Water Security in the Horn of Africa: Climate Change in Somalia, Ethiopia, Eritrea and Djibouti

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Introduction

The Horn of Africa poses a difficult challenge regarding scarce natural resources, especially water. The region is heavily reliant on agriculture to provide livelihoods for the millions that live there, yet climate change places enormous pressure on those people. As the temperature warms, population grows, migration increases, and the strain on water resources, both in terms of availability and governance, builds.

This paper explores the increasing impacts of climate change on water resources within the Horn of Africa (HOA) countries – Somalia, Ethiopia, and Djibouti. Climate change has a profound impact in the region, ranging from higher temperatures to prolonged droughts. In turn, this negatively affects many areas of people’s lives, from agricultural production (and therefore food security), livelihood insecurity and poverty. Poor governance exacerbates these problems to further entrench economic inequality.

Moreover, transboundary and historical conflicts have progressively increased vulnerability within the region, making it challenging to successfully provide the basics to sustain human life. These pre-existing hostilities threaten to decrease regional peace and security.

Regional Challenges

An important distinction worth noting from the outset is that literature typically refers to the HOA region to mean the members of the Intergovernmental Authority on Development (IGAD). This includes Eritrea, Kenya, Sudan, South Sudan and Uganda. This paper will refer only to the three nations mentioned previously.

Two of the three nations studied fall within the bottom 20 rankings of the global Human Development Index, with Somalia being unranked. The combination of extreme exposure, significant vulnerability and limited adaptive capacity creates a troublesome outlook. A 2016 index ranking vulnerability and readiness found Somalia to be the 2nd most vulnerable and least ready nation in the world.¹

The 230 million people in the Horn of Africa are exposed to prolonged drought. The inequalities and disproportionately of climate change are no clearer in any other part of the world. The cumulative greenhouse gas emissions are negligible in their contribution to global emissions, yet the vulnerabilities are enormous. The Ministry for Foreign Affairs notes that the IGAD region accounts for an estimated 0.59 per cent of global GHG emissions.²

Osima et al (2018) modelled future temperatures against a control period of 1971 – 2000 and found that the projected mean surface temperature difference between global warming levels of 1.5C and 2C is higher than 0.5C across almost all land points, suggesting that the Horn of Africa is likely to warm faster than the global mean. The research notes that precipitation over the central and northern parts of Ethiopia will decrease significantly and the length of dry spells will increase.³ This is especially bad news in a region where around 80 per cent of the population is reliant on agriculture as a means of livelihood. Naturally, as the impacts of climate change worsen, the ability to ensure livelihood security is significantly inhibited. The consequences of which are already visible. Economic inequalities and poverty are rampant, worsened by inefficient, and often corrupt, governance.

The presence of external military may add to the potential hostilities of the region. In the smallest of the nations – Djibouti – seven foreign militaries (USA, China, Japan, Germany,
France, Italy and Spain) have known operational facilities. This is due, in part, to its strategic geographic position – just 18 miles across the gulf from Yemen and sitting at the entrance to the Red Sea.

Transboundary conflict over natural resources threatens to escalate tensions further. The Nile acts as a key source of water, energy and food. Moreover, it has historical and cultural significance for the countries that share it. The construction of the Grand Ethiopian Renaissance Dam (GERD) has angered neighbors and climate change will compound these issues. If these problems are not tackled from both a community and local level, it could lead to further fractures in an already damaged region.

The region is heavily dependent on charities like Oxfam, aid organizations and governments providing humanitarian relief and assistance. It is thought that up to 15 million people require such assistance. Save the Children estimate that 6.5 million people in the region suffer from hunger and, as of June 2019, 1.8 million people have been displaced by drought.

**Somalia**

In Somalia, the right to use water is dependent on land access alongside rivers. Previously, natural resource laws were put in place to govern extraction, and in times of flooding, water would be diverted to a natural depression to control flows downstream. However, this progress from the 1980s was eroded when the government collapsed. Governance and institutions responsible for the allocation of natural resources could no longer function.

The UNDP notes that “due to a lack of investment and damage during Somalia’s protracted civil war, the national climate monitoring network – and therefore the capacity to forecast droughts and floods – is extremely limited.”

Often, communities have no choice but to buy water from catchments at exorbitant expense. For example, cost per day is around US $6 compared with a daily income of around US $1.25. This makes such purchases entirely unsustainable for longer periods. Farmers note a “total failure of all crops for the last four years.” Changes in temperature, the volume of rain and timing of rain is wreaking havoc. For example, residents note that seasons are changing. If the rain comes at all, it is coming much later.

Somalia is especially reliant on the Juba and Shabelle rivers despite 90 per cent of their flows coming from Ethiopia. The rivers are fundamental to agricultural production by providing irrigation and fertile lands to grow crops. However, a 2015 study found that irrigation infrastructure is in poor condition, having significant impacts on production. The transboundary nature of this vital resource creates many tensions. For example, as Somalia sits downstream, points much further down river receive limited runoff. In the 1980s, Somalia made grand plans to develop the Juba-Shabelle basins, but the collapse of the government ensured this did not come to fruition. Disputes between Ethiopia and Somalia are ongoing, often locked in decades of deep-rooted history.

In the early 2000s, Ethiopia submitted plans to construct multiple dams in the basins to help produce hydropower and irrigation. However, this has profound consequences for water security and economic well-being of Somalia. The Somalian plains reliant on the basins are known as the nation’s ‘breadbasket’. As researchers note, Somalia’s lack of government contributed significantly to this disagreement. Various planned Ethiopian projects were never known to Somalia because no government existed to notify or negotiate. As a result, the World Bank
estimates that Ethiopia’s dams could reduce the downstream flow of the Shabelle River by as much as 80 per cent. Farming at scale would come under enormous pressure if that were to be true, with many being solely reliant on rain-fed farming – a practice that typically only yields enough for subsistence.

The Food and Agriculture Organization of the UN (FAO) has worked with Somalia to help build infrastructure and water management. In 2002, the Somalia Water and Land Information Management (SWALIM) program was launched to provide in-depth, accurate information to preserve, manage and protect vital natural resources. It recovered available historical data and collected new data to support sustainability in the basins.

Two challenges remain. First, many areas in the country are insecure. The escalation of violence between groups and the enormous foreign military presence makes it difficult, if not impossible, for areas to be accessed. While there has been fantastic work done by many agencies, development organizations still lack access to many important areas. As SIPRI explains, “Somalia grapples with a multi-layered conflict system, with the conflict against al Shabaab being the highest-profile element, while historic inequalities and grievances contribute to violent conflict at the local level and political instability nationally.” Such armed groups have targeted people, especially the young and unemployed, for recruitment to provide a level of security in return for service. Second, there is limited reliable data. Nowadays, having accurate data is the first step to identifying potential gaps and areas for intervention. However, many data networks collapsed with the government and not all of them have been restored to working order. Nonetheless, progress is underway. In November 2019, Somalia and the UN Development Programme (UNDP) launched a climate adaptation project to secure access to water supplies. It is expected that around 360,000 farmers can benefit from sustainable water management and early-warning systems.

Ethiopia

Ethiopia is developing at an impressive speed. Between 2000 and 2018, Ethiopia’s GDP per capita growth was 189 per cent, ranking third globally behind China and Myanmar respectively. Yet, with such economic and population growth comes enormous pressure on food and water resources.

Taye et al (2018) researched the impact of climate change on water resources in the Awash Basin in Ethiopia. The basin is incredibly important for the country, both economically and socially, and is relied upon by around 17 per cent of the national population. Using three models for the future – 2006 – 2030, 2031 – 2055, and 2056 – 2080 – against the baseline period of 1981 – 2005, they found all three projections show an increase in water deficiency across all seasons due to an increase in temperature and decrease in precipitation. They note that this will threaten water security in different sectors and requires a resource management strategy that is inclusive of all users.

Naturally, this will cause several shocks, many of which we see already. For example, communities report substantial losses of livestock – up to 70 per cent in some places. As this provides the main source of livelihood, it creates enormous socio-economic pressures. These pressures increase as men typically move away to find work while women stay at home to care for children. The extent to which farmers suffer is dependent upon what they farm. Livestock farmers, although increasingly vulnerable, have the option to move to lands with more favorable conditions – albeit, often causing conflict. Whereas those growing crops have no such option, resulting in harvests frequently failing.
In Ethiopia, there are insufficient investments in human capacity and local management arrangements, a slow-moving supply chain and a lack of accountability to water users as the major factors constraining more sustainable water services. Ethiopia’s energy supply is highly reliant on water, with hydropower accounting for up to 90 per cent of total electricity. This overreliance on a single energy source places Ethiopia in a vulnerable position to climate shocks. For example, recent research found that a decrease in rainfall of just 5 per cent could cause the same drop in GDP from the Awash Basin and a 10 per cent drop in agricultural productivity. Moreover, the desire to produce hydropower is creating tensions with neighboring countries. Ethiopia’s dams, both already built and planned, hinder downstream irrigation.

At first glance, it may seem difficult to understand how Ethiopia struggles given it has abundant water resources. However, these resources are unevenly distributed. Increased temperatures are expected to reduce river flows and runoff, increase evaporation and evapotranspiration, therefore reducing availability in water-scarce, drought-prone areas. Moreover, limited capacity to store water when there are rare, heavy rainfall periods makes a steady supply difficult to ensure.

To prevent long-term shortages, the Ethiopian government is already undertaking projects. For example, the Legedadi Phase II Water Project aims to supply the city with an additional 86,000 cubic meters of clean water per day. Moreover, the installation of additional groundwater infrastructure could supply the city with 130,000 cubic meters of clean water each day. This provides opportunities for both water and food security, but also to reduce the spread of preventable diseases associated with dirty water.

Nonetheless, the challenges remain. The population of the capital – Addis Ababa – is expected to nearly double to 7 million by 2039. In a country where it is estimated that 42 million people do not have access to safe drinking water. The intersection of urbanization and climate change poses an enormous risk.

**Djibouti**

With a population of only around 958,000, Djibouti is often overlooked despite having its challenges. According to the UN Office for the Coordination of Humanitarian Affairs (OCHA), Djibouti is the most vulnerable country in the region. Around 280,000 people – a little under 30 per cent – do not have food in the country. A country that contributes virtually nothing to greenhouse gas emissions suffers from higher levels of poverty, unemployment, poor hygiene and lack of water as a result of climate change.

Djibouti possesses extremely limited natural resources. 89 per cent of the country is desert, 10 per cent is pasture and 1 per cent is forest, making it particularly unsuitable for agriculture. This makes the country highly reliant on the import of foods from abroad, largely from Ethiopia. Therefore, failed harvests in Ethiopia impede the food security of the entire region. To compound this, Djibouti is a hotspot for migration. An estimated 100,000 migrants are in the country, some fleeing conflict and fragile neighboring states, and some using the country as a transit point to the Gulf.

Some estimates place warming in Djibouti at 1C every two decades, suggesting it could be 4C warmer by 2100. As one of the hottest places on the planet already, this is a bleak forecast. For example, the shores of Lake Assal can regularly exceed 50C during the summer months, the risk of such heat more frequently throughout the year could render the entire area uninhabitable.
Moreover, around 88 per cent of Dijboutians live in coastal areas, putting them at risk of sea-level rise. A working paper by the International Monetary Fund (IMF) noted the probability of severe droughts will increase by 20 per cent by 2050 and sea level could rise by a meter or more by 2100. The paper also notes that the macroeconomic implications of climate change could be severe. Adverse effects on the population may well reduce labor productivity, industrial output and national GDP. Therefore, investment at enormous scale is required for adaptation and mitigation purposes to prevent extortionate costs in the future.

Razack et al (2019) studied aquifers in Djibouti. They concluded that the arid region characterized by high temperatures and low rainfall results in long-term droughts. Due to this, groundwater is overexploited to meet the demands of the population. Moreover, the risk of aquifer contamination is high due to saltwater intrusion. Therefore, the sustainable use of this as a water resource must take into account the impact of climate change.

Conclusion

The international community is starting to respond to these potential crises. A recent report by the Stockholm International Peace Research Institute (SIPRI) concluded that successful governance cannot be tackled alone and requires a multidimensional approach by all nations in the region. Moreover, SIPRI notes that “there is a need to shift the regional narratives around water resources and their governance: from a source of competition and tension towards a narrative of shared problems and opportunities that need shared multilateral solutions.” That is, progress will likely be halted without significant cooperation on the issue of water. In a region with weak institutions, limited adaptive capacity and a long history of distrust, this is easier said than done.

The Stockholm Environment Institute (SEI) studied climate resilience and water and energy infrastructure in Africa. They evaluated several river basins that, although not in the HOA region, share similar characteristics. Therefore, it is useful to include the results. For example, the river basins studied are all highly vulnerable to climate change and hold significance in terms of hydropower generation, basic water supply and irrigation. SEI researchers recommend including climate change considerations within any planning and design of infrastructure and investment. This includes promoting an open-data knowledge database for climate-resilient infrastructure, establishing training programs and establishing a facility to aid climate resilience projects.

Perhaps most importantly, the region requires help to build community resilience. Providing the tools to ensure self-sufficiency in the future is far more useful than the provision of aid with little education. This can be done by changing the narrative surrounding water resources and governance. Moving from a view of transboundary competition over scarce resources to one of cooperation and rationality would yield many benefits. Natural resource disputes are solved with effective leadership and diplomacy rather than doubling down on hostility and aggressive tactics. Some suggest establishing an institutional architecture to effectively manage water resources. No such organization currently exists and would be incredibly helpful in solving disputes in an impartial and unbiased way.

In 2019, FAO developed a drought action plan for Somalia calling for urgent humanitarian action to help over 6 million affected by severe drought. The plan is three-pronged: increasing food access and protecting livelihoods; protecting livestock by supplying animal feed, water and vaccinations, and; mitigation of new shocks. Such an approach could well be mimicked in other HOA countries if the plan in Somalia appears to be successful.
Lastly, promoting discourse between policymakers, government and scientists is essential. Those that make important decisions regarding water must be informed with the latest climate science. Increasing the accessibility of climate information and education to help build capacity at the government level is the first step towards the necessary investments for the future.

The outlook for the region is bleak. Rising temperatures combined with economic and political instability, conflict and the current global health pandemic places an enormous strain on natural resources. Yet, the little water available to the Horn of Africa countries remains poorly governed. A lack of appropriate institutions and governance structure mean positive outcomes for the nations that share rivers are not being delivered. Moreover, limited investment into climate-resilient infrastructure exacerbates existing vulnerabilities. As temperatures continue to soar and droughts predicted to last even longer, the region must foster an environment of cooperation and collaboration regarding natural resources to build a more sustainable future.

Notes

1 Ministry of Foreign Affairs. 2018. *Climate Change Profile: Greater Horn of Africa.* Available at: https://reliefweb.int/sites/reliefweb.int/files/resources/Greater%2BHorn%2Bof%2BAfrica.pdf

2 Ibid

3 Osiam, S; Indasi, V; Zaroug, M; Endris, H; Gudoshava, M; Misiani, H; Nimusiima, A; Anyah, R; Otieno, G; Ogwana, B. 2018. *Projected climate over the Greater Horn of Africa under 1.5C and 2C global warming.* Environmental Research Letters, Volume 13, Number 6. Available at: https://iopscience.iop.org/article/10.1088/1748-9326/aaba1b/meta


8 UNDP. 2019. *More than 360,000 farmers and pastoralists are set to benefit from GEF-funded project.* Available at: https://reliefweb.int/report/somalia/more-360000-farmers-and-pastoralists-are-set-benefit-gef-funded-project
9 Ibid


16 Ibid


23 Ibid
24 Ibid

25 Ibid

