Ghana's Akosombo Dam, Volta Lake Fisheries & Climate Change

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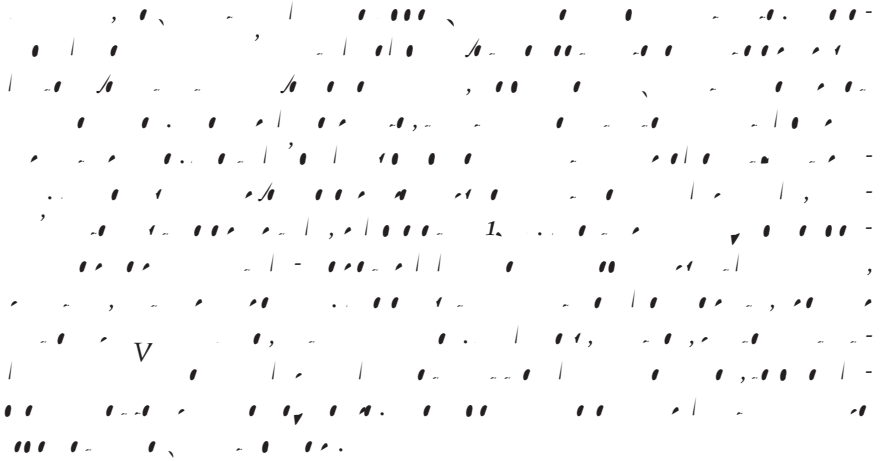

Over the last fifteen years, as several contributions to this issue of / note, Africa has experienced a resurgence of dam-building, with several major projects under construction or nearing completion.[1] In Ghana, the Bui Dam across the Black Volta was finished in 2013.[2] The Pwalugu Dam on the White Volta is in the final planning stage with construction by Sinohydro soon to begin. In the 1950s and 1960s, the promoters of Ghana's first dams emphasized the need for generating electricity to modernize and industrialize the new nation. The planners of the Pwalugu Dam have embraced a different rhetoric. Water issues have moved to the foreground. Due to climate change, the Northeast and Upper East Regions, where Pwalugu is located, have endured droughts with a devastating impact on local agriculture.[3]

At a stakeholder meeting in 2019, the Volta River Authority (VRA) promised that Pwalugu would address water security. Its primary purpose would be an irrigation scheme covering an area of 24,000 hectares that would produce rice and maize as well as provide a water supply during the dry season and flood control. Since Burkina Faso built the Bagre Dam upstream on the White Volta in 1992, spilling during the rainy season has caused devastation to riverine communities. Elec-

tricity generation at Pwalugu, through a hydroelectric plant with an installed capacity of 60 megawatts and a related 40-megawatt solar project, would be secondary. Pwalugu's reservoir, the stakeholders learned, would be small, only 135 square miles. Still, with a nod to a global discussion, VRA officers emphasized that Pwalugu would increase the generation of renewable energy capacity and thus enhance Ghana's commitment to the United Nations Convention on Climate Change.[4] At the sod-cutting ceremony in November 2019, President Nana Akufo-Addo foregrounded water security. He stated that the dam would "avert the perennial flooding caused by the spillage of the Bagre Dam." The large irrigation project, which should benefit fifteen thousand farmers, would mean a change from the northern regions' current agricultural pattern, in which farm work comes to a halt during the dry season. "Irrigation," the president added, "remains a key strategy to achieve food security, the eradication of poverty and generation of rural employment." The president emphasized the potential for aquaculture (fish farming) in the Pwalugu reservoir. He reminded his audience that the older hydroelectric dams, Akosombo and Kpong, were planned with irrigation schemes that did not materialize. The story of Pwalugu "[would] be different."[5] The president said nothing about displacement and other social impacts of the dam. According to recent media reports, 4,200 people would be displaced by the Pwalugu multipurpose dam.[6]

This essay historicizes concerns about water use and climate change in connection with the Pwalugu Dam by revisiting the Akosombo Dam, Ghana's first and largest hydroelectric scheme that was completed as part of the Volta River Project in 1965, with an installed capacity of (now) 1,000 megawatts. Akosombo created a vast reservoir, Volta Lake, which covers, when full, an area of 3,275 square miles and extends 250 miles to the north. The lake not only transformed the Volta Basin's ecology but displaced eighty thousand people and created new inland fisheries. What were the social and ecological impacts of this large dam project, both upstream and downstream? How did the communities impacted by the dam experience these changes? What have been the conceptions of water usage and climate change since the 1960s, and how have they impacted public discourse and policies?

The planners of the Volta River Project produced detailed studies about the dam's ecological and social impacts in the Volta Basin where the flooding would occur and in the Lower Volta, the downstream area that would be severely affected by the river's changed flow pattern. When the project was implemented in the early 1960s, these concerns were tossed aside. This discussion juxtaposes personal recollections of dam-impacted communities with reports by administrators, biologists, social scientists, and other experts. The essay draws on the VRA archive, scientific studies about Volta Lake, and oral histories. Ultimately, it argues, the builders and administrators of the Akosombo Dam failed to address most wa-

ter issues, despite ample knowledge about their existence. One hopes that these shortcomings will not be repeated in the Pwalugu project.

The Volta River Project, which straddles the colonial and postcolonial divide, was at the center of agendas concerning modernization, develop-

In the mid-1950s, about one thousand Tongu fishers operated in the area from the dam site to the heads of the future lake. They were part of a migratory economy that connected the Lower Volta with the upper parts of the river and its tributaries. Upstream economic activities "were an integral part of livelihoods in the

increase, possibly through lake transport, since its carrier, the tsetse fly, was more common in the north. It suggested clearing vegetation at major landing sites and inoculating fishers and boatmen. Onchocerciasis, transmitted through the bite of the blackfly, was widespread above and below the dam site. Damming the Volta would flood the blackfly's breeding grounds in the inundated area. During construction, spraying with DDT was expected to protect workers from onchocerciasis. Urinary schistosomiasis, a chronic disease, was widespread in the Volta delta and upstream from the future dam, with a high infection rate among migrant fishermen. The commission anticipated that the lake would become infested with its vector snail and proposed a Lakeside Health Section within the VRA to study these diseases. While the Volta project would cover the cost of health and sanitation issues caused by the formation of the lake, it would not cover the health of migrants settling on the lakeside for economic reasons. Their needs remained the responsibility of the government; the VRA would merely provide technical information and act as paid agent for control measures.[20]

The Preparatory Commission endorsed the Volta River Project. Following Ghana's independence in 1957, Aluminium Limited of Canada, the main corporate sponsor, withdrew. But the Cold War came to the project's rescue. The U.S. government saw in the Volta scheme an opportunity to assert its influence in Africa. In 1958, President Dwight Eisenhower and Prime Minister Nkrumah agreed to update the engineering reports and explore the potential of private U.S. funding. The following year, Kaiser Engineers proposed a more modest and cheaper version of the project. The Kaiser report suggested a larger dam at Akosombo, an aluminum smelter that merely refined imported alumina at Tema, and a five-hundred-mile transmission grid to connect cities and mines of southern Ghana with Akosombo. The report deferred the production of alumina from Ghana's bauxite, thus suspending the original plan for an integrated aluminum industry. Kaiser Engineers, eager to cut costs, ignored the dam-impacted communities. In late 1961, after prolonged negotiations with Kaiser Aluminum, which would operate the future smelter, the World Bank, the United States, and the United Kingdom, Nkrumah finally secured the funding for the Volta River Project.[21]

Dam construction began in 1961 before concrete steps toward resettlement were undertaken. The VRA, the state agency established to build the Akosombo Dam, became responsible for resettlement. The planners, abandoning the Preparatory Commission's call for self-help, developed strategies of how to "improve" the lifestyles of the dam-affected people. In 1963, Nkrumah assured the National Assembly that people's relocation would provide them "with new villages with better communal facilities and better farming methods."[22] The ,, -¥ ,,,/, , the blueprint for the country's modernization, considered resettlement "an exercise in positive economic development" to trans-

form "the lives of the people involved."[23] The government would introduce new forms of farming and fishing. Resettlement would contribute to Ghana's anticipated transition from tradition toward modernity. By 1963, the VRA had launched the construction of fifty-two townships designed to propel the "backward" dwellers from 739 villages into modernity. The resettlement towns were seen as "bridgeheads of modernisation in a sea of rural backwardness and underdevelopment."[24]

Most experts considered the evacuation, as well as the planning and construction of the fifty-two resettlement towns in such a short period, a tremendous achievement.[25]

son." After receiving her bachelor's degree in zoology from the University of Birmingham in 1952, Obeng taught at the University College of Science and Technology in Kumasi. She obtained a master's degree from Birmingham in 1961 and then a Ph.D. from the University of Liverpool in 1964. For her dissertation, she studied the blackflies that transmit the parasitic worm that causes onchocerciasis. She returned to Ghana just as Volta Lake was forming and looked for opportunities to study the new lake. Aquatic research was then a marginal scientific endeavor. Receiving support from Nkrumah, who was always curious about the latest trends in science, Obeng founded the Institute of Aquatic Biology in 1965.[41]

The Institute of Aquatic Biology was built on the findings of the Preparatory Commission. The fast pace of dam construction had made it difficult to pursue most of the enquiries the commission had suggested.[42] Obeng's scientific agenda received a big boost in 1968, when the VRA launched the Volta Lake Research

tists admitted that precise knowledge of fish stock in such a large lake remained "unattainable." What they offered were mere estimates and guidelines for management decisions.[49] Their estimates were based on statistical extrapolation from landed catches at major marketing centers.

When the water began to rise in 1964, Tongu communities did not return to the Lower Volta as the Preparatory Commission had anticipated but stayed on the lake. The VRA had provided limited housing in resettlement towns for about 1,200 fishers and their families. Most fishers were not interested. In Amate, Tongu fishers never took possession of their allocated "core houses." Instead, they moved to the lakeside and established the village of Nketepa, which quickly became a market center.[50] Without state guidance, many Tongu fishermen migrated from the Lower Volta to the lakeshore. What for some had been an annual migration took an increasingly permanent form. One study, carried out in 1969–1970, located 950 fishing villages and estimated that about 20,000 fishers with 12,500 canoes were operating on the lake. Around 60,000 people were living in these fishing communities. Most of these villages were only accessible by water and had no government services such as schools, post offices, or clinics. The male population exceeded the female population, and few people were above fifty years old.[51]

By 1970, Tongus still dominated the fishing communities, although some fishers were Anlo Ewes and Dangmes from Ada and Ningo. A typical fishing unit consisted of a master fisher ( ) who owned his flat-bottomed canoe of about six to nine meters in length. Half of the fishers had a junior assistant ( ) to bail water. Most fishers possessed over a dozen multifilament nylon gill nets. To set these nets, they tied the head rope between the branches of two submerged trees. The lack of tree clearing on the lake prohibited fishing with moving gear. During the main season, when the rains brought turbid water, an left with his

ploy [illegible] year-round and apprentice them in the art of fishing. Since the latter's profit share would increase, he could acquire his own gear sooner. Higher catches would make the use of larger boats and outboard motors more economic. In the mid-1970s, the Volta Lake Research and Development Project launched a program introducing monofilament nets.[53] Fishing communities, however, did not evolve in such linear fashion as anticipated. Rather, the changing lake conditions demanded a complicated adjustment of livelihood strategies with profound gendered implications.

Tsikata conducted extensive research in three fishing communities across the southern part of Volta Lake. Initially, the first wave of Tongu migrants focused on fishing, fish processing, and trading. They exchanged fish for foodstuff with their hosts. After a few years, when they experienced food shortages, they adopted drawdown agriculture on the banks of the lake. Once this area was no longer sufficient, they expanded their farms on higher ground with rain-fed agriculture. This changed the relationships with their host communities, as Tsikata has noted, "transforming many migrants from independent fishermen into tenant farmers." With the decline of fish stock in the 1980s, the original Tongu migrants and their children turned to farming and rearing of cattle, goat, and sheep. Women shifted to farming and trading for their livelihood. Men who mainly fished moved to the lake's more remote parts with larger stock.[54]

The second wave of migrants from coastal areas had the technology and experience to operate more successfully on the open lake. The Dangme fishing company proved to be a suitable work unit. Each company consisted of a male head who owned fishing equipment and a boat, adult male fishing assistants hired on contract, children doing related work like net fixing, and women responsible for fish processing. Such companies could purchase outboard motors that increased their

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cent by 1968 for children aged four to sixteen in Asuboni and in the resettlement towns of Amate and Mpam.[61] A VLRP survey of 140 villages mapped the prevalence of urinary schistosomiasis, with infection rates between 75 and 100 percent in the Pampram, Afram, and Sene arms and around Yeji. This study remained unpublished; the VRA was reluctant to make the problem known.[62]

The other major health concern was onchocerciasis, or river blindness. As

ed for schistosomiasis.[66] The VRA commissioned the boat , in 1990 to deliver free medical service and public health education to fishing communities and other lakeshore dwellers. Every year, the visited between seventeen and eighty-six lakeside villages.[67] Yet these efforts remained merely palliative, since the disease cycle of schistosomiasis had not been broken. That would require not only treating human carriers, controlling weed and vector snails, and limiting people's contact with lake water but changing people's sanitary habits by providing them with urinals, latrines, and clean water.[68] It is a high bar but one that could be achieved. Education outreach and proper sanitary facilities could stop the disease. Although snails will always live in the water and people will continue having contact with the lake, radically reducing the numbers of parasites would bring real change.[69]

The damming of the Volta River at Akosombo had a fundamental impact on Ghana. Downstream, with the end of the annual floods, water disappeared from the Lower Volta. The drying up of small streams and ponds resulted in migration and transformed livelihoods. Upstream, the formation of a massive lake displaced eighty thousand people in the Volta Basin. The VRA launched a resettlement program that sought to provide housing in fifty-two townships with modern amenities for the displaced people. The outcome was different from what the planners had promised. Water pumps broke down, land clearing for settler agriculture remained insufficient, and irrigation projects like the one at Amate were short lived. Unable to make a living, many residents abandoned the resettlement towns. The anticipated modernization did not happen.

This essay has tracked Volta Lake's ecologies and fisheries since the closing of the Akosombo Dam in 1964. Although the Preparatory Commission had extensively studied the project's impact on the flood basin and the Lower Volta, the commission failed to anticipate many consequences. The swift migration of Tongu fishers to the lakeside, followed by Fantes, Anlos, and Dangmes, unfolded without state guidance. Fish-stocking was unnecessary. Instead, fishers adapted to the lake's changing ecology and adjusted their livelihoods. They established their own settlements with no or limited state services. Lakeside communities had to live with waterborne diseases.

Since the early 1960s, Ghanaian scientists have explored the ecology of Volta Lake. With funding and support from intergovernmental agencies, they turned Volta Lake into one of the best-studied man-made lakes in the Global South. By the late 1970s, this knowledge production slowed to a trickle. Two decades later, when funding resumed, the scholarly and political context had changed. While experts had earlier suggested policies to expand the lakes' fisheries, the focus had shifted to stock management. Concerns about overfishing and sustainability moved to the foreground.[70]

Drought has become a recurrent issue for Volta Lake. Ghana experienced the first of several energy crises in 1983. They were the result of climate change that brought declining rainfall in the Volta Basin, the catchment areas of Volta Lake, which drains the Black and White Volta and Oti Rivers systems in northern Ghana, Burkina Faso, Togo, and Benin. Rising temperatures produced higher evaporation. Poor rainfall and increased evaporation resulted in lower water levels and a reduction of power generation at Akosombo.[71] Electricity shortages challenged the notion of Akosombo as a secure power supply. The planners had not foreseen such a situation. They were more concerned with future floods as they had experienced them during the dam's construction. Kaiser Engineers designed the Akosombo Dam with twelve floodgates.[72] What are the future projections? A recent study analyzing global climate models predicts that the Volta Basin will become warmer and slightly wetter during 2011 to 2040 compared to 1981 to 2010. Some areas, however, will become warmer and dryer during the same period, and warmer temperatures will mean more evaporation.[73]

Over the last decade, Ghanaian scientists, government officials, and local stakeholders have addressed some of the adverse issues of hydroelectric dams. They conducted a study to re-optimize the operations of Akosombo and Kpong for the Lower Volta. The proposal sought to re-create seasonal floods by operating the dams in a way that mimics natural flow regimes. During the rainy season's peak inflows, dam operators would significantly increase hydropower generation. Higher outflow from Volta Lake would replenish streams and ponds in the Lower Volta and wash out aquatic weeds. Yet re-operation would require expensive investments in alternative power supplies and transmission capacity. Moreover, downstream communities have adjusted to the postdam regime over the last fifty years. Since they experienced the negative impacts of the VRA spilling large quantities of water at Akosombo in 2011, they are now "reluctant to accept and adapt to the restoration flows." Instead, the study recommended alternative forms of weed control and increased irrigation that would enable lucrative dry-season vegetable farming to improve livelihoods.[74]

It is encouraging that these discussions about mitigating dams' water challenges are taking place in Ghana. One hopes that such insights with attention to impacted communities will be considered during the building of the Pwalugu project, and that the shortcomings of Akosombo will not be repeated.

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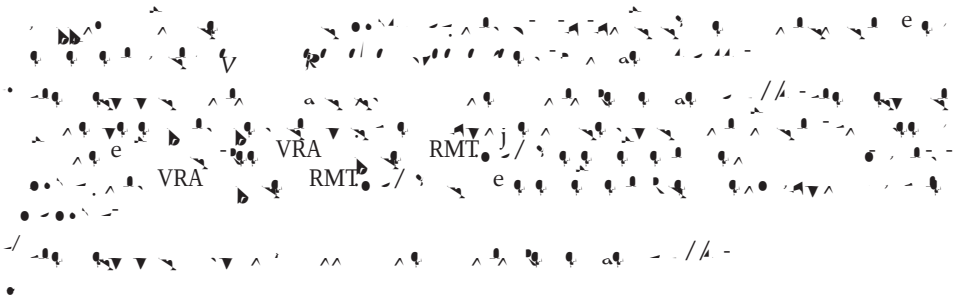
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