

Ghana's Bui Dam and the Contestation over Hydro Power in Africa

Roger Gocking 

Abstract: The negative environmental and social consequences of the major era of hydroelectric dam building in the 1950s and 60s generated social and political opposition to similar projects by the 1990s. In Ghana, hydroelectricity's dependence on unpredictable rainfall also undermined the attractiveness of this source of electricity. The Bui Dam, Ghana's third hydroelectric dam, faced considerable opposition until 2006, when the Chinese government loaned money for its construction. Gocking details how Chinese companies with similar funding, and constructing infrastructure projects in general in Africa, have contributed to a second era of major dam building in that continent, although there still remains considerable contestation.

Résumé: Les conséquences environnementales et sociales négatives de la grande époque de la construction de barrages hydroélectriques dans les années 1950 et 60 ont suscité une opposition sociale et politique à des projets similaires dans les années 90. Au Ghana, la dépendance hydroélectrique en fonction des précipitations imprévisibles a également érodé l'attrait de cette source d'électricité. Le barrage de Bui, troisième barrage hydroélectrique du Ghana, a fait face à une opposition considérable jusqu'en 2006, lorsque le gouvernement chinois a prêté de l'argent pour sa construction. Gocking explique comment des entreprises chinoises bénéficiant de financements similaires et construisant des projets d'infrastructure en général en Afrique, ont contribué à une deuxième ère de construction de grands barrages sur ce continent, bien qu'il subsiste encore une contestation considérable.

Resumo: As consequências negativas da grande era de construção de barragens hidroelétricas, nas décadas de 1950 e 1960, deu origem à emergência de uma

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oposição social e política a projetos deste tipo na década de 1990. No Gana, o facto de a hidroeletricidade depender da pluviosidade, sempre imprevisível, contribuiu igualmente para que esta fonte de eletricidade perdesse atratividade. O projeto da barragem de Bui, a terceira maior do Gana, enfrentou forte contestação até 2006, altura em que o governo chinês concedeu um empréstimo para a sua construção. Gocking analisa em pormenor o modo como as empresas chinesas e respetivo sistema de financiamento – bem como, mais genericamente, os projetos de construção de infraestruturas em África –, têm contribuído para encetar uma segunda grande era de construção de barragens no continente, apesar de ainda se verificar contestação significativa.

Keywords: hydroelectric dams; environmental opposition; population displacement; Chinese construction companies; sustainability

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On November 19, 2013, President John Mahama commissioned Ghana's third hydroelectric facility, the 400MW Bui Dam, which along with the Akosombo and Kpong Dams brought the country's hydroelectric generation to 1,580MW, about 54 percent of its total installed electricity generating capacity. The construction of the Bui Dam, which began in 2008, belongs to what can be seen as a second phase of large dam construction in Africa. It is an excellent case study for understanding how much more contested such projects have now become in contrast to the early years of independence. At that time, African leaders, academic experts, and funding agencies were convinced that mega-dams such as Kariba on the Zambezi (1959), Akosombo on the Volta (1965), and Aswan on the Nile (1970) were "potent symbols of the promises of modernity" and "a guaranteed path to rapid industrialization and electrification" (Miescher & Tsikata 2009–2010:16–17). Governments and developmental agencies were willing to fund such projects. The World Bank helped finance the construction of the Kariba Dam, and did likewise for Akosombo, along with contributions from the governments of the United States and the United Kingdom, while the Soviet Union was the primary source of funding for the Aswan High Dam. President Nkrumah of Ghana was able to take advantage of the rivalry between the United States and the Soviet Union to convince the latter to construct a Bui Dam. Preliminary work on the project had already begun before the Ghanaian military removed Nkrumah from office in 1966 and expelled the Russians when the country turned toward the West.

In the 1970s, there were several attempts to reactivate the Bui project, but it was hard to justify, as Ghana was then selling its surplus electricity to Togo and Benin.¹ Serious power shortages in the 1980s changed the situation, but hydroelectric power's erratic performance in years of drought encouraged the Ghana government to opt for a thermal power plant instead of another hydroelectric facility. In 1996, the year before the 110MW plant at Aboadze

came on line, Ghana had experienced yet another dry year for Akosombo, and diversifying the sources of the country's electricity did indeed seem like a wise decision. Nevertheless, Ghana still needed to import power from the Ivory Coast. More troubling still was the soaring cost of the fuel oil that the plant required. In 1997, the electricity the plant produced was four times the cost of that of Akosombo and Kpong (*West Africa* July 28, 1997).²

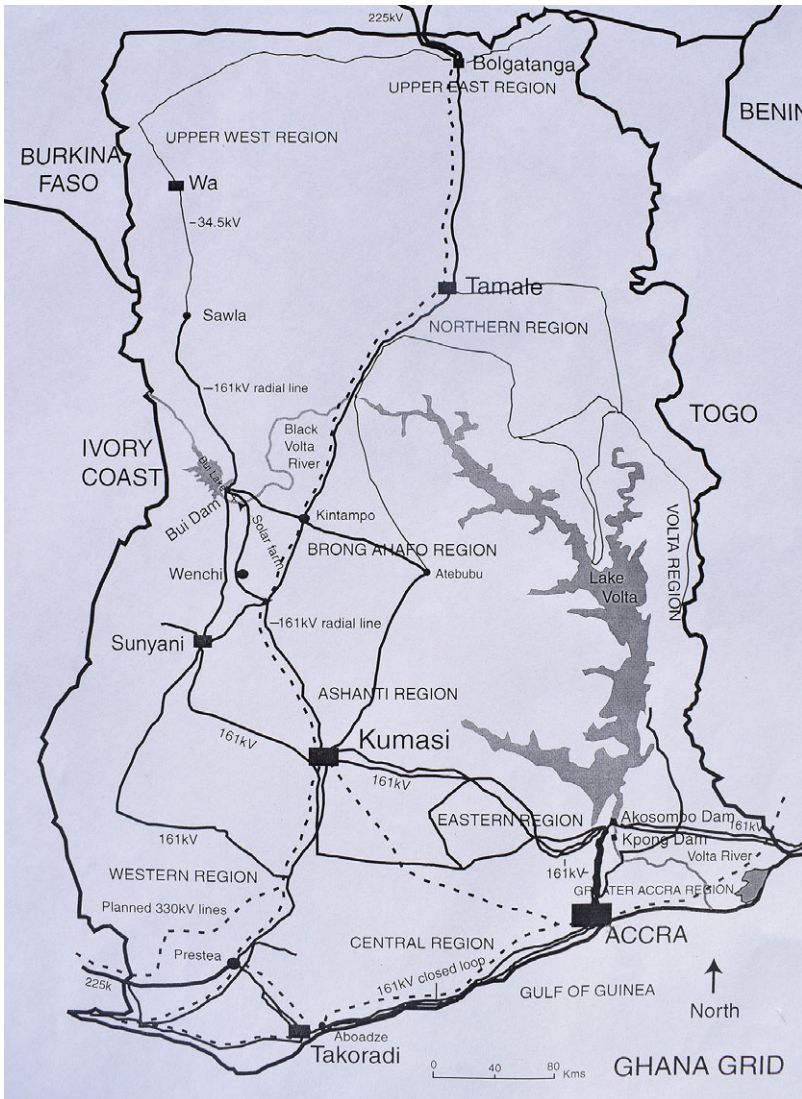
The result was that the Bui Dam project still retained considerable attractiveness, and in 1998 the National Democratic Congress (NDC) government of Ghana "set up the Bui Development Committee along with a Bui Development Secretariat to look for suitable candidates for development of the Bui Project" (Hensengerth 2011:9). However, in 2001 the NDC government canceled the agreement "for reasons that remain unclear" but were associated with cost and funding (Hensengerth 2011:10). For a short while, after the New Patriotic Party (NPP) government came to power in 2001, the consensus was that it would be less expensive to opt for thermal power. The proposed West African Gas Pipeline from Nigeria promised gas from the Nigerian oilfields that would make thermal power an attractive option. However, it was not until 2008 that this pipeline was due to come into operation, and there were those in Ghana who did not like the idea of the country being dependent for something as important as its energy sources on the good will of Nigeria. In early 2003, the NPP government set up a new Bui Development Committee, but there was initially little response, as only one company submitted a bid (Hensengerth 2011:10). It was so unpromising that Benzet Yao Vivor, writing in the *Daily Graphic*, hoped that the "euphoria generated in the immediately preceding years had not been left to fizzle out" (May 10, 2004).

Funding the construction of the Bui Dam was not solely a challenge for Ghana. The negative environmental and social side effects of these mega-projects had produced a reaction against all such dam building, and in the 1980s an international anti-dam movement emerged. In the 1990s, the opposition crystallized around the Sardar Sarovar Dam in the Indian state of Gujarat, primarily because of the massive population displacement this project required (Global Nonviolent Action Database 2010). It was so damaging to the reputation of the World Bank, the major funder of such projects in the developing world, that it prompted the institution's withdrawal from financing all "big, bad infrastructure and to invest in small, beautiful and soft solutions" (Briscoe 2010a:56). Not surprisingly, "bank lending for hydro-power fell by 90 percent in the 1990s" (Briscoe 2010b:403). Up until the 1990s, "big dams had always been built with government and development agency money...but shrinking budgets and pressure from anti-dam campaigns were drying up this previously plentiful source" (McCully 2001b:1461). Attracting private investors to build big dams had become extremely difficult, as they had "had appalling records of time and cost overruns and...hydrologists had systematically underestimated the impacts of droughts on hydropower production" (McCully 2001b:1462).

The construction of the Bui Dam is an important case study for investigating this new anti-dam reality and also the push-back response from dam

proponents. Apart from the challenge of obtaining funding for its construction, as with most dams, there was going to be significant population displacement. The proposed flooded area was small in comparison to the Volta Lake that had formed behind the Akosombo Dam: 444 square kilometers for the Bui Dam as opposed to 8,502 for Akosombo. The vast difference in size is graphically indicated on the Ghana Grid map (see Figure 1). However, it was

Figure 1. The map graphically underscores how small the footprint of the Bui Dam is in contrast to that of Akosombo. The transmission lines show how much the Ghana grid favors the south rather than the north.



going to inundate about 21 percent of the Bui National Park where the dam was going to be constructed. Much of the affected area was savanna woodland and grassland, but along the banks of the river there was a small strip of riverine gallery forest which was the only remaining example of such forest on the Black Volta. It was a unique environment that was rich in flora and fauna. Inevitably, there was going to be opposition from environmentalists. In addition, given the erratic performance of the Akosombo Dam with its susceptibility to drought conditions, the issue of "sustainability" seemed particularly pertinent, since both dams were going to be dependent on the catchment basin of the Volta River.

There had been opposition to the construction of the Akosombo Dam, the most important of which had revolved around its cost and whether the dam would serve Ghana's interests or those of the former metropole, Great Britain (Miescher 2014:346). Opposition to Bui was far more fundamental, as it challenged the "old belief in dams as shining icons of prosperity and modernity" (McCully 2001a:xvi). It also challenged hydroelectricity's potential for mitigating global warming by characterizing dams, especially in the tropics, as major producers of greenhouse gases such as carbon dioxide and methane. At a time when global warming had come to be seen as a "very real and massive threat to human society," anti-dam opponents were able to tar and feather hydropower as "not only socially and environmentally unfriendly but also far from being climate friendly as its proponents alledge[d]" (McCully 2001a:141). Far from being the "temples" of modernity that Indian Prime Minister Jawaharlal Nehru had suggested in 1954, to opponents, dams had become economic white elephants and social and environmental "temples of doom" (McCully 2001a:65).

Silenced Rivers

In the 1980s, the anti-dam movement gave rise to a number of non-governmental organizations (NGOs) that spearheaded dam fighting on a global scale. Undoubtedly the most important was International Rivers (IR) Network that was established in 1985 in Berkeley, California, to "coordinate international campaigns to discourage financial, government and industry support of harmful river projects" (International Rivers n.d.).³ Under the influence of its charismatic campaign director, Patrick McCully, IR rapidly became the most important source of opposition to large-scale dam building. In the 1980s and 90s it bitterly opposed the Lesotho Highlands Water Project (LHWP), which was designed to provide water to South Africa's arid PWV (Pretoria, Witwatersrand, and Vereeniging) commercial and industrial heartland from a series of dams and tunnels constructed in neighboring mountainous Lesotho. IR also opposed the construction of the Bujagali Dam on the Nile River in Uganda when this was proposed in 1994. The PWV's need for water was so great, and South Africa's economic resources were powerful enough to get the water bonds necessary to fund the LHWP. In

contrast, the Ugandan project foundered in no small way because of the environmental objections IR and other NGOs had raised.

This anti-dam opposition played a highly important role in making it difficult to get funding for large hydroelectric power projects, particularly in the Global South. In 1997, as a “response to the growing opposition to large dam projects,” the World Bank and the World Conservation Union established The World Commission on Dams (WCD) “to review the development effectiveness of large dams...and develop internationally acceptable guidelines...for the planning, construction and operation of dams” (World Commission on Dams 2000:xxx). However, rather than legitimizing dam construction, which dam builders thought would be the outcome of the Commission, the “overall tone [of the report was] undoubtedly negative as regards the role of dams, giving a bleak picture of the social, environmental and economic costs, while barely recognizing their benefits” (International Commission on Large Dams et al. 2001:2) According to the authors of the report, “in too many cases an unacceptable and often unnecessary price was paid to secure [dams’] benefits especially in social and environmental terms” (World Commission on Dams 2000:310). For Patrick McCully, “anti-dam activists saw the WCD as a means to further the aims of the international movement against dams by getting a thorough and unbiased review of the actual impacts and performance of dams that would be difficult for dam promoters to ignore or discredit...To adapt Clausewitz’s famous dictum, the WCD was a mere [continuation] of the anti-dam struggle by other means” (McCully 2001b:1470).

The report was a major victory for the anti-dam campaigners. John Briscoe, who at the time when this report was issued was a senior water advisor at the World Bank and who helped to design the WCD, described how the “extreme NGOs were able to dominate the proceedings and drive out industry and governments to the sidelines.” These “professionals” who had “other responsibilities (their jobs!)” than engaging “in such efforts” were no match “for NGOs [for whom] camping out and advocating IS their job” (Briscoe 2010a:57). As an indication of just how much this was so, Briscoe relates the revealing anecdote of watching dam opponents and dam builders alike, at one of the WCD’s meetings, lining up to get their copies of Patrick McCully’s *Silenced Rivers*, an unrelenting attack on dam building, signed by the author himself. Not surprisingly, the enlarged and updated edition of this “truly dazzling book” that came out in 2001 rings with a sense of triumphalism as “the dam industry itself [was] weaker than it was five years [before],” and some of the “biggest names in dam building [had] ceased to exist” (McCully 2001a:xvii).⁴

Reflective of the new climate of opinion regarding dams and influenced by the Akosombo Dam’s unreliable performance during droughts in the recent past, there was local opposition to constructing another dam in Ghana. Dr. Charles Wereko-Brobby, the CEO of the Volta River Authority (VRA), the parastatal that administered the Akosombo Dam, felt that there should be “alternatives like nuclear, thermal or diesel plants as well as solar energy” (*West*

Africa May 18–31, 1998). In 1999, the Ghanaian journalist Mike Anane began attacking the project in *The Independent* (April 22, 1999). Apart from destruction of flora and fauna, even worse, 2,500 people would be forced to move. With the still all-too-painful memory of the less-than-successful relocation of over 80,000 people affected by the flooding of the Akosombo and Kpong dams, this was a highly sensitive issue in Ghana.⁵ Two years later, this opposition took on more of an international dimension when the Ghana government banned the British researcher Daniel Bennett from doing research on the ecology of the Bui National Park. He had been doing this since 1994, but comments on his web site about how the dam would adversely affect the hippopotamus population in the Black Volta, where the dam was to be constructed, made him persona non grata to the Ghanaian government.

IR was also very quickly on the offensive, seeking “urgent action” to prevent “the construction of the Bui Dam.” In a similar fashion to the Akosombo and Kpong dams, “the construction of the Bui-dam...could end as another shortsighted investment project. Power supply from the already established dams [had] been anything but reliable due to long periods of droughts in the sub-region with too little water to power turbines.” It also stressed the “obvious irreparable adverse impact on local people and the environment, and that the World Bank and the European Investment Bank [had] shunned the project.” IR urged “environmentalists” to write letters to Ghana’s President Jerry Rawlings requesting that “investors submit a comprehensive environmental and social impact assessment before starting the construction work” (International Rivers 2000b).

At this time, a combination of local and international opposition was clearly a very real challenge to dam-building plans. Western private industry, upon which such schemes then depended, had become very leery about going forward with such projects. For example, in 2002, the two Scandinavian companies involved in the Bujagali Project, Veidekke and Skanska, pulled “out due to bribery and environmental controversies” (Kasita 2012). If saving unique hippopotamus populations was a rallying cry for opponents of the Bui Dam, saving the Bujagali Falls, which the dam would submerge, elicited an even more impassioned response from those who wanted to save this “Magic on the Nile” (Simon 2002). Only about 2,000 hardy tourists per year were making the fairly challenging trip to see the hippos on the Black Volta in Bui National Park (Interview, Peter Owusu [Ranger, Bui National Park] October 22, 2006). In contrast, over 6,000 people per year were rafting the Nile near Bujagali, and white-water rafting had become the biggest draw for foreign tourists in Uganda. Altogether, tourism was the second largest source of foreign exchange, earning the country over USD90 million in 1996 (International Rivers 2000a). A year after Veidekke and Skanska pulled out of the Bujagali Project, the U.S. company Applied Energy Services (AES), the project sponsor, did likewise and absorbed a loss of USD75 million (International Rivers 2003). It seemed as though concerted action on the part of the anti-dam opponents, who spanned a large spectrum of interests, had been successful in preventing the silencing of the Magic of the Nile.

Big, Bad Dams Return

In such a hostile anti-dam climate, it is easy to understand the Ghana government's overreaction to the fairly minor challenge to the Bui Project that Daniel Bennett posed. Moreover, the effectiveness of this opposition was to be quite short-lived. The rapid increase of African populations at the end of the twentieth century, and especially the dramatic increase in urban areas, had created a demand for electricity that far outstripped supply. Between 1984 and 2004 Accra, Ghana's capital, doubled in size from a little under one million to slightly over two million inhabitants. Kumasi, the second largest city, saw a similarly spectacular growth, going from a population of about half a million in 1984 to around two million by 2010. Increased industrialization and commerce as well as a population that aspired to acquire electrical and electronic appliances inevitably increased the demand for electricity. Like many other African countries, Ghana tried to meet this demand by turning to thermal power plants. Thermal power plants were relatively cheap and quick to build, but if hydroelectric dams were subject to erratic seasonal rainfall, thermal power plants that depended on imported oil were far more expensive to operate, and the price of their fuel was even more unpredictable than water flows, and inevitably increased in cost. In 1998, when Ghana's Aboadze thermal power plant became fully operational, oil was selling at USD11.91 per barrel on the world market but by 2005 the price had risen to USD50.04 (Crude Oil Prices *n.d.*).

This meant that hydroelectric power remained an extremely attractive option. During the first period of large-scale dam building, African countries had tapped into less than 5 percent of the continent's massive hydroelectric potential (Briscoe 2010b:401–2). However, sites for building more of such facilities exist all over the continent in its numerous river basins. This was very much in contrast to thermal power plants, where only some countries are blessed with their own petroleum, natural gas deposits, or coal fields, and instead have to rely on a very volatile world market for supply. Initial costs for hydroelectric facilities are high, and long periods are required for construction, but following this, operating costs are low and, in contrast to thermal plants, their life spans are longer. Their load following capability is also superior, as they can more rapidly be ramped up and down depending on grid needs. In the dawning world of what is known as “distributed generation,” in which intermittent sources of electrical energy, such as wind and solar, will increasingly be part of the energy mix, they are by far the best form of backup power. Also, in contrast to thermal power plants, hydroelectric power has ancillary benefits such as supplying water for residential, commercial, and industrial use as well as for irrigation, providing new means of transportation, expanded fishing industries, and tourism associated with new recreational opportunities.

In the period after the Second World War until the 1980s, Western nations were the major funders for hydroelectric projects in what was then known as the Third World. By the turn of the century, this had begun to

change significantly, as other capital-rich nations began to emerge. The best-known grouping was what came to be known as the BRICS nations: Brazil, Russia, India, and China, with South Africa added later. Western-based NGOs had minimal influence over how these newcomers were willing to invest their capital in development projects. Most were involved in dam-building projects at home and had companies that were capable of undertaking these projects. Significantly, China had retreated from the WCD in 1998 and when its report came out had suggested it would “be more appropriate to change its title to ‘Anti-dams and anti-development.’” To the Indian government “the recommendations and Guidelines of the WCD [were] not acceptable,” and the Brazilian government felt that the Guidelines “would signify, in practice the paralysis in financing of new dams” (Briscoe 2010b:407). At that time, considerable dam building was going on in all three countries with limited funding from Western nations.

The first major indication of how this new funding reality was to affect dam building in Africa came with the construction of the 1,250MW Merowe High Dam at the Fourth Cataract on the Nile River in the Sudan. Funding for this project only became a reality after 1999 when Sudan became an oil exporter, which made it possible to pay back construction loans (Verhoeven 2016:567). In 2004, when construction began, 70 percent of the funding came from Arab states, awash in petrodollars, with the Sudanese government responsible for the rest. In addition, the Chinese government “volunteered” 5 percent of the funding necessary for the transmission lines and substations.⁶ As an important harbinger of what was to come in this new era of “Big, Bad Dams,” the construction company for the dam and its hydromechanical works was the Chinese firm China International Water and Electric Corporation (CWE), which had been involved in building the Three Gorges Dam in the Hubei province of China.

The People's Republic of China was itself in the throes of a major dam-building effort. The massive Three Gorges Dam on the Yangtze River was only the best known of these projects, but since the Communist takeover in 1949, by the turn of the twenty-first century “China had built over 22,000 large dams (over 50 meters in height)” (World Commission on Dams 2000:9). They ran the gamut of dam types from massive gravity dams, arch dams, double curvature arch dams, concrete face rock filled dams, and smaller embankment dams. The state enterprises that built these projects became major corporations in the Chinese economy. With their expertise and funding from state banks they were ideally situated to take advantage of the “going global strategy” the Chinese government initiated in 1999 (Brautigam 2009:74). With the Chinese domestic market nearing saturation, expanding to dam foreign rivers was one important strategy for remaining in business (Xiao Han 2018:93). Dams were a relatively safe investment for the state banks that provided the construction loans, as they could be paid back from the sale of electricity generated even if the dam was poorly maintained, as hydroelectric dams have long functioning lives.

Ghana was well positioned to benefit from China's interest particularly in funding infrastructure projects overseas (Dreher et al. 2018:185). There was a long history of such foreign direct investment between the two countries that went back to the Nkrumah era. More recently, the Rawlings government's support for China after the Tiananmen Square protests in 1989 played an important role in obtaining the funding for the construction of the National Theatre, which the Shanghai Construction Group built in 1992 (Odoom 2015:3). Ghana had stayed in China's good graces by adhering to the latter's One China Policy, and consequently could take advantage of its increased interest in the African Continent at the turn of the century. In 2002, shortly after John Agyekum Kufuor became Ghana's president, he traveled to China and Japan in search of aid for his country. He only got USD30 million for a trunk road project from the Chinese but had much larger projects in mind. It was a reasonable expectation, as in 2004 the Chinese extended a loan of USD2 billion to Angola to help rebuild its war-ravaged infrastructure. In 2006, President Kufuor presented the Bui Dam project "as one of his priority projects" to the Chinese Premier Wen Jiabo when the latter was in Ghana, as part of his seven nation African tour (*Hydro Review* 2006).⁷ At the China Africa Summit later that year, the Chinese President Hu Jintao agreed that China would provide USD562 million to fund the project.

The Chinese government provided Ghana with a concessional loan of USD263.5 million with a fixed interest rate of 2 percent, a grace period of five years, and a maturity period of twenty years. The Export-Import Bank of China provided a buyer's credit of USD298.5 million with a grace period of five years with a twelve-year maturity period, and an interest rate set at a margin of 1.075 percent over the prevailing Commercial Interest Reference Rate.⁸ Unlike the concessional loan, this loan was secured with revenue from the sale of the dam's power and annually 30,000 metric tons of cocoa from Ghana at preferential rates. To make sure that this loan would be fully repaid, the Chinese demanded that electricity from the Bui Dam would sell for not less than 3–4 cents per kWh. The proceeds from the cocoa sales were to be put into an escrow account to help pay off the debt. Finally, the Ghana government contributed USD60 million for a total amount of USD622 million (Hensengerth 2011:37).

This Chinese method of funding has come to be known as an "Angola-mode" arrangement, where the Chinese first made use of this system, in which infrastructure projects are exchanged for partial repayment in resources (Habiyaremye 2013:636). The major advantage of this system is that the Chinese banks involved do not disburse the money to the borrowing government, but it stays in China where it is used to pay the Chinese company/companies doing the construction. This "means that [there is] also a little less opportunity for the kind of wholesale embezzlement sadly common in some resource rich countries" (Brautigam 2009:294). It is unlikely to eliminate all forms of corruption in something as complex as any large construction project in the developing world or elsewhere, but it is significant that Ghana's very lively independent press and continually sparing major parties uncovered very little diversion of funds in Bui's case.

Neither were there the huge cost overruns and extended construction delays that McCully points to as typical in hydroelectric dam construction (McCully 2001a:269). The project eventually required a further USD168 million, which the Chinese provided. According to the project CEO Jabesh Amissah-Arthur, this was due to “unanticipated effects of the 2008 global financial upheavals, as well as unforeseen essential work and an underestimation of the cost of some of the engineering, procurement and construction costs” (*Ghanaian Chronicle* March 1, 2011). The dam's five-year construction period was only slightly longer than anticipated.

The Ghana government signed an engineering, procurement, and construction (EPC) contract with the Sinohydro Corporation, which since its founding in the 1950s had become one of the largest hydropower construction firms in China. It was a major contractor for the Three Gorges Dam and was one of the first state-owned corporations to take advantage of the “Go Out Policy” to begin dam construction in Africa. In 2004, it had become one of the contractors for the Merowe High Dam (*Hydro Review* 2009). The 400MW, 108 meter-high and 492.5-meter-long dam that Sinohydro proposed to build at Bui was to be a roller compacted concrete (RCC) gravity dam. This technology uses basically the same ingredients as conventional concrete but in different ratios, and is spread like asphalt in making roads, but in much thicker layers (30+ cm thick) and then vibrated and compacted. If “you get everything right [the dam construction goes] extremely fast and [is] extremely economic” (Dunstan 2014). Some indication of this process can be seen in Figure 2. The technology has been

Figure 2. The Bui Dam under construction, February 27, 2011. The steps in the three channels for the dam's penstocks (behind the crane) correspond to RCC layers. Photo by author.



around for dam building since the 1960s, but by the end of 2007, nearly half of all RCC dams were in Asia, with the largest number and those with the greatest heights in China (Dunstan 2008:69). Sinohydro has been experimenting with this technique since the 1980s and constructed the first of these RCC dams in China in 1987.⁹ The Chinese have been criticized for a “rough and tumble anything goes business culture,” but this does not seem to be the case for their projects in Ghana (*Economist* April 20, 2011). In the case of the Bui Dam, communicating between engineers in China and Ghana was sometimes difficult, as was the case with European consultants and Chinese engineers, due to the latter’s “poor English skills.” Tropical climatic conditions also affected the performance of some of the materials the Chinese selected, and there were delays getting necessary construction materials, such as fly ash that came from China, for the RCC cement (Han 2018:158–59).

High Modernist Expectations

Nkrumah in the first era of major dam building in Africa held as his “dearest dream” that the Akosombo Dam along with the Aswan Dam would lead to the “electrification of the continent” (Miescher & Tsikata 2009–2010:21). It would also help with “transforming Ghana into a socialist society” (Miescher 2014:346). To his credit, this early foray into hydroelectric power did contribute to making Ghana today among the most electrified countries in Africa. Equally effusive were those in the Central African Federation who promised that the Kariba Dam on the Zambezi River would be the “birthplace of multiracial modernity” and create “a large lakeshore civilization” (Tischler 2013:153). In contrast, in this new era of dam building in Africa, expectations have become more pragmatic as “the focus has shifted to the megawatt from the dam itself” (Dye 2019:18). Two engineers of the Bui Power Authority (BPA), the new parastatal the Ghana government created for the Bui Project, described Bui’s “main purpose was to bridge the gap in development between north and south Ghana” (Osafu-Kissi & Kwaku Akosa 2009:80). Of Ghana’s then ten regions, the three in the north were by far the poorest. Reflective of this divide, most of the country’s largest urban areas are in the southern half of the country and benefit most from electricity.¹⁰ In 2011, after two decades of the National Electrification Project (NEP), 66.7 percent of the population had been connected to the Ghana grid, but the Northern, Upper East, and Upper West Regions had rates that varied from 43.52 percent to 30.39 percent (*Daily Graphic* November 20, 2011). Along with the Akosombo and Kpong Dams, most of the thermal plants are in the south and on the coast. The Bui Dam, about midway between the north and south, will help to stabilize the load flow in the northern portion of the Ghana grid. Much of the country’s transmission system consists of 160Kv radial transmission lines with high power losses of over 10 percent and susceptibility to power outages, which are typical of such radial, single power source grids. Bui’s proximity to the north will also have a significant impact on this situation.

Nevertheless, the “high modernist ideology” that exaggerates the benefits of large construction projects, as described by James Scott in *Seeing Like a State*, continues to cast a long shadow over the present (Miescher 2012:368). As was the case for the Merowe High Dam, the Bui Dam was also to do much more than merely generate electricity. Indeed, in his sod-cutting speech in August 2007, President Kufuor promised that there was to be “a major irrigation scheme to facilitate all year-round farming in the area.” The Bui National Park would be a “natural reserve,” which would “promote eco-tourism” (*The Statesman* August 24, 2007). There had been an attempt to create a “model city,” Akosombo Township near the Akosombo Dam (Miescher 2012:368). Similarly, below the Bui Dam there was to be the “creation of a major metropolis to be known as Bui City. This settlement [would] have all the facilities of a modern city and should lead to a major transformation of the economic and social status of the area.” It was to be “one of Africa’s most livable and cosmopolitan cities” (*The Statesman* August 24, 2007). At that time, this was little more than a pipe dream, as there was no money in the budget for any of these projects.¹¹ Neither was there any incentive for private investors to step in. The Akosombo township housed workers during the construction of that dam, but there was no such link with the proposed Bui City and the Bui Dam (Miescher & Tsikata 2009–2010: 39).

The Banda area of Brong Ahafo, the dam’s site, was indeed one of the more underdeveloped areas of Ghana. When I first visited in 2006, it was via muddy, washboard lateritic roads. Crossing the Black Volta at the dam-site-to-be was via a leaky dugout canoe (now there is a major bridge), and the only accommodation in Bui National Park was the weather-beaten dilapidated bungalows that the Russians had left behind from 1966 when they had begun their short-lived attempt to construct a Bui dam. However, as soon as construction began, the area surrounding the dam did undergo transformation. When I returned for a second visit in 2008, as the river diversion channel was nearing completion, the road from Wenchi, the direction from which the dam-construction material was coming, had undergone major regrading with drainage, and part of it had been paved. Best of all, there had been a blackfly control campaign in 2007 to eliminate these insects that are more than just a nuisance, as they spread onchocerciasis (river blindness) (*Daily Graphic* September 11, 2007). In 2011, I was again in Bui, and by this time the main roads were all paved; electricity had come to the surrounding villages, and telecommunication had improved dramatically. At the peak of the project, Sinohydro hired a maximum of 1,836 workers at the site with 1,676 being Ghanaian, although most of them were from outside the area (Kircherr et al. 2016a:15). However, with the long history of discontinuity in dam construction in Ghana, there were few skilled workers for dam building, and Sinohydro had to resort to bringing in Chinese and Pakistani workers (Han 2018:165). There clearly was much more money around than had been the case in 2006, which was evident in the new private building construction.

The Long Shadow of Silenced Rivers

China's Going Global policy allowed the Ghana government to do an end run around the considerable opposition to dam building that the anti-dam NGOs had created. However, not surprisingly, *Silenced Rivers* continues to cast a long shadow. Most of the recent literature on large dams "is highly biased with regards to perspective (45 percent negative versus 5 percent positive)." There is also "bias in terms of whose views are included with those of dam developers rarely examined by scholars" (Kircherr et al. 2016b:1). Internet sources on dams, which are the most readily available, reflect this bias. At the top of the list for the Bui Dam is the International Rivers' website with a criticism of Ghana's energy ministry for ignoring climate change and renegeing on the promise to move away from hydroelectricity and diversify the country's energy supply. Even Wikipedia in its description of the Bui Project makes sure that the negative social and environmental costs are well spelled out. There is a "take no prisoners approach" on the part of dam opponents, which some see "as a deliberate effort by northern countries and organizations...to purposefully subvert genuine developmental needs, thereby keeping [countries in the Global South] in a perpetual state of underdevelopment" (Alhassan 2009:156).

The current concerns with the anthropogenic causes for climate change have provided an updated means of continuing the anti-dam struggle by other means. Philip Fearnside's work on hydroelectric dams in the tropics, where most dam building is taking place, seeks to demonstrate that they are significant emitters of the greenhouse gases (GHGs) carbon dioxide and methane. He looked primarily at two dams in the Amazon, Tucuruí (8,370MW) and Balbina (250MW), and concluded that due to the decay of flooded biomass in their reservoirs, they generated considerable amounts of both carbon dioxide and methane. With regard to Balbina, which is a particularly shallow dam with a high ratio of flooded area to energy generation (low power density), Fearnside estimated that "in 1990 it had 20 times more impact on global warming than would generating the same power from fossil fuels" (Fearnside 1995:7). As the construction of the Bui Dam got underway, Patrick McCully was soon attacking the environmental assessment's claim that there would be only "minor" greenhouse gas impact. Instead, he asserted that "as a tropical dam...emissions from Bui [were] likely to be significant and of a magnitude similar to those of Brazilian dams." The dam was to have "a very low power density...and it could be assumed that Bui's emissions would also be multiple times those of a natural gas power plant." He also criticized the dam's "susceptibility to climate change," and maintained that "chang[ing] hydrological cycles were already impacting dam safety and performance" (McCully 2008).

The Bui Dam, though it is in the tropics, is not in a rainforest environment like the dams Fearnside studied.¹² It is questionable to assume a direct correspondence between it and dams in the Amazon with vast amounts of decomposing biomass. In general, measuring the effect of greenhouse gas

emissions on the environment from fossil fuel power plants is far easier than doing so for dams that cover large areas, vary in depth, soil composition, biomass they flood, and their annual filling cycles and discharge patterns. In a more recent study of gas emissions from hydropower reservoirs in the Amazon, Brazilian research scientists Marco dos Santos and Luiz Rosa have presented a more nuanced picture of GHG emissions from hydroelectric dams than Fearnside's analysis. They emphasize the need to distinguish between gross and net emissions, as areas flooded by dams emitted greenhouse gases before flooding took place. In addition, they distinguish three different stages of GHG emission over time, with the last stage one of "stabilization" with much less in the way of emissions. (dos Santos & Rosa 2011:72) Nevertheless, the battle over hydroelectricity's clean energy credentials continues, and at the 2015 UN Climate Conference in Paris, IR spearheaded the presentation of a manifesto that outlined ten reasons why climate initiatives should not include large hydroelectric projects (International Rivers 2015).

In general, it has been single issues such as sustainability, forced resettlement, token community participation, and ignoring the downstream impact of the Bui Dam that have been the focus of most recent academic evaluations of the project.¹³ The issue that has generated the most criticism of the Bui Project has been the inadequacy of the compensation given to the people affected by the dam's construction. This has been and continues to be the Achilles heel of all dam-building projects. It has particular resonance in the case of Ghana, where claims for compensation for the flooding due to the Akosombo and Kpong Dams still continue to be litigated before the country's courts (Obour et al. 2016:296). According to the BPA, only 1216 people needed to be resettled for the Bui Dam, in contrast to over 80,000 for Akosombo and Kpong. The fact that there was a much smaller number of people involved and that NGOs participated in the deliberations played a significant role in the much greater degree of fairness offered these dam-affected people than had been the case previously.¹⁴ The VRA spent about USD360 per resettled person for the Akosombo Dam in the 1960s, but in the case of the Bui Dam the BPA spent over USD21,000 per person.¹⁵

Along with concrete structures to replace the mud and wattle huts of the past, the BPA provided schools, boreholes, toilet facilities, roads, and eventually electricity for the two resettlement communities. In addition, the BPA provided compensation for loss of fruit-bearing trees and a resettlement grant of GH¢100 for relocation for each member of the community, a farm grant of GH¢50 to till a new farm, and a temporary income support of GH¢100 per month for each household for one year in all of these resettlement communities (Interview, Wumbilla Salifu [external and community relations manager of the BPA] Accra, November 17, 2016).¹⁶ Nevertheless, ensuring that "the dam-affected people were beneficiaries of the project...and improv[ing] livelihoods" as the WCD stipulated should be the result of dam construction, has not been easy (American University International Law Review 2001:1435). Those who fished in the Black Volta are now four kilometers away

from the river.¹⁷ Becoming farmers, as the BPA envisioned, has been difficult since the land they were given is of limited fertility and depends on erratic seasonal rainfall. Even for those who were farmers the transition has been difficult as in the new arrangement they have fixed plots which make it difficult to practice the shifting cultivation of the past. In addition, in spite of the lessons learned from the Akosombo and Kpong projects, resettlement has “failed to cover the downstream communities creating an emerging livelihood challenge” (Owusu et al. 2016:2) However, if the promised irrigation component does come to fruition this should play an important role in improving the livelihoods of such communities.

The Bui situation demonstrates that even with the best of intentions providing new livelihoods for people with minimal education and limited skills continues to be a major challenge for those in charge of dam-resettlement projects. Even though there has continued to be a significant increase in economic opportunities in the area around the dam since it was completed in 2013, this has not necessarily benefitted the resettled. As was the case when the Volta Lake formed in the 1960s behind the Akosombo Dam, there has been a dramatic increase in the fish population in Bui Lake. However, similarly, fishermen who had experience fishing on large bodies of water, like the ocean, have profited (*Daily Graphic* June 15, 2015). With more suitable equipment, like outboard motors and seaworthy boats, they are better able to cope with the distances involved in getting to fishing grounds and the rough conditions that can quickly develop on Bui Lake, which have resulted in a number of fatalities for those in unstable dugout canoes.

As a result of such activity, “new business opportunities have emerged” that include “transportation services, battery charging centers, food vendors, cloth sellers, petty trading, drinking spots, telcom airtime, mechanics, carpenters, and even a rural bank” (*Ghana News Agency* September 10, 2015). However, many of these jobs have gone to “strangers” and not surprisingly this has generated a xenophobic reaction that recently created enough concern for schools in the Banda Traditional Area (the Dam’s immediate location) to close so that teachers who felt they were not secure could leave (*Ghanaian Chronicle* March 16, 2017). Undoubtedly, contributing to this sense of inequity has been the BPA’s construction of “luxury homes” for “high ranking dam officials” on what was formerly farmland for displaced persons (Hausermann 2018:8). Young men in the resettlement communities seem most adrift and without occupations (Interview, Kpako Awusagbo II [chief of Bator Akanyakrom] November 13, 2016). The continual refrain that you hear from them is “we are suffering.” In contrast, women seem to be doing better. They have established small shops, drinking and “chop bars” (cooked food), and seamstress businesses. According to one of my young male informants, it was typical for Ghana where “women have all the money” (Interview, Rockson Asumpo, [Edern Security Guard, Bui Village] November 15, 2016). However, a number of young men do own small motorcycles, and I never had any difficulty hiring one for local transportation. According to a recent survey, 58 percent of the households had cell phones (Asiama 2015:47). All the men I

interacted with in Bui Village, when I was last there in 2016, had one, and keeping them charged was of prime importance. Men dominated salaried positions (like security guards, teachers, and park rangers) but many spent a great deal of their time in the drinking bars as well.

Having a source of capital is essential for being entrepreneurial, and some observers have suggested that resettlement support should continue for at least five years; however, very likely this would only prolong the descent into inevitable "suffering" (Asiama 2015:73). A more radical suggestion, specifically with the Bui Project in mind, has been that compensation should be permanent, with the "authorities [offering] a certain percentage of hydro-power revenue or royalties to affected communities, and this percentage should be reviewed regularly to reflect the current economy" (Adu-Gyanfi 2015:55). In 2009, the Burkinabé National Electricity Company in Burkina Faso did attempt something like this for those displaced by the Bagré Dam on the Nakambé River, but lack of "transparency" in the arrangement resulted in "causing tensions with other local councils" (Bazin et al. 2011:24) Perhaps even more equitably, payment should come from a surcharge added to the electricity tariffs that all Ghanaians pay who gain from the sacrifices that dam-affected people have made so that all can benefit. How this would be distributed would be a significant challenge, given the arcane nature of land tenure in Ghana, and specifically in the Banda area of the Bui Dam (Obour et al. 2016:294). Even more challenging would be getting Ghanaians to pay this, as they "are increasingly questioning the logic of paying for electricity," and currently do not pay rates that cover the cost of electricity production and provide a surplus for maintenance. (Sackeyfio 2018:182). It is a situation that has long resulted in what one commentator, during the recent experience with severe load shedding, known locally as "*dumsor*," described as the country's "malnourished energy sector" (*Daily Graphic* May 19, 2015).¹⁸

Conclusion

As the new era of dam building in Africa continues to gather steam and African countries seek expanded electricity generation, case studies of dams like that of Bui will become increasingly relevant. The vast "high modernist" projects like the Grand Ethiopian Renaissance Dam that will have three times the installed capacity of the Aswan dam, currently the largest in Africa, and the proposed Grand Inga, "the 'El Dorado' of African infrastructure projects," are currently the attention grabbers in today's world (Verhoeven 2016:563). However, most new dams, or those under construction, in Africa today are much more like the Bui Dam in terms of size, and often smaller. The Bujagali Dam, which was finally completed in 2012 (with European, Asian, and World Bank funding), has an installed capacity of 250MW. The Grand Poubara Dam in Gabon (completed in 2013), another RCC dam, has an installed capacity of 160MW. The Soubre Dam recently completed in the Ivory Coast has an installed capacity of 275MW, while the Gribo-Popoli Dam downstream on the same river is to have an installed capacity of 112MW

(Xinhua 2017). The World Bank, which has also returned to supporting hydro power construction in Africa, in 2013 agreed to fund part of the construction of the 80MW Rusumo Falls Hydroelectric Project on the border between Burundi, Rwanda, and Tanzania. (World Bank 2013). Most recently, Sinohydro began construction of Ghana's fourth dam, the Pwalugu Multi-purpose Dam in the Upper East Region. It will also be an RCC dam, and along with flood control and irrigation it will have an installed capacity of 60MW (*Daily Graphic* December 30, 2019).

Like Bui, these dams will have only a modest environmental impact. They do not flood large areas, have reasonable power density ratios, and do not displace large populations. They are likely to be built in obvious and less environmentally disruptive locations than mega dams. As far back as 1924, Albert Kitson, the director of the Gold Coast's Geological Survey, recognized the Bui Gorge as an ideal site for a major hydroelectric dam (Kitson 1925:16–8). Dam building comes with tradeoffs, but no country has developed without dams. In the United States and Australia there is around 5000 m³ of water stored up for each citizen, for India and Pakistan about 150 m³, and for Ethiopia and Kenya it is a measly 50 m³. European countries have developed over 70 percent of their economically viable hydroelectric potential while Africa has developed less than 5 percent (Briscoe 2010b:401–2).

In some concession to this reality, IR has suggested micro-hydro-run-of-river alternatives to large dams (Klunne 2012). However, it is difficult to see how this would work on any significant scale in a country like Ghana, as even in the rain forest region, rivers are very seasonal in their flow. Small hydro-power in Ghana is also limited by the amount of pollution and siltation of its rivers from agricultural runoff and illegal “*galamsey*” gold mining. More realistically, recently there has been an attempt to add solar power in conjunction with hydroelectricity. The BPA has contracted with Sinohydro to install 250MW of solar power not far away from the Bui Dam in 50MW stages (*Daily Graphic* May 29, 2018). By 2020, Ghana intends to increase its current 22.5MW of solar power to 300MWs. However, doing this will require having considerable “dispatchable” power that can quickly step in when solar power, an intermittent source of electricity, is not available. Hydropower plants are ideal for this purpose, as they can “ramp up” to full capacity in less than ninety seconds. Other power plants cannot “load follow” with this degree of flexibility. In the case of the Bui Dam, it can also operate at different outputs by varying the number of turbines it uses.¹⁹ Like most hydroelectric plants in the tropics, where there are long dry seasons, the Bui Dam will operate at a fairly low capacity factor of only about 28 percent. By working in tandem with its solar component, it will be able to use its stored water more frugally.

Recently IR has gone through a leadership change and seems to be moving away from the time when the WCD was seen as a continuation of the anti-dam struggle by other means to now advocating “for improved [dam building] policies and practices and encourag[ing] companies to compete for a strong environmental track record.” The organization “came up with benchmarks to measure the policies and project performance of the major

players in the Chinese hydropower sector.” Most of these companies responded very favorably to this initiative, and IR was “frankly overwhelmed by the strong and positive response.” Contractors did better than those who invested in their own projects, and overall Sinohydro had the best record. (Mang 2015). There is clearly much still to do to improve how dam building affects displaced populations, but the Bui Dam does indicate that there has been considerable improvement with regard to how this has been done in comparison to the Akosombo experience of the 1960s. Undoubtedly there will be continuing contestation to dam building, but as the Akan proverb expresses it: *ade-pa na yeto aboden* (we buy a good thing at a high price). Part of this cost is the contestation that is inevitable.

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 November 20, 2011
 May 19, 2015
 June 15, 2015
 May 29, 2018
 December 30, 2019
- Ghana News Agency*, Accra
 September 10, 2015
- Ghanaian Chronicle*, Accra
 March 1, 2011
 March 16, 2017
- The Economist*, London
 April 20, 2011
- The Independent*, Accra
 April 22, 1999
- The Statesman*, Accra
 August 24, 2007
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Interviews

- Asumpo, Rockson, Edern Security guard, Bui Village and informant at Bui Village, November 15, 2016
- Kpakpo Awusagbo II, chief, Bator Akanyakrom (one of the Bui resettlement villages), November 13, 2016.
- Ousman, Ranger at Bui Village (now Bui National Park Headquarters), November 11, 2016
- Owusu, Peter, Ranger at Bui National Park, October 22, 2006, November 27, 2001, and at Bui Village, November 11, 2016.
- Salifu, Wumbilla, external and community relations manager of the BPA, Accra, November 17, 2016.

Notes

1. Miescher & Tsikata (2009–2010:29–34) summarize these attempts at reactivation.
2. The Acheampong government began construction of the Kpong Dam (160MW) in 1977, ten miles below Akosombo. It is a run-of-river dam using the outflow from Akosombo upstream.
3. It is now known as International Rivers. Some of their Internet postings are undated.
4. This is how the Booker Prize-winning Indian author Arundhati Roy describes the book. She was much involved in the protest against the Sardar Sarovar Dam.
5. Tsikata (2006) gives the most extensive treatment of this resettlement.
6. The source for this information is the original website for the Merowe Dam. This website is no longer functional. In lieu of this, for further information about the Merowe Dam, please consult https://en.wikipedia.org/wiki/Merowe_Dam.
7. Mohan (2012) maintains that a railway from the coast to Burkina Faso was another funding possibility, but to the Chinese a hydroelectric dam offered a more guaranteed repayment of the loan.
8. Brautigam (2011:2) maintains that Chinese loans have been more generous than those offered by Western banks, with lower interest rates and longer repayment schedules.
9. The source for this information is a page on the Sinohydro website titled "Sinohydro and the Kengkou Hydropower Station." This website is no longer functional.
10. The Ghana Grid map (Figure 1) that accompanies this article demonstrates just how much this is so.
11. In 2016, the Ghana government did contract with the Dutch firm Royal Haskoning B.V. to conduct a feasibility study for irrigating 5,000 hectares of land in the first phase of an irrigation project (Bui Power Authority 2016).
12. Neither is much of the Volta Lake.
13. Sutcliffe 2009; Mettle 2011; Asiamah 2015; Adu-Gyanfi 2015; Jetter 2015; Mortey 2015; Arthur 2016; Owusu et al. 2016; Yankson et al. 2017; Abdulai & Fynn 2018; Hasuermann 2018.
14. The most important was the Deutsche Gesellschaft für Technische Zusammenarbeit, which provided support for a local forum known as the Ghana Dams Dialogue. However, this was centered in the capital, Accra, about 300 miles away

from Bui and six to seven hours by car, which limited effectiveness in dealing with immediate issues. For example, informing locals of upcoming important meetings with officials at Bui was difficult (Interview, Kpakpo Awusagbo 2016).

15. The VRA spent a little more than GBP12 million (about USD28 million) on the resettlement of slightly fewer than 80,000 people that the Akosombo Dam displaced (Moxon 1969:159). The BPA spent USD26 million on resettling the 1,216 people that the Bui Dam displaced (Interview, Peter Owusu November 27, 2001). This works out to about USD360 to USD21,380. Adjusted for inflation USD360 would be around USD2,808 in 2013.
16. A cedi (GHS) was worth 66 percent of a USD in 2011.
17. They wanted to be resettled on the banks of the lake, but this was unacceptable to the BPA, as they considered it would contribute to siltation and damage the dam's turbines, which has been a serious issue for the Akosombo Dam. It will become one for the Bui Lake as "stranger" fishermen are already illegally establishing settlements on its shore (Interview, Wumbilla Salifu 2016).
18. *Dumsor* means off and on in Twi, the most widely spoken Ghanaian language.
19. It has three turbines which individually can generate 133MW.