill on water.

5 UNESCO (2018). *Global initiative on out of school children: South Sudan country study*. Paris, United Nations Educational, Scientific and Cultural Organization.

6 UNICEF (2018) Child marriage database: https://data.unicef.org/resources/dataset/child-marriage/

7 United Nations (no date). *Human Rights to Water and Sanitation*: https://www.unwater.org/water-facts/human-rights/

4.5 Climate threatens to reignite conflict in Darfur

Elzahraa Jadallah and Mohamed Abdelaziz, Sudan

The 17-year-old conflict in Darfur has forced an estimated more than 2 million people into refugee camps and informal settlements. Political instability has fuelled the conflict, but underlying climate stress, limited resources, and environmental devastation are the driving factor behind the struggles in Darfur's communities.

With rainfall down by up to 30 per cent in the last half century and the border of Sahara advancing by over a mile every year, tensions between farmers and herders in Darfur over decreasing pastures and evaporating shallow water resources threaten to reignite conflict at any time in Africa's largest country, Sudan.

Darfur occupies 25 per cent of Sudan's landmass, yet more than 60 per cent of the population lives below the national poverty line, according to a United Nations Environment Programme (UNEP) report[8] from 2016. As the desert encroaches at over 1 mile per year, the one-third less rainfall over the last 40 years has pitted cattle herders fighting for water, land, and survival against farmers. Yet it is the climatic variations that make Darfur so vulnerable and could reignite conflict at any time.

"In 2019 for example, the rainy season extended to five months," says Hamed Mala, a resident of North Darfur. The average is three to four months. "Valleys just kept flooding," adds Dr Mala.

Mohamed Abdullah, another resident of North Darfur, says his area remains insecure due to recent armed looting and tribal conflicts between farmers and herders. "Climate change has had a negative impact on nomads in North Darfur as livestock have decreased over the years due to environmental change, diseases, and conflicts. Some people have lost all their cattle. Many cattle owners lost their livestock and changed, they became aggressive towards farmers and city people. Farms decreased in numbers, and so did the grazing lands. All because of the climate that led to many conflicts which resulted in the death of innocents," recounts Mr Abdullah.

Climate change causes competition over access to water, life's vital amenity. "Since 2003, conflict has held back economic development and caused significant displacement of rural populations, which have concentrated in urban centres and in large camps, often on the edges of towns and cities," states UNEP in a February 2020 report.[9] "These concentrations of population, along with continued insecurity in many areas, have had generally unfavourable consequences for local ecosystems. The result has included accelerated deforestation, overuse of groundwater resources, over-cultivation of available arable land, and overgrazing of available rangeland. The situation is neither environmentally sustainable nor supportive of post-conflict economic recovery and peaceful coexistence," adds the report.

UNEP studies suggest the true genesis of the conflict in Darfur are decreasing rainfall and desertification. Climate models for the region predict a rise in temperature of between 0.5 °C and 1.5 °C between 2030 and 2060. Yields in local staple crops like sorghum could drop by 70 per cent.

"In Darfur's arid climate, the seasonal water courses originating from the Jebel Mara highlands represent a vital resource for the region's rapidly growing population. One of the largest is Wadi El Ku, which runs south-east through North Darfur, before moving south into East Darfur, where it terminates in an outflow delta," adds the UNEP report. Projects by donors such as the European Union have been undertaken to enhance water catchment areas in regions like North Darfur where, according to UNEP, 700,000 people depend on the Wadi El Ku seasonal river.

The rate of deforestation has been accelerated by climate change while underground aquifers are being drained. According to the United Nations, in the world's wealthiest countries the average citizen uses nearly 400 litres of water per day. In Darfur, 400 litres of water are shared by 20 people.

Tayallha Almadeni is a water management expert at UNEP in Sudan. "It doesn't take a genius to work out that as the desert moves southwards there is a physical limit to what ecological systems can sustain, and so you get one group displacing another," Dr Almadeni told our correspondent.

"Water shortages and poor management of water resources are one of the major driving factors of the conflict. Good management and fair distribution of

8 UNEP (2016). *Some, for all, forever: Emerging development of integrated water resources management in non-Nile Sudan*. Nairobi, United Nations Environment Programme.

9 UNEP (2020). *Integrated Water Resources Management Good Practices in Sudan*. Nairobi, United Nations Environment Programme.

resources can lead to sustainable development for the people of Darfur," adds Dr Almadeni. Sudan has a new government since the army removed Omar al-Bashir in 2019. Finding solutions for the people of Darfur will need to be one of its priorities.

Abu Sadam is one of thousands of people who migrated from the west in Darfur to Sudan's capital Khartoum. His family, like many others, fled the famine and droughts in the 1980s after losing their farms and livestock. They were forced to move to urban centres. Mr Sadam, like most in his situation, moved to Khartoum State.

Displaced and with nowhere to go, people leaving their home areas set up informal settlements with no services or infrastructure in Khartoum State. Their numbers exceeded 50,000. They slowly became part of the city but encountered new conflicts with the government, since the land they occupied was allocated for housing projects and commercial real estate development.

Such conflicts tragically often resulted in more deaths. Eventually the government had to resettle the migrants in different parts of the state. However, only about half of the new community was relocated. The remaining citizens are still fighting with the authorities to have basic services in the area; they hope that with the current change the transitional government will address their needs.

UNEP's Dr Almadeni estimates that the Darfur region needs about USD 1.5 billion to rehabilitate water projects, present new and advanced technologies and systems, and help the nomads, farmers, and herders to adapt to climate change. In order for talks on peace and sustainability between the government and the armed movements to result in real change, climate change needs to be at the heart of the agenda.

"The United Nations is aware that climate change is one of the main causes of the conflict in Darfur and this has been included in several reports by the United Nations

In Darfur, thousands of refugees struggle to survive. Photo: kursat-bayhan/Shutterstock

A United Nations peace-keeping squad outside the airport in El Fasher City, Darfur, Sudan. Photo: rizki buna/Shutterstock

Assistance Mission in Darfur (UNAMID), but unfortunately the paragraphs referring to this matter were later discarded," says Peter Schumann, former deputy Joint Special Representative of UNAMID in Darfur. Mr Schumann says authorities, local and international, continue to ignore the impact of climate on conflict in Darfur. "I've criticized the negligence towards the impact of climate change during the 10 years of the mission's work, as they viewed the struggle as a tribal conflict," adds Mr Schumann. He says some areas in Darfur have lost 70 per cent of agricultural land. The growing population places more pressure on the limited resources.

Mr Schumann urges the Sudanese government to confront the displacement and conflict caused by changes in the climate in Darfur. "The threats of climate change cannot be eliminated, but they can be mitigated," Mr Schumann reminds us. Strengthening governance and the economy in Darfur, while raising awareness, will be vital, he adds.

4.6 Rising sea levels pose major risk for future of Alexandria

Amira Sayed and Mohamed Wadie, Egypt

The northern Egyptian city that stood tall in the face of invasions over centuries is now battling a new threat: climate change.

Slabs of heavy concrete line the beach in Alexandria, defending the coastline and the city. The construction of such marine walls, a feature in coastal cities across northern Egypt, began again in 2019 after being halted in 2010 due to political events. And for good reasons. Researchers at the Coastal Research Institute in Alexandria estimates that sea level rise could lead to the disappearance of the city's historic corniche in approximately 50 to 80 years, besides the disappearance of around 20 per cent of the city area within the next 50 years.

The concrete blocks visible on Alexandria's shoreline extend into the sea and are designed to reduce the impact of waves on the city's shores. Submerged barriers, placed 300 m from the coastline, expand by 2700 m under water and are part of a multi-million-dollar project by Egypt's department of coastal protection to safeguard Egypt's second-largest metropolitan city.

"The aim is to protect the archaeological wall of Alexandria and its beach from erosion," Azza Abdel Hamid, General Director of the General Department of Coastal Protection, told our correspondents. The total cost of the coastal protection project in Alexandria is about 1.5 billion Egyptian Pounds (EUR 83 million).

Another government plan to offset rising sea levels is to bring sand from desert areas to the coastline to reinforce beaches and protect the city's corniche. Estimates suggest the width of Alexandria's beaches has already been reduced by 80 per cent, from 50 to 10 m, according to local residents. Probably a further 2 cm of beach is being eaten up by the sea each month.

Concrete walls built in Alexandria to protect the city from the rising sea. Photo: Amira Sayed

The extent of coastal erosion in and around Alexandria was an important contributing factor to why the ancient city of Heracleion, located north-east of Alexandria, sank into the sea approximately 1,200 years ago. The city was re-discovered in the year 2000.

According to the Egyptian Environmental Affairs Agency, the sea level in Alexandria is expected to rise from half a metre to one metre by 2100, a manifest threat to the city's beaches and tourism sector.

Besides the obvious threat of coastal erosion, human displacement, and the impact on the economy, rising sea levels represent a challenge for agriculture and food security. When water begins to leak into the lower layers of the earth, it then rises through the pores to the surface, harming soil fertility, an effect already in evidence in Egypt's Kafr El-Sheikh governorate, where increased salinity is harming agriculture. The Egyptian government has discussed growing rice in Kafr-El-Sheikh, the governorate with the highest salinity ratio in Egypt, to protect soil fertility.

Tackling climate change in Alexandria will be vital to safeguard the city's economy and social cohesion, argues Aly el-Bahrawy, Professor of Hydraulics at Ain Shams University Faculty of Engineering. A failure to do so would mean an increase in floods, sea inundations, soil erosion, and saltwater intrusion. Loss of lands would force mass migration and create high unemployment, argues Professor el-Bahrawy in a paper on the effects of climate change on Alexandria.

The consequences of not tackling the effects of climate change now could be devastating for Egypt, and are stressed in a report by the Organisation for Economic Co-operation and Development (OECD).[10] The study, which focused on the effects of climate change on four Egyptian cities, estimates that Alexandria could lose 30 per cent of its landmass by 2100. The study concludes that 1.5 million people could be displaced, and 195,000 jobs would be at stake. Such a scenario envisages losses of billions of dollars for the Egyptian economy.

The content of this article has also been published by the Egyptian Gazette.

10 Agrawala et al. (2004). Development and climate change in Egypt; Focus on coastal resources and the Nile. Paris, Organisation for Economic Cooperation and Development.

4.7 "We need to have cooperation as a system in the whole river basin"

Rehab Abdalmohsen, Egypt

Michael Abebe is the regional dam safety coordinator at the Eastern Nile Technical Regional Office of the Nile Basin Initiative. He spoke with our contributor from Cairo about how to develop transboundary confidence regarding the safety of dams.

Mr Abebe calls for a strengthening of existing collaboration on dams between Egypt, Ethiopia, and Sudan, as well as more transboundary sharing of data and knowledge between experts. He also advocates for a common data repository to be created between all Nile basin states to foster transboundary knowledge exchange between experts. Mr Abebe was recently elected vice president of the International Commission on Large Dams. He will hold that position for the next three years.

Q: What are the risks of building dams in general and how can we be prepared and avoid any risks?

MA: Dams have a lot of benefits, but if they are not properly managed, they come with many risks. It is important to review the process during the design, construction, and operation phases.

In terms of structural risks, the dam may fail, so ensuring a dam's safety is very important as it protects the downstream population and environment. It is also important to properly monitor the filling of the dam during the construction period, because this is the time when verification of assumptions from the design period should be made. For example, monitoring the safety of the dam body should be made by installing various instruments in different places to collect data on the dam. This gives an overview of whether the dam filling is going well or not, and how safe the dam is.

By 'properly monitor,' I mean that you have to attentively follow up on what the data are telling you. You have to make regular visual inspections around the dam area. If the data show any changes, the filling has to immediately stop.

Q: How is the filling process usually undertaken?

MA: The dam filling is done gradually over many stages. If there are any sudden changes, it can then immediately be reviewed, and plans should then be readjusted to incorporate the new risks.

Q: With regards to cascade dams, what kind of cooperation should be pursued?

MA: Cooperation is especially important in the case of cascade dams, because every aspect related to the water level and the water flow in one dam will affect another dam that comes after it in the same river. That's why before implementing or operating a dam, there must be discussion regarding operations and how to release the water. If there are some sudden changes in the dam's filling, the downstream countries have to prepare to retain that water.

Q: Would it be accurate to say that having a new dam in the upstream countries might be one of the risks threatening the downstream countries' dams?

MA: It's not a risk as such, but it requires cooperation. There are some good examples and experiences around the world on how cascade dams operate in China, Europe, and the USA. Even in Ethiopia, we have three cascade dams on the Omo river. These are good examples on how cascade dams can be operated and might be used as a guide for coordination elsewhere, locally and internationally. On a transboundary riparian level, there must be coordination with the downstream countries. This is one of the biggest challenges.

Q: Even before GERD, there were other dams on the Blue Nile. What kind of cooperation existed between countries regarding the management of these dams?

MA: The dams that we have on the Blue Nile are relatively small dams, with a small water capacity – not to be compared with GERD, that has a very high storage capacity. That's why GERD is attracting more attention and focus. It will have a serious impact on the downstream areas if something were to happen. That is why the three stakeholder countries – Egypt, Ethiopia, and Sudan – should work cooperatively.

Q: In order to cooperate, we need to get over the lack of trust that seems to exist between the countries. How can we do that?

MA: Hiring an independent panel of experts to monitor the safety of the dam. That is one way of building trust and confidence with regards to dam safety. Professional experts from the three countries also have a role in informing decision-makers on the practical aspects of dam safety, while not interfering with the dam politics. Experts have to work together based on scientific research and analysis, and inform policy-makers on the right way to handle these issues.

The Grand Ethiopian Renaissance Dam will be the largest hydropower dam in Africa and among the ten largest in the world. Photo: Maria Vink

Q: One suggestion has called for a common management of both the GERD and Aswan dams. Would this help enact better communal coordination?

MA: There are three levels of cooperation. The first is data and information exchange without any legally binding documents or any change to dam operations. The second level is having an agreement on the operation roles of the dam. The third would be a fully-fledged coordination framework, a very high level of cooperation, where the whole network of dams in the basin works together and each part coordinates with the other. There are different levels of cooperation: countries might start from level one and then develop gradually to the next level, then to the third one.

Q: How can the safety of GERD be guaranteed?

MA: The safety of GERD has already been checked by a panel of experts, now the discussion is about the filling period. One option is that the Government of Ethiopia could hire an independent panel of experts who have experience in this area, and to work with them and check the safety of the dam during the filling period. They could then disclose that information to the downstream countries. That is the way the Government of Ethiopia is expected to act, to build trust and confidence with the downstream countries, and show how the dam is safe even during the filling and operation period.

There are a lot of mechanisms to ensure the safety of the dam and to inform downstream countries on this issue. I suggest it is better to cooperate and work together, not only regarding the safety of the dam, but also on future operations.

Q: As an expert, what are your hopes for the Nile basin countries?

MA: I hope that the countries come together, work together, and create a successful and sustainable water development model in this basin. I would also like to see the establishment of a centre of excellence for studies on dams on the Nile and its tributaries. There are a lot of dams under construction in the Eastern Nile and the Nile basin countries. There are also older dams, like Sinar dam in Sudan and Aswan dam in Egypt, so we need the communal capacity of experts in this field in the Nile basin. Rather than bringing experts from Europe to work in this area, we'd do better to involve our own experts more. Egypt, for instance, has good experience on dam safety management. So why don't we bring experts from the region together and create a national excellence centre to train ourselves and ensure the safety of the dams in the region?

I hope to see more coordinated operation implemented in the Eastern Nile basin countries, not only for the GERD and Aswan dams, but also for other cascade dams, like the one we have in the Tekezé river in the Atbara basin. We need to have cooperation as a system in the whole river basin.

The content of this article has also been published in April 2020 on SciDev.net: https://www.scidev.net/mena/water/opinion/Q-A-Ethiopian-official-safety-Renaissance-Dam.html

4.8 Egypt, GERD, and playing the nationalism card

Yosra El-Zoghby, Egypt (March 2020)

With the last round of United States-facilitated GERD negotiations, the status of the sought-after tripartite agreement appears to be further aggravated – at best, elongated – rather than resolved or propelled forward. And while Egypt initialled the US-proposed agreement, Ethiopia, on the other hand, refused to initial the draft. So, where does Egypt currently stand?

The entangled GERD situation continues to unfold following the latest round of US and World Bank-mediated negotiations held in February 2020. The talks, which were presumed to bring about a final agreement on the filling and operation of the disputed dam, ended instead with Egypt initialling the American-brokered agreement. Ethiopia recorded a no-show in the last meeting, refusing to sign on a background of time needed for further national consultations, and Sudan was also not ready to sign.

The ensuing weeks saw Ethiopian officials speak prolifically of US pressure, taking the matter to the public, while a petition signed by Ethiopian scientists and scholars was circulated, with hashtags launched carrying nationalist mottos and sentiments such as #mydam. After initially emphasizing their commitment to the negotiation path, the Egyptian side issued similarly heated statements, and a petition was initiated defending Egypt's right, although it was less widely circulated and encouraged. Meanwhile, the official Egyptian stance remains grounded in water agreements setting Egypt's annual water share at 55.5 bcm, viewing them as equally binding as border agreements, even if inked during 'colonial' times.

Intensifying diplomatic efforts, Egypt resorted to the Arab League, extracting a ministerial decision to support its water rights, followed by tours to Arab, African, and European countries where Egypt's Foreign Minister Sameh Shoukry clarified and amassed support for the Egyptian stance. And although as an observer, one can be critical of the Egyptian government in many ways. In this instance, Egyptian officials could well be given credit for two points: first, for providing specific information on the nature of the points discussed and the Egyptian proposition made – especially in comparison to their performance during earlier stages of the negotiation; and second, for avoiding to over-nationalize the issue, or mobilize the public around it to the point of no return.

This is not to say that the topic has not been present in Egyptian public discourse. A repeated comment appeared on social media during recent unusual flooding in Egypt citing sentences like "let them cut the water [supply] from us," in reference to assumed hostile intents behind the Ethiopian dam. And albeit informal and dispersed, the comments reflect unarticulated sentiments that – although not widely discussed or circulated – probably exist on the Egyptian street.

Ethiopians have expressed similar sentiments on their #mydam hashtag, with some accusing the Egyptian government of standing in the way of their future development. It is such sentiments that may erupt in unpredictable ways when such a hot topic is sensationalized or tackled with a national tug of war. These sentiments most probably and hopefully do not reflect the goodwill behind the efforts of both countries and their desire to reach an equitable solution for both nations.

4.9 Analysis: Ethiopia and Egypt continue to disagree on GERD dam filling and operation

Addis Getachew, Ethiopia (September 2020)

A new phase in the GERD negotiations took off on 9 June 2020 as the African Union stepped in to facilitate talks among the water ministers of Egypt, Ethiopia, and Sudan, as well as their respective technical teams. However, outstanding issues that rolled over from Washington-led talks in February have yet to be resolved.

Negotiations between Egypt, Ethiopia, and Sudan on the filling and operation of Ethiopia's most important hydropower dam, known as GERD, have followed an intense schedule over June, July, and August 2020. The talks have been facilitated by the African Union, with the United States and European Union as observers.

For quite some time now, relations have been strained between Cairo and Addis Ababa over the filling and operation of GERD, which is being built by Ethiopia on the Blue Nile, one of the two main tributaries of the River Nile.

Ethiopia launched the construction of the GERD hydropower scheme in 2011 with the objective to expand domestic access to electricity. Currently only 44 per cent of Ethiopia's 110 million population has access to power. Ethiopia also plans to export energy from GERD to neighbouring countries such as Djibouti and Sudan, which is expected to have a positive impact on the regional economy.

One of the major sources of contention between Egypt and Ethiopia has been the timeframe in which the dam should be filled. This has now largely been agreed upon, but there are other matters still to be resolved, such as operations during prolonged drought periods, monitoring of annual operations, and legal aspects of the agreement under negotiation.

The latest development in the talks is the visit by US Foreign Secretary Mike Pompeo to Sudan in late August, during which he called for the three countries to continue to negotiate and arrive at an agreement in the shortest time possible. Reportedly, US President Donald Trump, who initiated the Washington rounds of talks in November 2019, wants a deal now as one of his foreign relations legacy imprints, which he would use for his re-election campaign as the US election is coming closer.

The four-month talks observed by Washington – they broke down in February when Ethiopia accused the US of clearly siding with Egypt and scaling up its role from observer to facilitator and then mediator – were supposed to help create a rapprochement between the neighbouring states. Unfortunately, relations have cooled further as Egypt and Ethiopia continue to disagree on a schedule to fill and operate the dam.

Mr Pompeo's visit is considered widely in Ethiopia as a demonstration that the US is still being the all-too-powerful voice behind the scenes. The more so as Mr Pompeo just signed a cut on US foreign assistance to Ethiopia, a measure that greatly irked Ethiopians; not because of the money suspended in assistance for security and anti-terrorism programmes, but because the cut purported to sanction Ethiopia for rejecting US mediation and thrashing the agreement that US Secretary of the Treasury Steven Mnuchin authored back in February.

"The US clearly shifted its role from observer to mediator in the disputed issues that should have been left for the three countries to hammer out in a settlement that would be acceptable," Ethiopia's Foreign Minister Gedu Andargachew told journalists in Addis Ababa in early 2020. Other African states, such as Kenya, have since offered to assist to resuscitate the negotiations.

The talks broke down after Mr Mnuchin met as scheduled with Egyptian and Sudanese delegations in Washington DC, while Ethiopia had announced its absence and asked for a prolongation of the talks, requesting time to make more local consultations at home.

The negotiations between Egypt and Sudan resulted in a draft agreement for the three countries to sign. Ethiopia refused to sign it, arguing that it was Egypt's initiative, and Sudan wants all three countries to reach a common agreement. Egypt and Ethiopia heightened the tone of their statements thereafter. Ethiopia declared that it would start filling the dam in 2020 regardless of whether an agreement is reached or not.

Egypt garnered the support of the Arab League to assist the negotiation process in safeguarding what it described as its historical right to the largest share of

Shortly after leaving Lake Tana, the Nile water enters the Blue Nile Falls in Tis Issat, Ethiopia. Photo: Alexandra Kossowska/Shutterstock

the Nile. The Arab League issued a statement in early March stating that Ethiopia should not take unilateral measures and all parties should try to reach a consensus.

The Egyptian Ministry of Foreign Affairs accused Ethiopia of ignoring the collective good. "Ethiopia now believes that its interests overwhelm the collective interests of the sovereign states that are members of the League," it said in a statement on 11 March, according to Egyptian media reports. Sudan was the only Arab League member that did not endorse the statement.

Ethiopian officials say they do not agree with elements of the draft document announced in Washington. "It is a piecemeal document that we were asked to sign," said Ethiopia's Minister of Water, Irrigation and Energy, Seleshi Bekele.

According to Minister Bekele, one of the document's key appendices only focuses on one of the issues tabled: tackling the amount of water to be released from the dam during droughts and extended drought periods, and the mitigation measures for such scenarios. "It lacks comprehensiveness in view of the overall issues that were being tackled concerning the GERD, and there were also points in the appendix that we did not agree with. We therefore needed to further review it and to seek agreement," Minister Bekele said.

Ethiopia wants the trilateral talks to only focus on the issue of GERD, as it believes the three countries alone cannot agree on basin-wide broader water-sharing issues related to the Nile – a river shared by 11 countries. Ethiopia also wants the trilateral talks to clarify all GERD issues, not just the filling of the dam. Egypt

would prefer the talks to tackle broader water-sharing issues.

"Sudan emphasizes the importance of reaching a comprehensive agreement including safe operation of the GERD prior to commencing of the initial filling," said Sudan's Ministry of Irrigation and Water Resources, confirming Sudan's commitment to finalize a comprehensive agreement.

GERD is a two-edged sword for Sudan, with positives and negatives for Africa's largest nation. "The hydrological changes due to GERD will likely have beneficial impacts on irrigation in Sudan," says Mohamed Abdelaziz, a Sudanese journalist who has followed the negotiations. "But it will also have potentially negative impacts," he adds.

"One has to do with the ecological functioning of the Blue Nile and the main Nile in the stretch of river between GERD and the High Aswan dam," says Mr Abdelaziz. "A large dam like GERD will likely trap a significant fraction of the sediment flux in the Blue Nile, and by doing so shorten the lifespan of its own reservoir."

With so much at stake for all three countries, civil society voices have urged their governments to resume talks. "It is better for the three countries to return to the negotiations, reach a satisfactory agreement, and find a good model for regional cooperation," says Mr Abdelaziz. One can only hope that happens soon.

The three countries submitted their draft proposals to the Bureau of the Assembly of the African Union Heads of State and Government, which includes South Africa as Chairperson (for a term of one year) as well as the Democratic Republic of the Congo, Kenya, and Mali, and their respective experts.

In the last days of August, the three countries were expected to agree on a document that drew from all three proposals, but so far nothing came up. Under the circumstances, it would be hard to predict what turn the talks would take under the auspices of the African Union and one can only say let us wait and see.

4.10 Sudan caught between a rock and a hard place in difficult dam talks

Elzahraa Jadallah, Sudan (September 2020)

Negotiations between Egypt, Ethiopia, and Sudan over the contentious GERD are set to continue under the auspices of the African Union, according to the head of Sudan's negotiating team, Salih Hamid. A deal is far from set, however, as the last round of talks took many steps backwards, ending any gains made in previous discussions.

The last round of negotiations in August 2020 between the three countries over GERD ended without a solution, according to Sudan's Minister of Water and Irrigation, Yasser Abbas. The minister explained that experts were unable to merge the three drafts submitted by each state within the 10-day negotiations set by the African Union. In a press conference, Professor Abbas said the Egyptian and Ethiopian sides had shown regression towards reaching an agreement, changing views they had previously agreed upon.

"The negotiations went many steps back in this round. At the beginning of the round, the two other countries insisted on negotiating a compiled document of the three countries' proposals. Sudan opposed this approach as it was tried before and proved to be a complete failure before moving the negotiations to Washington," said Salih Hamad, the head of the Sudanese negotiating team. By insisting on three separate proposals, "every single word starting from the agreement title was now under negotiation." Instead, Dr Hamad explained, Sudan wanted the three countries to focus and negotiate on the outstanding issues, "leaving the coding and wording for a designated committee."

Hopes for the African Union mediation to bring positive results were dashed by the obdurate stances of Egypt and Ethiopia, says Kamal-Eldein Bashar, an expert on water and irrigation.

"The last round of negotiation with the mediation of the African Union was expected to have positive results, but the lack of flexibility led to a dead end. Ethiopia wants all their demands to be fulfilled while Egypt is unwilling to compromise," Dr Bashar said.

Over time, as both Egypt and Ethiopia escalated the dispute via the press, Sudan was accused of favouring one side over the other. Dr Bashar explains that Sudan should not take sides; it should prioritize its own national benefits and focus on the safety and operation of the dam as it is the first to be affected. "Egypt wants to take the bigger share of water, and Ethiopia want the full liberty to use their water resources, and the two sides are wrong. They should compromise for a mutual benefit."

Recently Ethiopia took two unilateral dam-related decisions that are considered violations of the negotiating teams' previously agreed principles and international law, Dr Hamad said. All three countries signed a Declaration of Principles in March 2015 in Khartoum.

Neither Egypt nor Sudan appreciated Ethiopia's unilateral decision to start filling the dam without notification. The three countries have previously agreed to store the first 4.9 bcm in July and August, but Ethiopia managed to store the entire quantity in one week in July.

On 4 August the Ethiopian Minister of Water and Electricity issued a letter stating that the country would not negotiate over the dam's operations despite agreeing to adhere to a consultative process in a signed declaration of principles. "This delayed negotiations for a week until Ethiopia finally agreed to abide by the declaration of principles," Dr Hamad added.

But Ethiopia is not the only offender, says water expert and researcher Sami Mohamed Ahmed. Apparently, Egypt also violated the Declaration of Principles by seeking mediation from the United States without consulting the other parties. At this stage, it is crucial for both Egypt and Ethiopia to compromise. "Smart cooperation and collaboration must be the goal without one country wanting to have the bigger share or violate international standards," Mr Ahmed said regarding the negotiations.

Although not considered part of the GERD negotiations, water sharing represents a central area of contention between the three countries. "These negotiations never discussed water sharing, and Ethiopia does not recognize the 1959 agreement. Sudan declared the 1929 agreement void in July 1957," said Dr Hamad.

The first agreement, accrued during English–Egyptian rule in Sudan, allowed Sudan to use only 4 million cubic metres, and the second, finalized three years after independence, allowed Sudan 18.5 bcm, while Egypt took 55.5 bcm. The sharing divided the total annual flow of 74 bcm, measured at the Aswan High dam after deducting 10 bcm for evaporation and other losses.

"Those agreements were very harmful to sustainable development and agriculture in Sudan, it was very unjust," says Mr Ahmed, adding that any agreement that harms future generations should be refused.

As Sudan experiences unprecedented floods, the lack of clarity in the GERD negotiations is a cause for concern, especially for those residing near dams. "Dam security and operation are two important issues that must be addressed with the participation of all three States," Dr Bashar said, adding that the lack of engagement over GERD operations could affect many dams in Sudan. GERD is only 100 km from Roseires dam, says Dr Ahmed, which could easily be affected if GERD's operations are not mutually agreed upon.

Fears over GERD affecting current flood levels in Sudan, however, are unwarranted, Professor Abbas said at a press conference last week. According to the minister, GERD would actually protect Sudan against future flooding once it is fully operational, another reason the negotiation deadlock needs to be resolved.

Over 100 people have died in recent devastating floods, with over 60,000 people rendered homeless, as reported by the United Nations.

Sudan's Minister of Irrigation and Water Resources believes only the three countries' political leaders can break this deadlock. Legal and technical considerations persist, such as filling during droughts, compulsion of the agreement, and its impact on future projects.

"The remaining points are technical and legal issues, but as you know, the legal issues have political implications," Sudan's chief negotiator stated. "That is why our minister declared that these issues need political commitment." As it stands, all three countries now look to the African Union for intervention, to give the negotiation process the political impetus to conclude this thorny agreement.

The content of this article is based on the original published by Ayin Network on 12 September 2020:
https://3ayin.com/en/dam-disputes/

Tuti Island in Khartoum where the Blue Nile meets the White Nile. Photo: Claudiovidri/ Shutterstock

5. Concluding thoughts

Mats Eriksson, International Centre for Water Cooperation, SIWI

Each time has its own challenges. However, undoubtedly, the mounting pressure that the world sees today on social systems and ecosystems all over the globe may very well be the greatest challenges mankind has ever faced. The rate of global warming is accelerating, mountain glaciers and ice sheets are melting at an increasing speed, sea-level rise follows at the same pace, forest and bush fires reach alarming levels. In the midst of this turmoil, human pressure on ecosystems results in an extinction rate of species unprecedented in human history. Humans continue to act unsustainably in various ways, with clearing of the remaining rainforest and overfishing as horrifying examples.

The increasing pressure on existing water resources worldwide is similarly of great concern. Water is a finite resource and to ensure its sustainable management will be pivotal to make sure that the resource will continue to provide the underpinning socio-economic basis for prosperous societies in the future. The Nile river basin is no exception. In 2016, the population in the Nile basin countries was estimated at 487 million, 40 per cent of Africa's population, with about 260 million living within the basin boundaries. Since then, the population has increased, and will continue to increase, with demand for water, food, and energy following at the same pace. The basin population is estimated to reach 800 million by 2050. Africa is the continent with the largest built up need for investments in infrastructure for water supply, and the demand for energy and food needs to be met by increased and improved productivity.

Shared rivers come with particular challenges, but also great opportunities, in terms of providing a basis for prosperous and sustainable development. They provide possibilities to meet the increasing demand for water supply, energy, and food production, but development needs to be undertaken in a coordinated manner in order to be effective. Regional trade of services and commodities will be an important part of the solution towards elevated living standards. The growing populations will be part of the solution, as humans are also a resource in a development context.

All of the above, from the great challenges of our time – including wasteful and unethical use of the planet's resources, to finding sustainable solutions in developing land and water resources to serve a growing population – require professional, fact-based media coverage. Our world is complex and adequate reporting needs to be rooted in a sound understanding of the complexities. This puts high expectations on the cadre of journalists in their job to adequately assess, analyse, and describe what is happening, so that the message will be clear, concise, and balanced. Responsibilities to undertake these are great since the audience may potentially be very large and possibly powerful, spanning from the less-educated mass to key policy- and decision-makers.

In the eastern Nile river basin, all of the above complexities exist, from climate-induced stress factors to challenges posed by human populations and their desire to develop and manage natural resources. But there is also a great dimension of potential for increased cooperation, prosperity, and sustainable development of common resources lying ahead. Thus, eastern Nile basin journalists have an important role to play in covering these developments and delivering messages to the basin inhabitants and beyond in a professional, informative, and respectful way.

About this report

The role of the media in shaping the views and opinions of the general public, and policy- and decision-makers alike, cannot be underestimated. The media have the power and means to portray matters for discussion in more positive or negative dimensions, and they can be more or less balanced and impartial in communicating different views. Thus, it is crucial that the media can carry out their work in an objective manner and with the highest possible access to facts and science-based knowledge. In this report, 10 articles - authored by 11 journalists from Egypt, Ethiopia, South Sudan, and Sudan – highlighting water, climate, and environmental aspects in the eastern Nile river basin, provide a flavour of important, even urgent, topics that deserve increased attention. The environmental matters presented are all transboundary in their nature, although the articles focus on national or local examples.

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