

# Water Security in Africa in the Age of Global Climate Change

The common refrain that “water is the source of life,” heard in traditional African proverbs and the desperate voices of environmental activists alike, is a clarion warning that we are on the precipice of major ecological crises, that is, unless we redouble our efforts and respond as urgently to this global challenge as we have, at our best, responded to the COVID-19 pandemic.

Climate change has seriously exacerbated these problems. The human-induced crisis— a result of greenhouse gas emissions principally through the unbridled burning of fossil fuels— has led to a heating planet that is threatening lives and livelihoods, particularly of poor people in Africa and other regions of the developing world.<sup>3</sup> The poor have disproportionately borne the impacts of the climate crisis in the form of seasonal weather changes, soaring temperatures, and floods and droughts.<sup>4</sup> Global concerns about the impact of climate change have thrown the spotlight on the availability of secure water sources in the face of frequent extreme weather conditions.

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in turn, affect other aspects of people's experiences, sociopolitical dynamics, and well-being, broadly conceived; and 4) water governance and the politics of water at the local, national, and transnational levels.

Some of these issues were generated by wide-ranging conversations during the two-day colloquium on the theme "Water in Our Future," hosted by the American Academy of Arts and Sciences in Boston, Massachusetts, on June 19–20, 2019. Several scholars who participated in this meeting agreed to contribute to this volume and write reflective essays across a number of aspects of water security, including Jackie King (who had recently won the highly prestigious 2019 Stockholm Water Prize), Jennifer Derr, and Mucha Musemwa. We are delighted that other colleagues from Lesotho, South Africa, Zimbabwe, Belgium, Switzerland, Taiwan, and the United States agreed to contribute their research and lived experiences to our project.

While most of the contributors have recently conducted interdisciplinary fieldwork to determine how water scarcity has affected local communities across Africa, all of the contributors stress the importance of understanding the historical factors that have helped shape the current situation. Their investigations reveal that the end of European colonial rule did not mark a radical departure in the water history of the continent. While the power dynamics have shifted somewhat, colonial adulation of large development projects persists, as does the failure to recognize how these schemes often adversely affect the rural and urban poor.<sup>10</sup>

**A** water crisis sparked by climate change is threatening one-quarter of humanity.<sup>11</sup> A number of authoritative reports, foremost among them from the Intergovernmental Panel on Climate Change, have long concluded that climate change will have dire consequences the world over and will contribute to poverty, environmental degradation, and the further weakening of already fragile governments. The African continent, producing less than 4 percent of the world's greenhouse gases, has already borne the brunt of the externally induced effects of global warming;<sup>12</sup> many of its ecological systems have by now been ruinously transformed and are no longer of any significant value for its inhabitants.

This is, therefore, no longer an imagined possibility, but a lived reality of deleterious effects, especially with respect to access to water supplies, on the livelihoods of any number of people in sub-Saharan Africa. So, too, has water insecurity become an existential crisis for many Africans, although these daily realities hardly ever become headlines like the mega-water crises of Flint and Cape Town. Although the continent has large reserves of untapped water, aquatic resources are distributed unevenly. The major share of Africa's water resources lies in a few large basins such as the Congo, Niger, Nile, and Zambezi Rivers. At the same time, one-third of Africa's people live in regions susceptible to droughts and semi-aridity; intensifying climate change has put an additional 75 million to 250 million people at risk.<sup>13</sup>

Climate change, particularly rising temperatures and changing rainfall patterns, has had a multitude of immediate and far-reaching effects on water resources on the continent, on biophysical environments, and on peoples' daily lives. Among the most visible and deleterious effects of climate change are flooding, cyclones, droughts, drying up of rivers and lakes, and decreased quality of water. Soil erosion and reduced biodiversity have increased food shortages, led to the spread of disease, and exacerbated mass migration, which further compound the destructive effects of climate change in a negative feedback loop.<sup>14</sup>

In March and April 2019, for example, tropical cyclones Idai and Kenneth pounded vast areas of Malawi, Madagascar, Mozambique, and Zimbabwe. They are the most destructive tropical cyclones on record to have shaken Africa and the Southern Hemisphere/Southwest Indian Ocean, inflicting catastrophic losses of life and limb, including about 1,200 deaths and an estimated US\$2 billion in physical damage. This in a region that had already been experiencing long periods of endemic droughts, often leading to water scarcity (and food insecurity) of significant proportions in Zimbabwe, Namibia, Malawi, Mozambique, and Zambia. The 2015–2018 drought in Cape Town assumed legendary proportions as “Day Zero” – when dam water levels might fall past the threshold requiring a total shutdown of the municipal water supply – loomed large for residents.<sup>15</sup> Nothing more vividly reveals the effects of global warming and drought than the desiccation of a large portion of Lake Chad, once among Africa's largest freshwater lakes, covering 45,000 square kilometers in 1960. Fifty years later, it has shrunk to one-quarter of that size.<sup>16</sup>

At the same time, urban water crises due to rainfall variability, as well as aging infrastructure and booming populations, are destabilizing the African continent from Accra to Cape Town and from Bulawayo to the edges of the Sahel. The shortages of potable water have brought to the fore the inadequacies of established water supply strategies.

mate discourses to veil their own developmental failures or offensive political strategies, as Verhoeven warns.

This issue of *Journal of Modern African Studies* draws particular attention to the increasingly urban nature of the challenges Africa faces. Water shortages, whether the result of colonially entrenched patterns of accumulation, incompetence and mismanagement, climatic shifts, or other causes, have become particularly acute in many of the continent's booming centers, such as Lagos, Johannesburg, and Kinshasa. These cities are facing severe shortages of potable water. Urban residents rely on adequate supplies of water for cooking, bathing, and urban gardens, while industries must have regular water supplies to sustain production. Water scarcity has highlighted health vulnerabilities in impoverished populations; the rising incidence of cholera and dysentery resulting from frequent flooding and poor disposal of waste is of particular concern.<sup>18</sup>

Water scarcity, nevertheless, does not inevitably produce crisis, as sociologist Lyla Mehta has pointed out. Instead, embedded in crises of water are crises of power relations: "flows of water are also flows of power."<sup>19</sup> Save for the most recent scholarship, which has begun to provide multiple and detailed meanings of scarcity, there is still a preponderance of popular literature that contains assertions that have dismally "failed to address relational and distributional aspects of water scarcity and their links with prevailing social power relations, which have a tremendous bearing on how water is used or abused."<sup>20</sup> As such, this issue of *Journal of Modern African Studies* seeks to unravel the often hidden yet significant inequities in access to water along the intersections of race, class, gender, and spatial/residential differentiation.

Embedded in the prevailing water scarcity discourse, especially as it relates to processes of urbanization, are critical characteristics designed to ensure the sustainability of the urban-construction project: namely, water commodification, marketization, and privatization schemes.<sup>21</sup> Moreover, many African countries,





After a short hiatus in the construction of hydroelectric projects following the scathing conclusion of the report by the World Commission on Dams, governments, with the support of bilateral and occasionally multilateral partners, began building dams with a newfound zeal, much of it owing to the emergence of new financiers, as the essay by Jyhjong Hwang in this volume evidences. Over the last fifteen years, dozens of major projects have been completed, or are under construction, in Sudan, Ethiopia, Rwanda, and Tanzania.<sup>36</sup> In Ghana, the Bui Dam across the Black Volta was finished in 2013.<sup>37</sup> Construction on another project, the Pwalugu Dam on the White Volta, began in April 2020.<sup>38</sup> There is also renewed interest in building the massive Grand Inga Dam in the Congo, which, proponents argue, could provide cheap energy to a vast region stretching from South Africa to Southern Europe.<sup>39</sup>

But even with the most sophisticated technology of the time, dams do not always function as engineers predict. Hydrologists and engineers have in recent years expressed concern about the stability of the aged walls of the Kariba Dam. If the dam walls break— which is debated as much locally as in international newspapers— about three million residents will lose their homes, livestock, and possibly their lives.<sup>40</sup> At the time of its construction in the late 1950s, it attracted worldwide attention as the largest infrastructure project of its kind. Today, Kariba has resurfaced as a symbol of the unintended consequences of megalomaniacal infrastructure projects.<sup>41</sup> After more than sixty years in operation, it has aged to fragility. Over decades of operation, the water coming out of the sluice gates has carved out a deep underwater plunge pool; if it gets too big, the dam's foundation will be washed out. If the dam breaks, 40 percent of the electricity capacity of twelve countries in Southern Africa would be destroyed.<sup>42</sup> The recent collapse of dams in India and Brazil, which left a toll of death and destruction, is a powerful warning of what might occur at Kariba or other dam sites in Africa.<sup>43</sup>

**S**eventy percent of the earth embodies water, yet a significant part of the global population regularly experiences dire challenges of accessing clean potable water because water resources are unequally apportioned. In sub-Saharan Africa alone, 29 percent of the population suffers from lack of access to clean and nearby water resources, let alone electricity, with women and girls bearing the brunt of water collection from distant places.<sup>44</sup> This unequal access to water and hydroelectricity raises critical questions about notions of scarcity, water governance, and the politics of water.

Issues of water shortages and distribution are embedded in specific biophysical landscapes, historical contexts, and fields of power. The rationale for privileging White settlers in relatively water-abundant Rhodesia over their rural Black counterparts was far different from the state strategy of building big irrigation projects in Egypt and the Sudan at the expense of the rural and urban poor.<sup>45</sup> As previous-



ly noted, government officials promoted large hydroelectric projects deemed essential for industrial and rural development in countries as diverse as Ghana and Mozambique.<sup>46</sup> In both countries, women, who often had to spend two to three hours a day fetching water, and young children, who are particularly susceptible to waterborne diseases, have paid the heaviest price.

The politics of water are not only critical at the local and national levels but affect transnational relations as well. South Africa's effort to appropriate water from the Lesotho Highlands and from neighboring Namibia has been a source of growing tension. Control of aquatic resources has, at times, strained relations between Egypt, Ethiopia, and Sudan. Some of the most highly publicized dams in Africa—the Aswan High Dam, the Kariba Dam, and the Lesotho Highlands R d snd tsa

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poor will continue to be devastating. The authors drill down on the deleterious effects of water scarcity on the daily lives of farmers and urban dwellers, women and men, old and young, across the African continent. Their research highlights the vulnerability of the underclasses whose voices have long been silenced by those in power and their economic allies, whose dreams of development would only benefit themselves. The authors raise the troubling question: development for whom?

In her essay, “Everyday Experiences of Water Insecurity: Insights from Under-served Areas of Accra, Ghana,” Leila Harris shows how the urban poor in Accra live through the “everyday” occurrence of nonavailability or scarce provision of water. She stresses that water scarcity and insecurity are not impending crises exacerbated by climate change, but have long been a challenging reality for many. Based on long-term multi-sited and multi-method research, Harris focuses on regulatory challenges and risks associated with a fixation on built infrastructure, as opposed to the ongoing realities of water insecurity experienced by marginalized communities and concomitant effects on social life. The experiences of the urban poor in Ghana are evident in metropolises throughout the continent.

Over the last three decades, Zimbabwe has been in the throes of economic collapse and the resultant breakdown of social services. One distinct marker of this deterioration has been the worsening provision of water and sanitation services in Zimbabwe’s urban centers. Mucha Musemwa, in “Urban Struggles over Water Scarcity in Harare,” examines how urban residents in Harare have had to contend with water shortages dating back to the colonial era, but which manifest in increasingly acute forms today. This scarcity is situated in a region with relatively good rainfall. Since independence in 1980, the ruling Zimbabwe African National Union–Patriotic Front (ZANU-PF) party has regularly blamed the perennial contemporary water crises on the economic sanctions imposed on Zimbabwe and on twenty-first-century global warming. By contrast, Musemwa documents that scarcity lies in the environmental, historical, and structural injustices occasioned by colonial segregationist architects of the Rhodesian settler society in the late nineteenth and twentieth centuries, as well as the woeful governance track record by the postcolonial ZANU-PF state. As water shortages have increased, inequalities between residents have deepened and struggles between urban residents and

gies for mitigating future shortages. Bender contends that in much of the country, users have long developed creative strategies for managing periodic scarcity. In addition to technologies like irrigation canals, boreholes, and cisterns, they have also adopted practices such as multiple sourcing. This is true for urban spaces as well, like the fast-growing metropolis of Dar es Salaam, where the lack of reliable, affordable, public water has encouraged users to rely on their own ingenuity for water provision. Bender's essay indicates the potential for these strategies to inform present and future water planning, and to address impending water scarcity due to climate change. In the process, it also challenges the divide between rural and urban that has long shaped water planning.

In her comparative essay on water scarcity and health in urban Africa, Julie Livingston demonstrates that water is the cornerstone of public health. She, like Bender and Musemwa, reveals that many of Africa's largest cities have unreliable water supplies and this shortage is escalating as a result of the urban boom. Clean water is essential for healthy food preparation but urban residents often have no alternative but to consume contaminated water, which causes recurring illnesses and heightened morbidity. Many postcolonial governments have made efforts to improve access to potable water the cornerstone of their public health policies. Nevertheless, a wide array of waterborne illnesses persist, including cholera and typhoid. They disproportionately affect the most vulnerable urban residents: babies, the elderly, and the destitute. The commodification of water has simply highlighted the sharp economic divides between those who can purchase bottled water and those who cannot.

The spread of debilitating, and sometimes deadly, waterborne diseases has been further exacerbated by the dam revolution throughout the African continent. The mammoth Aswan Dam and the integrated system of irrigation canals constructed to promote cotton cultivation and year-round agriculture are cases in point. In her essay on parasitic diseases, "The Dammed Body: Thinking Historically about Water Security & Public Health," Jennifer Derr documents how the building of Egypt's Aswan Dam in 1902 precipitated a dramatic increase of schistosomiasis. Based on household studies, researchers estimate that approximately 60 percent of peasants who farm adjacent to the canals came to suffer from the disease. The canals proved to be the ideal habitat for the tiny freshwater snails that carried the parasites. In addition, cultivators were also infected with hookworm in large numbers, as a result of the increase in the moisture level of the soil. The dam had other indirect effects on the health of the riverine population. As diets shifted toward corn as their basic foodstuff, because its growing cycle mimicked that of cotton, many suffered from pellagra, which results from an overreliance on the grain.

In his essay "Ghana's Akosombo Dam, Volta Lake Fisheries & Climate Change," Stephan Miescher shifts the angle of vision to the countryside to ex-

plore the effects of the Akosombo Dam and the recently completed Pwalugu Dam on water use and water security for people living along the Lower Volta River. In the 1950s and 1960s, the promoters of Ghana's first dams, Akosombo and Kpong, emphasized the need for generating electricity to modernize and industrialize the new nation.<sup>50</sup> The planners of the Pwalugu Dam have embraced a different rhetoric of water management under increasingly difficult circumstances. Due to climate change, the northeast and upper-east regions, where Pwalugu is located, have endured droughts that have devastated local agriculture. The new dams will enable the establishment of an irrigation scheme covering an area of 24,000 hectares to produce rice and maize as well as provide water supply during the dry season, while also offering flood control.

The massive Cahora Bassa hydroelectric project was completed on the Mozambican stretch of the Zambezi River in 1974, the year before the end of Portuguese rule. Allen Isaacman in "Cahora Bassa Dam & the Delusion of Development" documents how from its inception, the hydroelectric project, designed to provide cheap energy to apartheid South Africa, had a catastrophic effect on the lives of the approximately half-million people who depended on the river and its delta for their livelihood and for the tens of thousands who were forcibly relocated when the dam's lake was created. Despite the traumatic history of Cahora Bassa, the postcolonial government is committed to a colonial-era plan to build a second dam approximately 60 kilometers downriver from the first one. In many respects, Mphanda Nkuwa, as the dam project is called, looks like a replay of the colonial past. The postcolonial state of Mozambique justifies the dam in language largely unchanged from the days of Portuguese rule. The overarching economic imperative driving the dam is the same: cheap energy for South Africa. According to environmentalists, Mphanda Nkuwa is being pushed through without proper impact studies. And as with Cahora Bassa, decisions on Mphanda Nkuwa have generally occurred behind closed doors. Impacted communities have had little meaningful say in what is to befall them. The Mozambican government has deferred the start-up date for the new project, depending on external funding most likely from China and a commitment from the South African government to purchase the bulk of the electricity. In the process, farmers living near the proposed dam site have been in suspended animation for nearly two decades as the state periodically pursues these negotiations.<sup>51</sup>

Mozambique is not the only African state seemingly wedded to grandiose visions of hydrodevelopment: the Nile Basin is not only home to Egypt but also to Sudan and Ethiopia, which have launched ambitious dam programs of their own. For decades, Ethiopia has been coined by natural scientists and its own bureaucracy as "Africa's water tower" because of the extraordinary levels of rainfall that land on its northern, central, and southern highlands. Harry Verhoeven's essay, "The Grand Ethiopian Renaissance Dam: Africa's Water Tower, Environmen-

tal Justice & Infrastructural Power,” analyzes the Grand Ethiopian Renaissance Dam (GERD), which since the start of the project in 2011 has escalated tensions in Northeast Africa and challenged Egypt’s historical hegemonic position in the basin. The GERD was and is intended to help expand the reach of the Ethiopian state, domestically and internationally: its reservoir is not only supposed to hold record quantities of water, but it is also intended to help provide the foreign currency necessary to help the nation industrialize and for the state to deliver public services to Africa’s second-largest population. Yet, as so often is the case with mega-projects, the GERD has been politically disruptive not only to riparian neighbors such as Egypt, but it has also altered the balance of power in Addis Ababa itself. Verhoeven explores how the project has intensified internal conflict among the ruling party leadership and fanned ethno-regional differences between the winners and losers of economic development. The project that was supposed to bring all Ethiopians together under a nationalist banner of environmental justice has been weaponized by elites jockeying for power in ways that threaten the survival of Ethiopia.

The stakes of the nexus between domestic state-building and redrawing international relations are not as existential and prone to violent escalation in Southern Africa, but they are nonetheless crucial to questions of human security and political influence. The Lesotho Highlands Water Project transfers water to South Africa under prescribed terms set out in the project’s treaty. Climate change has, however, adversely affected water resources in Lesotho, thereby threatening water transfer to South Africa. Oscar Mwangi’s essay, “Hydropolitics versus Human Security: Implications of South Africa’s Appropriation of Lesotho’s Highlands Water,” examines the relationship between climate change, hydropolitics, and water security in the context of South Africa’s appropriation of Lesotho’s water. Using securitization theory as a framework, Mwangi argues that climate change and its impacts upon water in Lesotho are real but that the country’s political elite has sought to instrumentalize the specter of environmental hazards to enforce the unpopular commodification of water. So-called existential threats are constructed on the basis of diplomacy rather than domestic socioenvironmental concerns.

Whether in the reform of South Africa’s water laws or in the work of the World Commission on Dams or through the declarations of the World Water Congress—such as the Melbourne Declaration in 2000—governments, nongovernmental organizations, and social movements have repeatedly constructed sets of principles designed to frame the governance of water resources. Beginning with the creation of the “Water Law Principles,” issued by the Department of Water Affairs and Forestry as the Mandela government’s first step to water law reform in post-apartheid South Africa, and continuing with the work of the World Commission on Dams and subsequent international declarations, Heinz Klug, in “Between Principles & Power: Water Law Principles & the Governance of Water in Post-Apart-



“business as usual” approach, perhaps through a lack of awareness of what is now possible in terms of new kinds of information. They may still see the environment as a commodity to be used at will, rather than as our essential support system that is increasingly and ever more rapidly degrading. The new call to “leave no one behind” is not working. We need to move from a mindset of entitlement and exploitation to one of respect, equity, and balance.

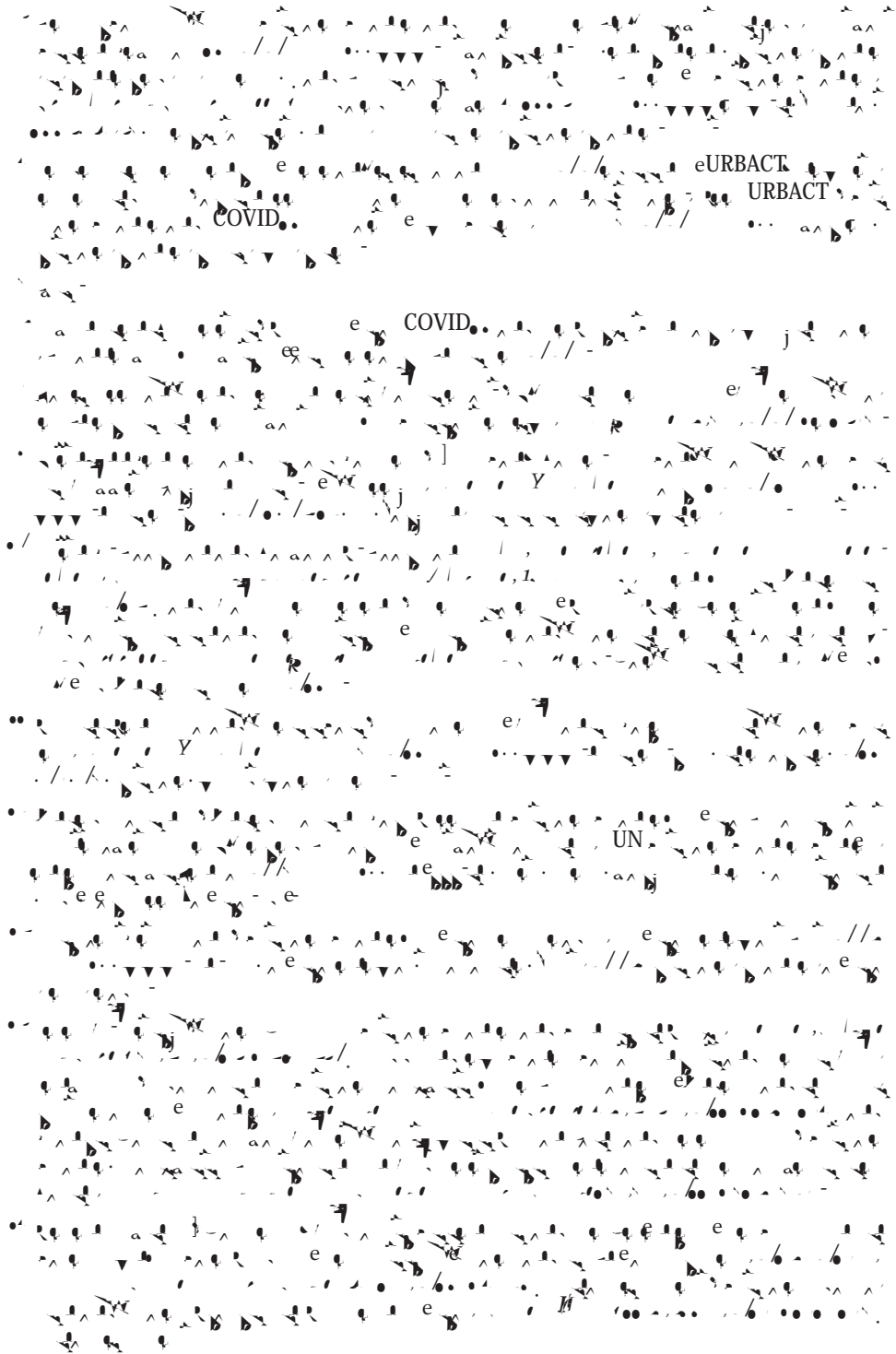
New thinking is emerging, encapsulated in “the ecosystem approach” or “nature-based solutions.” Such an approach requires that the management of human needs be based on a deep understanding of the natural resources being exploited. Specialists such as river ecologists and resource economists are bringing new thinking and methods into water planning and management, and properly costing out water developments alongside the benefits presented by developers and funders. This is not to halt development but to help governments make more informed and balanced decisions, and to empower all stakeholders to better understand what the future could hold and negotiate for the future they want.

In his conclusion to this issue of *Water*, Harry Verhoeven, in “Climate & Water in a Changing Africa: Uncertainty, Adaptation & the Social Construction of Fragile Environments,” reflects on not only a changing climate and changing understandings of water security, but also on an Africa in transformation: how do its evolving political structures, economic networks, and social compacts influence its relationship to the environment, locally and globally? Synthesizing the key insights from the essays in this collection with his own analysis, Verhoeven argues that the dominant thinking about climate change and water security continues to be simplistically preoccupied with ideas of Africa as a victim of exogenous (and nefarious) transformation. This bypasses the long track record of many of Africa’s populations dynamically adapting to extremely difficult circumstances and various African imaginaries of what climate and water security entail. It also fails to think through questions of political participation and social contestation, including the troubling ways in which African forms of knowledge about the environment have historically been marginalized and the contin(ve 5069 4uued and (pota)1 (7Td [(sr9

This collection of essays is by no means an exhaustive treatment of the important subject of water security and water in Africa in the age of climate change. All the contributions focus on local lived social, ecological, and economic realities, as well as domains of power in several countries on the African continent. The constraints of space have made it impossible for us to explore related topics such as the state of Africa's forests, the economics and politics of desalination, and the so-called blue economy.<sup>54</sup> But it is our earnest hope that the topics and debates

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The image displays a complex musical score consisting of approximately 15 staves of notation. The notation is highly detailed, featuring a variety of note values, rests, and articulation marks. Several letters are interspersed throughout the score, including 'e', 'j', and 'y', which likely represent specific rhythmic values or performance instructions. The score is written in a standard musical notation style, with a key signature of one flat and a time signature of 6/8. The overall appearance is that of a professional manuscript or a high-quality typeset score.

