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The GERD promises to bring electricity to underdeveloped East Africa. Located in western Ethiopia, approximately 20km from the Sudanese border, the GERD disrupts the natural flow of the Blue Nile, the main tributary to the Nile. Regionally, this disruption will create consequences from its origin through ancient civilizations in rain-poor Sudan and Egypt where agricultural production is dependent upon continued irrigation from the Nile. Locally, the rising reservoir behind the GERD will displace 20,000 individuals. Given these disruptions, the GERD has the potential to cause international and/or local conflict, but this case study illustrates that the benefits of regional electrification can enable actors to avoid conflict.

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United States Marine Corps
Command and Staff College
Marine Corps University
2076 South Street
Marine Corps Combat Development Command
Quantico, Virginia 22134-5068

MASTER OF MILITARY STUDIES

ELECTRIFICATION: CONFLICT OR COOPERATION IN EAST AFRICA? A CASE STUDY OF THE GRAND ETHIOPIAN RENAISSANCE DAM (GERD)

SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF MILITARY STUDIES

MAJOR ASHLEY M. NOREUIL, UNITED STATES MARINE CORPS RESERVE

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Mentor and Oral Defense Committee Member: Dr. Michael Baskin
Approved: Michael Baskin
Date: 5/2/2019

Oral Defense Committee Member: LtCol Kevin DeWitt
Approved: K. B. D
Date: 5/2/2019

Executive Summary

Title: Electrification: Conflict or Cooperation in East Africa? A Case Study of the Grand Ethiopian Renaissance Dam (GERD)

Author: Major Ashley M. Noreuil, United States Marine Corps Reserve

Thesis: With its interference of the Nile River and local displacement of 20,000 individuals, the GERD has the potential to cause conflict; however, if the actors continue to leverage mitigating factors, they can continue to favor cooperation over conflict.

Discussion: The GERD is an infrastructure development project that promises to bring electricity to underdeveloped East Africa. Located in western Ethiopia, approximately 20 kilometers (km) from the Sudanese border, the GERD disrupts the natural flow of the Blue Nile, the main tributary to the Nile. Regionally, this disruption will create consequences from its origin in the Ethiopian highlands through ancient civilizations in Sudan and Egypt to the Mediterranean Sea. Agricultural production in rain-poor Sudan and Egypt is dependent upon continued irrigation from the Nile. Locally, the rising reservoir behind the GERD will displace 20,000 individuals. Given these disruptions, the GERD has the potential to cause international and/or local conflict, but this case study illustrates that the benefits of regional electrification can enable actors to avoid conflict.

Conclusion: As construction of the GERD illustrates, electrification has the potential to ignite international and/or local conflict; however, its promise to bring economic growth enables actors to participate in a spirit of cooperation rather than competition. It serves as a case study for a developing country that is considering building a dam at a location with diverse local actors and downstream neighbors.

DISCLAIMER

THE OPINIONS AND CONCLUSIONS EXPRESSED HEREIN ARE THOSE OF THE INDIVIDUAL STUDENT AUTHOR AND DO NOT NECESSARILY REPRESENT THE VIEWS OF EITHER THE MARINE CORPS COMMAND AND STAFF COLLEGE OR ANY OTHER GOVERNMENTAL AGENCY. REFERENCES TO THIS STUDY SHOULD INCLUDE THE FOREGOING STATEMENT.

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Preface

This thesis originated in a chance observation of my online personnel record approximately ten years ago. I clicked on a link titled "Cultural Familiarization" and found that I had been tasked with familiarizing myself with East Africa. Interested, I completed an online training module with basic information on the region; however, my commissioning predated mandatory requirements for the more intensive Regional Cultural and Language Familiarization (RCLF) Program so my interest waned. A decade later, I enrolled in the Energy & Innovation Scholars Program (E&ISP) at Marine Corps University during my year at Command and Staff College. Combining the politics of energy security with a tenuous foundation of basic knowledge about East Africa, I arrived at the topic of this paper. This rudimentary framework was augmented by the security studies curriculum at Command and Staff College and an elective titled *The Politics of Conflict in Africa*.

Dr. Michael Baskin, leader of E&ISP, served as my thesis advisor. Dr. Claire Metelits taught *The Politics of Conflict in Africa* elective, providing substantial insight on conflict within the continent. In addition, security studies professors Dr. James Joyner and Dr. Douglas Streusand informed this thesis. Lieutenant Colonel Kevin DeWitt, USMC, and Dr. Richard DiNardo provided invaluable support to see this thesis to completion. Finally, I would like to acknowledge Major Tim Riemann, USMC, and Dr. Anne-Louise Antonoff for hosting the elective *Where Good Ideas Come From* and subsequently reinvigorating my enthusiasm for learning within Professional Military Education.

INTRODUCTION

Energy resources hold the potential to be both a blessing and a curse. Utilized in a productive manner, they can power economic growth, catalyze advances in human development, and stabilize a society. Sequestered for rent-seeking, they can enrich the lives of ruling elites. Siphoned by nonstate actors and sold on a global commodities market, they can fund intrastate conflict. Financing a combatant, their liquidity can sustain conflict. Balancing the blessings with the burdens, the countries of East Africa are tasked with developing their resources in an environment that affects the probability of future conflicts, whether internal or external, to the originating state.

The extraction of energy resources in East Africa is an underdeveloped industry that is currently defined by potential, as opposed to kinetic, operations. The East African Rift has geological connections to the oil-rich Saudi peninsula, serving as a potential hydrocarbon frontier for new development.[1] Oil discoveries within Uganda led to the signing of an Intergovernmental Agreement between Uganda and Tanzania to build the East African Crude Oil Pipeline, creating a design for the world's longest electrically heated crude oil pipeline.[2] Onshore and offshore natural gas reserves in Tanzania total over 34 trillion cubic feet (tcf), driving the creation of the country's first multitrain liquified natural gas (LNG) facility.[3] The identification of these reserves creates the opportunity for infrastructure development projects that can stimulate further economic growth and human development.

[1] David E. Brown, "Africa's Booming Oil and Natural Gas Exploration and Production: National Security Implications for the United States and China," *Current Politics and Economics of Africa* 7, no. 3 (2014): 245.
[2] Reuters, "Here's When Stanbic Expects $2.5 Billion Debt Deal for Uganda's Oil Pipeline to Conclude," *CNBC Africa*, November 21, 2018, https://www.cnbcafrica.com/news/east-africa/2018/11/21/heres-when-stanbic-expects-2-5-bln-debt-deal-for-ugandas-oil-pipeline-to-conclude-in/.
[3] Brown, "Africa's Booming Oil and Natural Gas Exploration and Production," 245.

The Grand Ethiopian Renaissance Dam (GERD) is an example of one of these projects. A hydropower project, it weaves together the management of two resources – water and electricity – in an array of state and nonstate actors. Located in western Ethiopia, approximately 20km from the Sudanese border, the GERD promises to bring electricity to underdeveloped East Africa. Doing so will require the disruption of the Blue Nile, the main tributary of the Nile River that stretches into the Mediterranean Sea. Regionally, this disruption will create consequences from its origin in the Ethiopian highlands through Sudan and Egypt, where agricultural production is dependent upon continued irrigation from the Nile. Locally, the rising reservoir behind the GERD will displace 20,000 individuals.[4] Given these disruptions, the GERD has the potential to cause international and/or local conflict; however, if the actors continue to leverage mitigating factors, they can continue to favor cooperation over conflict.

[4] Jennifer C. Veilleux, "The Human Security Dimensions of Dam Development: The Grand Ethiopian Renaissance Dam." *Global Dialogue* 15, no. 2 (Summer/Autumn 2013): 5.

BACKGROUND ON EAST AFRICA

Physical and Political Geography

Although regional similarities exist among the fifty-four African states, the definitions of these regions are not universally accepted. North Africa, bounded in the north by the Mediterranean Sea and the south by the Sahara Desert, is often separated from analysis with the rest of the continent. The rest of the continent, sub-Saharan Africa, encompasses, but is often analyzed as a contiguous entity. In accordance with these differences, the United States Department of Defense left Egypt in U.S. Central Command when it established U.S. Africa Command in 2008.

Figure 1. East Africa[5]

The eleven states of sub-Saharan East Africa were carved out of post-colonial rule with Sudan to the north; South Sudan, Uganda, Rwanda, and Burundi to the west; Tanzania to the

[5] Venic Nyanchama, "List of East African Countries and Their Capitals," Tuko, accessed April 29, 2019, https://www.tuko.co.ke/283643-list-east-african-countries-capitals.html#283643.

south; and the Indian Ocean, Gulf of Aden, and Red Sea to the east (Figure 1).[6] Spanning over six million square kilometers of land area,[7] East Africa encompasses a variety of terrain. Traveling from northern Sudan to the Great Lakes of southern East Africa, one leaves the desert, travels through a swamp and arrives at the tallest point in the continent at Tanzania's Mount Kilimanjaro. Additional highlands in Ethiopia gather the rainwater that fuels the Blue Nile flowing northwest, the Awash River flowing northeast, and the Juba and Shabelle Rivers flowing southeast.

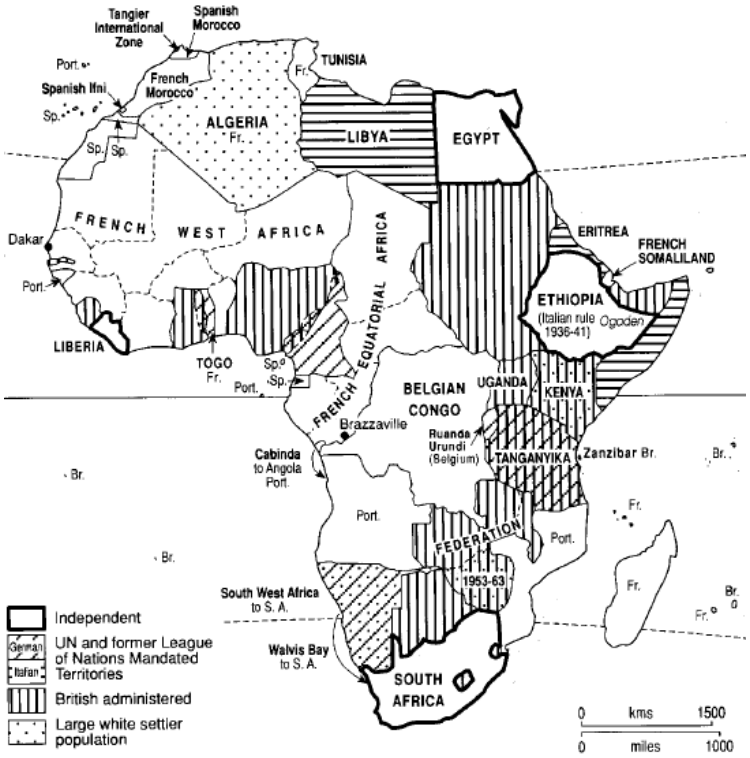

Figure 2. Colonial Africa[8]

[6] This region defines the eleven states that comprise the East Africa region as defined by the Regional Culture and Language Familiarization (RCLF) program: Burundi, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, Somalia, South Sudan, Sudan, Tanzania, and Uganda. Marine Corps University, "East Africa," accessed November 8, 2018, https://www.usmcu.edu/CAOCL/RCLF/EF/.

[7] Total land area is summed from the individual country pages of the CIA World Factbook. Central Intelligence Agency, "The World Factbook," accessed May 2, 2019, https://www.cia.gov/library/publications/the-world-factbook/.

[8] Jeffrey Herbst, *States and Power in Africa: Comparative Lessons in Authority and Control* (Princeton, NJ: Princeton University Press, 2000), 69.

European powers divided this diverse geography into colonies during the latter part of the nineteenth century, with the one exception of Ethiopia (Figure 2). After successful colonization of Eritrea, Italy evaded Ethiopia to expand its empire. At the 1896 Battle of Adwa, Emperor Menelik II led Ethiopia in a defeat of Italian forces. Although the Italians would reemerge to occupy Ethiopia in the 1930s, Ethiopia was never colonized. In addition to Eritrea, the Italians colonized eastern Somalia. Britain colonized the majority of the landmass in East Africa, including Kenya, Uganda, British Somaliland, and Sudan. Following World War I, the British assumed administration of Tanzania from Germany. Belgium's prominence in central Africa spilled over into East Africa with the administration of Rwanda and Burundi.

Although the majority of East African states gained independence from their colonial powers in the 1960s and 1970s, there are notable exceptions. As previously noted, Ethiopia was never colonized, but experienced Italian occupation from 1936-1941. When the Italians left Ethiopia in 1941, they also vacated Eritrea. The British administered Eritrea until a 1950 United Nations resolution federated Eritrea into Ethiopia. After a war that lasted nearly three decades, Eritrea earned its independence from Ethiopia in 1993.[9] South Sudan is the only other East African state to receive sovereignty in the post-Cold War era. In 2011, following a popular vote for independence, South Sudan became independent from Sudan.[10] These two states, Eritrea and South Sudan, are the newest countries on the continent. The process of state creation may still be in progress in East Africa. Former British Somaliland received its independence in 1947 but joined Somalia less than a week later. When the Somali government collapsed in 1991,

[9] Eritreans approved a referendum for independence in 1993. Central Intelligence Agency, "Eritrea," The World Factbook, last updated May 1, 2019, https://www.cia.gov/library/publications/the-world-factbook/geos/er.html.
[10] Central Intelligence Agency, "South Sudan," The World Factbook, last updated April 30, 2019, https://www.cia.gov/library/publications/resources/the-world-factbook/geos/od.html.

Somaliland declared its independence; however, its sovereignty has not been recognized by another state or international organization.

Conquest by colonial powers did not dissuade the East African states from participation in the international order. Each one joined the United Nations and all but two—Eritrea and South Sudan—have been members of the Security Council.[11] In addition to participation on a worldwide forum, all East African states are members in the continental African Union (AU), with Addis Ababa, Ethiopia serving as the home of the AU Commission. Regionally, Burundi, Kenya, Rwanda, South Sudan, Tanzania, and Uganda form the East African Community (EAC), an intergovernmental organization that promotes socio-economic development.

Energy Resources

Oil. Prior to an independent South Sudan in July 2011, Sudan was the sixth largest producer of oil in Africa and the only East African oil producer of sufficient size to appear in the June 2018 *BP Statistical Review of World Energy*.[12] Per the same report, oil production in both Sudan and South Sudan has declined since the latter gained independence. In fact, the combined production from both countries in 2016 was less than half of 2010 production levels. These production fields are part of the East African Rift, a tectonic boundary that extends north with geological connections to the oil-rich Saudi peninsula. It is projected to serve as a hydrocarbon frontier for new development.[13] Oil discoveries within Uganda led to the 2017 signing of an Intergovernmental Agreement between Uganda and Tanzania to build the East African Crude Oil

[11] United Nations, "Countries Never Elected Members of the Security Council," United Nations Security Council, accessed December 5, 2018, http://www.un.org/en/sc/members/notelected.asp.
[12] BP PLC, *BP Statistical Review of World Energy 2018*. 67th ed. (London, UK: June 2018), 14, https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review/bp-stats-review-2018-full-report.pdf.
[13] Brown, "Africa's Booming Oil and Natural Gas Exploration and Production," 245.

Pipeline. The project will create the world's longest electrically heated crude oil pipeline.[14] The parties to the 24-inch diameter pipeline are expected to conclude a final investment decision in June 2019.[15] Heading into the May 2019 East African Petroleum Conference and Exhibition, the six countries of the EAC advertise 28 prospective sedimentary basins with an estimated 2 billion barrels of oil and current licenses to over 37 international oil and gas companies.[16]

Natural Gas. The African continent accounted for 6.1% of worldwide natural gas production in 2017.[17] The majority of this production came from North Africa and Nigeria. No East African nation produced natural gas at a level to be recognized on the June 2018 *BP Statistical Review of World Energy*. However, the previously mentioned geologic basins where oil reserves are being discovered also contain natural gas deposits. Onshore and offshore natural gas discoveries in Tanzania have boosted their reserve of this resource to over 34 trillion cubic feet (tcf), driving the creation of the country's first multitrain liquified natural gas (LNG) facility.[18]

Electrification. Oil and gas account for just under 50% of the electricity produced in Africa, and over 90% of the production in Egypt.[19] Within East Africa, the Ethiopian highlands provide the terrain necessary to develop hydroelectric power. Development of a regional grid can be accelerated by the coordination and management capabilities of intergovernmental organizations.

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[14] Reuters, "Here's When Stanbic Expects $2.5 Billion Debt Deal for Uganda's Oil Pipeline to Conclude," *CNBC Africa*, November 21, 2018, https://www.cnbcafrica.com/news/east-africa/2018/11/21/heres-when-stanbic-expects-2-5-bln-debt-deal-for-ugandas-oil-pipeline-to-conclude-in/.
[15] Halima Abdallah, "Uganda Oil Pipeline to Wait for a While," *The East African*, March 14, 2019, https://www.theeastafrican.co.ke/business/Uganda-oil-pipeline-to-wait-for-a-while/2560-5025464-bietbw/index.html.
[16] East African Community, *Final Circular: 9th East African Petroleum Conference and Exhibition 2019* (Arusha, Tanzania: East African Community, April 11, 2019), 11, https://eapce19.eac.int/key-documents.
[17] BP PLC, *Statistical Review*, 30.
[18] Brown, "Africa's Booming Oil and Natural Gas Exploration and Production," 245.
[19] BP PLC, *Statistical Review*, 47-48.

Recognizing that access to electricity is a primary driver for socio-economic development in East Africa, the EAC plans to significantly increase electricity production among its member states. As a result of a projected 30-fold increase in production between 2014-2050, the regional electrification rate is expected to increase from 19% to 74%.[20] As the EAC moves towards its vision to increase regional income, it is focusing the largest percentage gains in electricity production from renewables and natural gas. This brings its generation profile in line with that of the developed countries in Europe and North America (Figure 3). Bringing new generation facilities online by 2050 will require the technical expertise held in these countries.

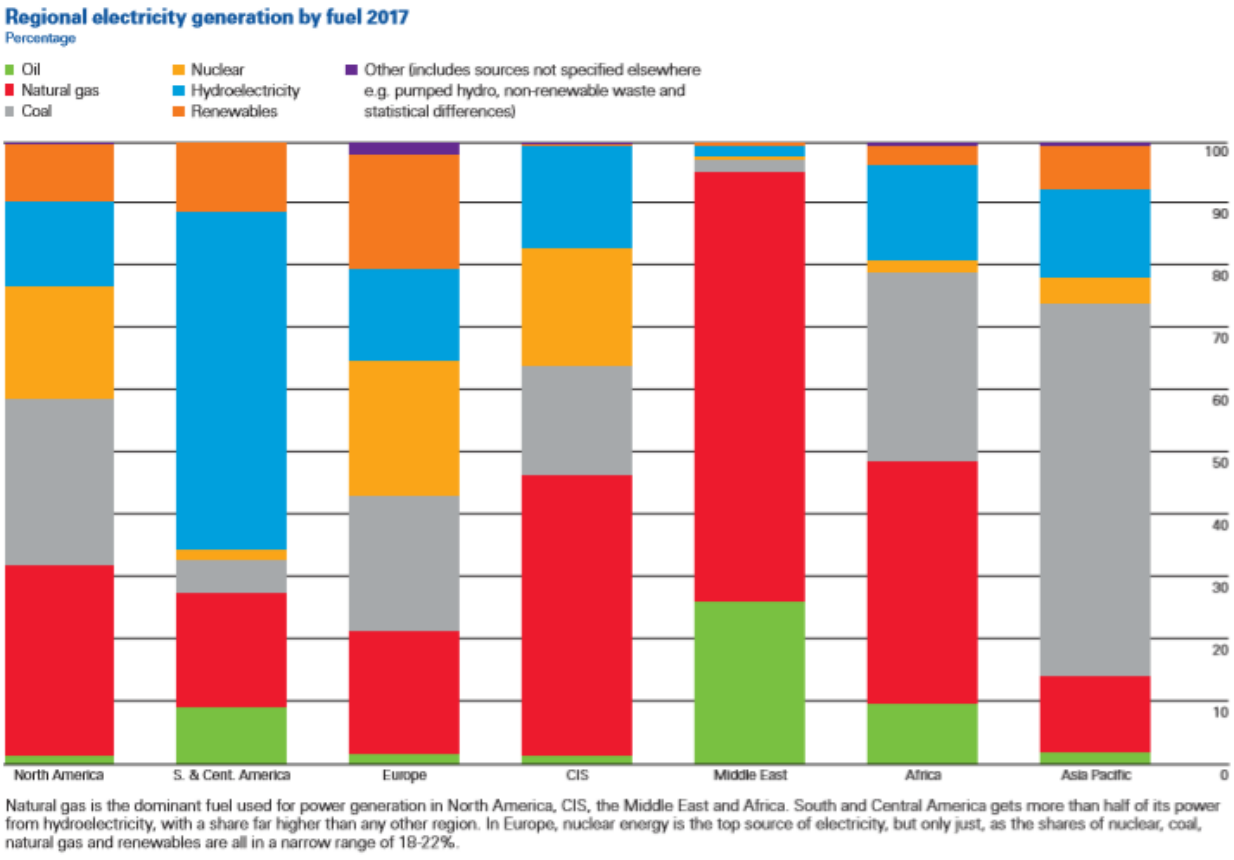

Figure 3. 2017 Electricity Generation by Fuel Source.[21]

[20] East African Community, *Vision 2050: Regional Vision for Socio-Economic Transformation and Development* (Arusha, Tanzania, February 2016), 38.
[21] BP PLC, *Statistical Review*, 47.

Foreign Direct Investment

Power Africa, a project led by the United States Agency for International Development, is one entity outside of East Africa that assists developing countries undergoing electrification. In 2018, it focused two-thirds of its 2018 transactions on renewable energy.[22] The methods employed by Power Africa include capacity building, financing, information resources, transaction assistance, and policy or regulatory reform.[23] By focusing its work on the processes that lead to electrification, Power Africa is organized as a government-led partnership with this private sector.[24] This method of development stands in stark contrast to the strategy of China, another great power.

While undergoing military and economic expansion, China's oil imports increased by 9.0% per annum between 2006-2016 overtook the United States as the world's largest oil importer in 2017.[25] The growth in China's demand for oil has been a boon for oil extraction in East and South Africa, where 64% of all crude exports are sent to China. While these metrics explain the magnitude of China's oil and gas purchases, they are an insufficient indicator of the full impact of China's involvement in the East Africa energy sector. Understanding how China acquires these resources will better explain the role of this great power within the region.

In the 1970s, as diplomatic relations between China and the United States resumed, the Japanese offered China a $10 million USD line of credit for infrastructure development, to be repaid in oil exports.[26] Japan received a two-fold benefit from this arrangement: oil to fuel its

[22] United States Agency for International Development, *Power Africa 2018 Annual Report* (Washington, DC, August 2018), 3.
[23] USAID, *Power Africa 2018 Annual Report*, 5.
[24] USAID, *Power Africa 2018 Annual Report*, 1.
[25] Throughout the same decade, increases in shale oil and gas production in the United States led its oil imports to decrease at a rate of 3.0% per annum. BP PLC, *Statistical Review*, 24.
[26] *China's Role in Africa: Implications for U.S. Policy: Hearing before the Subcommittee on African Affairs of the Committee on Foreign Relations United States Senate*, 112th Cong. (2011), 13.

economy and new export market to increase revenue. China also received a two-fold benefit: direct infrastructure development and financing to procure imports despite its lack of an international line of credit. In her testimony to the U.S. Congress, Dr. Deborah Brautigam, Senior Research Fellow at the International Food Policy Research Institute advocated that China is using this model in Africa today, writing multimillion-dollar loans that are being repaid in oil or minerals.[27] While spurring the development of infrastructure, these loans often undermine "governance, domestic job growth, and environmental quality. [Whereas,] U.S. investment drives energy development, and the U.S. government supports international environmental, anti-corruption and transparency standards; but plays a limited role in promoting infrastructure development."[28] The respective investment strategies are perceived in different manners by the citizens of East Africa. Describing this perception in an opening statement during a 2011 hearing before the Subcommittee on African Affairs, Senator Christopher Coons summarized, "We may be, in sum, winning the war on disease while losing the battle for hearts and minds."[29]

Human Geography and Security

Without an intercontinental transmission line to export electricity outside of East Africa, nonregional states do not have a supply route to defend. In the absence of this incentive, international states acting in East Africa are participating in the region out of a desire to provide aid. The United Nations Development Program's Human Development Index (HDI) is one measure that defines the need for aid in a country. The HDI combines a life expectancy index,

[27] *China's Role in Africa: Implications for U.S. Policy: Hearing before the Subcommittee on African Affairs of the Committee on Foreign Relations United States Senate*, 112th Cong. (2011), 9.
[28] David L. Goldwyn, "Squaring the US-Africa-China Energy Triangle: The Path from Competition to Cooperation," in *Energy Security Challenges for the 21st Century: A Reference Handbook*, ed. by Gal Luft and Anne Korin (Santa Barbara, CA: ABC-CLIO LLC, 2009), 233.
[29] *China's Role in Africa: Implications for U.S. Policy: Hearing before the Subcommittee on African Affairs of the Committee on Foreign Relations United States Senate*, 112th Cong. (2011), 3.

education index, and per capita income index into one measure of how well a country enables its population to achieve their potential.[30] One is a perfect HDI and 0.735 is the median HDI. Out of the 189 countries to receive an HDI score, all East African countries fall in the bottom quartile (Table 1).

2017 Human Development Index

	HDI	Rank
Burundi	0.417	185
Djibouti	0.476	172
Eritrea	0.440	179
Ethiopia	0.463	173
Kenya	0.590	142
Rwanda	0.524	158
Somalia	-	-
South Sudan	0.388	187
Sudan	0.502	167
Tanzania	0.538	154
Uganda	0.516	162

Table 1. HDI Indices[31]

In addition to the current challenges of short life expectancies, lack of education, and low per capita incomes, the East African states possess demographic profiles that provide an additional justification to invest in electrification strategies. Between 50-70% of the population in this region is less than 25 years old (Table 2). As this youth matures, they will need jobs and shelter to establish new households. Electrification is a key industrial input to providing the necessary jobs and lighting the future households. While the generation infrastructure driving electrification can employ a proportion of this demographic, it can also create grievances from others. These grievances may result in conflict.

[30] United Nations Development Programme, "Human Development Index (HDI)," Human Development Reports, accessed May 2, 2019, http://hdr.undp.org/en/content/human-development-index-hdi.
[31] United Nations Development Programme, "Human Development Data (1990-2017)," Human Development Reports, accessed February 6, 2019, http://hdr.undp.org/en/data.

Youth Demographic Profiles

	Percent of Population Under 25-years-old	Median Male Age
Burundi	64.7	16.8
Djibouti	51.7	22.4
Eritrea	59.5	19.4
Ethiopia	63.4	17.8
Kenya	58.6	19.9
Rwanda	60.4	18.5
Somalia	62.2	18.4
South Sudan	63.2	18.4
Sudan	63.3	17.7
Tanzania	63.4	17.6
Uganda	68.9	15.8

Table 2. Youth Demographic Profiles[32]

Climate Change. Worldwide, oil, coal, and nuclear are generating a decreasing percentage of electricity (Figure 4). The corresponding global increase in renewables is reflected in Africa where partners such as Power Africa build renewable energy sources into a portfolio of generation facilities.[33] The substantial increase in renewables coincides with a continental concern over the impact of climate change in Africa.[34] Ugandan President Yoweri Museveni demonstrated this concern in 2007 when he called climate change an "act of aggression" by the developed world.[35]

[32] Data accumulated from the individual pages of the CIA World Factbook. CIA, "The World Factbook," accessed May 2, 2019, https://www.cia.gov/library/publications/the-world-factbook/.
[33] USAID, *Power Africa 2018 Annual Report*, 3.
[34] *China's Role in Africa: Implications for U.S. Policy: Hearing before the Subcommittee on African Affairs of the Committee on Foreign Relations United States Senate*, 112th Cong. (2011), 12.
[35] Andrew Clark, "Climate Change Threatens Security, UK tells UN," *The Guardian*, April 18, 2007, https://www.theguardian.com/environment/2007/apr/18/greenpolitics.climatechange.

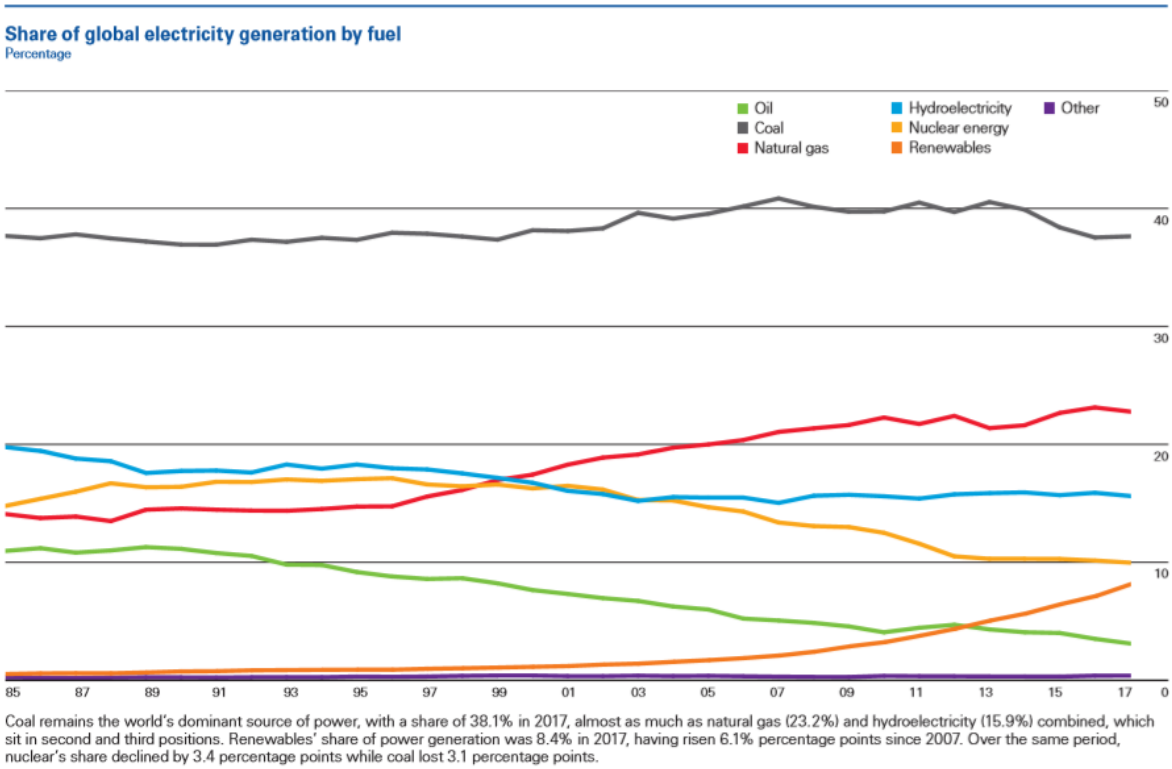

Figure 4. Global Electricity Generation by Fuel Source (1985-2017)[36]

Although the Intergovernmental Panel on Climate Change (IPCC) concluded with high confidence that, "Africa is one of the most vulnerable continents to climate change and climate variability, a situation aggravated by the interaction of 'multiple stresses', occurring at various levels, and low adaptive capacity," there were mitigating calls for optimism, especially within East Africa.[37] The severity of climate change in East Africa is partially offset by forecasted increasing in temperature and rainfall that will extend the growing season in the Ethiopian

[36] BP PLC, *Statistical Review*, 47.

[37] Michel Boko, Isabelle Niang, Anthony Nyong, Coleen Vogel, Andrew Githeko, Mahmoud Medany, Balgis Osman-Elasha, Ramadjita Tabo and Pius Yanda, "2007: Africa," in *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. Martin L. Parry, Osvaldo F. Canziani, Jean P. Palutikof, Paul J. van der Linden, and Clair E. Hanson (Cambridge, UK: Cambridge University Press, 2007), 435, https://www.ipcc.ch/site/assets/uploads/2018/03/ar4_wg2_full_report.pdf.

highlands.[38] Further adaptations of social and economic resilience are mitigating the severity of climate change.[39]

The East African physical and political geography, known energy resources, available foreign direct investment, and current human geography and security factors outline the conditions that led to the construction of the GERD. The following case study provides a scenario in which three international neighbors – Ethiopia, Sudan, and Egypt – arrived at a mutually beneficial agreement for an infrastructure development project. Although the analysis is limited to the local Ethiopian population and these three states, it produces a case study for other developing nations that might consider building a dam at a location with a diverse local population and downstream neighbors that belong to a different sovereign state.

[38] Boko, et al., "2007: Africa," in *Climate Change 2007*, 448.
[39] Boko, et al., "2007: Africa," in *Climate Change 2007*, 453.

CASE STUDY: THE GRAND ETHIOPIAN RENAISSANCE DAM (GERD)

Introduction

The Grand Ethiopian Renaissance Dam (GERD) is an infrastructure development project that promises to bring electricity to underdeveloped East Africa. Located in western Ethiopia, approximately 20km from the Sudanese border, the GERD disrupts the natural flow of the Blue Nile, the main tributary to the Nile (Figure 5). Regionally, this disruption will create consequences from its origin in the Ethiopian highlands through ancient civilizations in Sudan and Egypt to the Mediterranean Sea. Agricultural production in rain-poor Sudan and Egypt is dependent upon continued irrigation from the Nile. Locally, the rising reservoir behind the GERD will displace 20,000 individuals. Given these disruptions, the GERD has the potential to cause international and/or local conflict.

Figure 5. Map of the GERD.[40]

[40] Richard Conniff, "The Vanishing Nile: A Great River Faces a Multitude of Threats," *Yale Environment 360*, April 6, 2017, https://e360.yale.edu/features/vanishing-nile-a-great-river-faces-a-multitude-of-threats-egypt-dam.

Ancient Civilizations, Modern States, and the Nile. Civilization has utilized the waters of the world's longest river for millennia. The Nile basin collects water from 10% of the African landmass[41] and its inhabitants hail from eleven countries: all of the East African states except Djibouti and Somalia, plus the Democratic Republic of the Congo and Egypt. The western White Nile tributary originates at the southern terminus of the basin, an area surrounding Lake Victoria. The eastern Blue Nile tributary originates at Lake Tana in the Ethiopian highlands. The two tributaries combine at Khartoum, Sudan where the confluence of the two rivers reveals the contrasting colors that give the two rivers their names; the White Nile laden with grey sediment against the darker Blue Nile. Although the flow of the Blue Nile is highly variable and dependent upon monsoon rains, it contributes approximately 86% of the total flow, with the balance coming from the White Nile.[42] The consolidated Nile flows north through Sudan and Egypt, expanding into a delta downstream of Cairo before emptying into the Mediterranean Sea.

Agricultural production upstream of the confluence of the White and Blue Nile primarily relies on rainwater to deliver crop yields.[43] Absent demand for water for industrial uses other than agriculture, Ethiopia utilized less than 1% of the water in the Blue Nile at the turn of the twentieth century. In contrast, the two downstream countries – Egypt and Sudan – do not receive sufficient rainfall to deliver crop yields. Within these two countries, an estimated 120 million

[41] Richard Kyle Paisley, "Why the 11 Countries that Rely on the Nile Need to Reach a River Deal Soon," The Conversation, last modified August 27, 2017, 5:56am EDT, https://theconversation.com/why-the-11-countries-that-rely-on-the-nile-need-to-reach-a-river-deal-soon-75868. This reference is the first of several sources obtained through the Foreign Area Officer (FAO) program and forwarded to the author by Major Laura Perazzola.
[42] Haggai Erlich, *The Cross and the River: Ethiopia, Egypt, and the Nile* (London, UK: Lynne Rienner Publishers, 2002), 1.
[43] Michon Scott, "Two Niles Meet," NASA Earth Observatory, last modified April 26, 2013, https://earthobservatory.nasa.gov/images/81186/two-niles-meet.

people rely on irrigation from the Nile, [44] with 86% of the total irrigation water in Egypt originating as rainfall in Ethiopia.[45]

The importance of the Nile as an irrigation source can be seen in the current population distribution within Egypt (Figure 6).

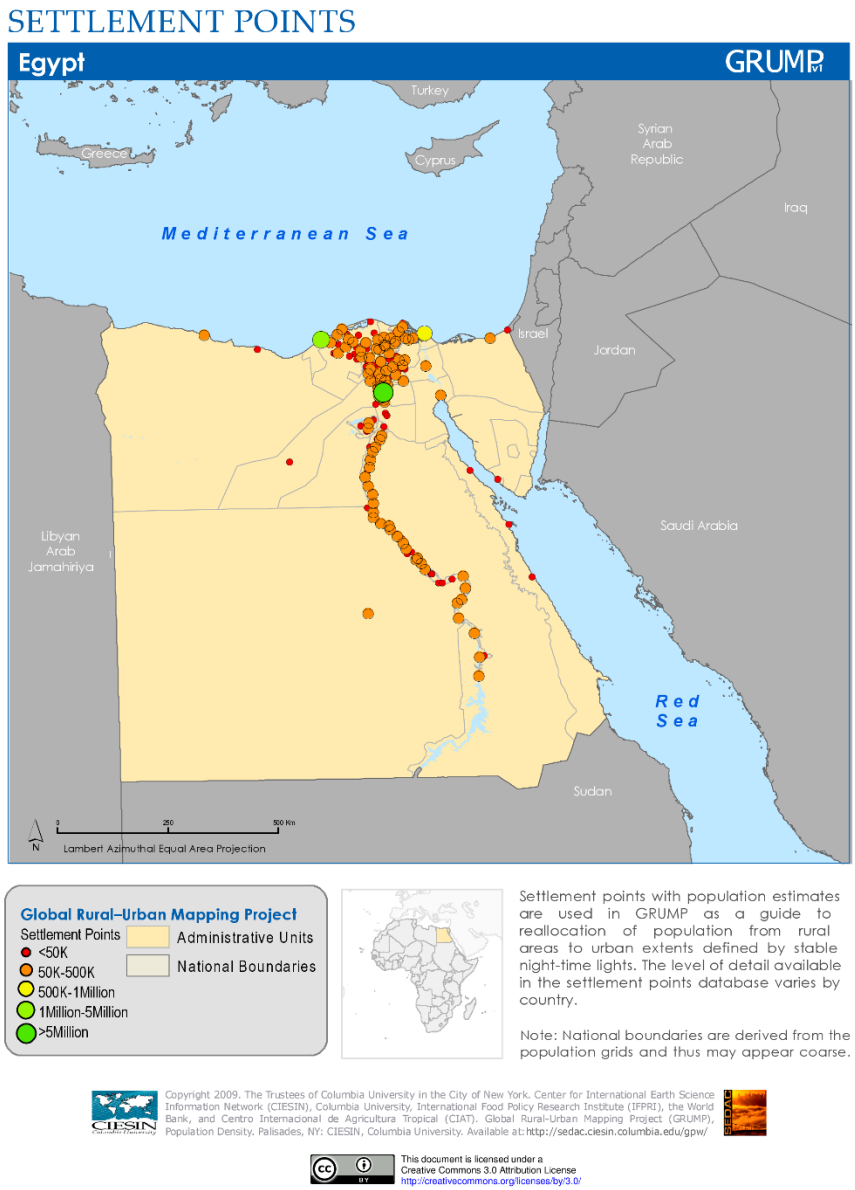

Figure 6. Map of Egyptian Settlement Points.[46]

[44] Scott, "Two Niles Meet," https://earthobservatory.nasa.gov/images/81186/two-niles-meet.
[45] Erlich, *The Cross and the River*, 1.
[46] Center for International Earth Science Information Network, "Settlement Points: Egypt," Socioeconomic Data and Applications Center (SEDAC), accessed April 30, 2019, http://sedac.ciesin.columbia.edu/maps/gallery/search/3?facets=theme:population&facets=region:africa.

Despite generations of technological advances that have enabled mankind to inhabit extreme environments, the Egyptians continue to live next to the Nile. In addition to determining Egyptian settlements, the Nile also defined early foreign policies with its upstream neighbors. The height of its role in foreign policy may have occurred in the eleventh century when the Egyptians believed that the Ethiopians had the ability to control the flow of the Nile.[47]

As industrialization slowly gathered steam across the continent, the demands for water from the Nile increased; however, the historic uses provide a background explanation as to why the upstream countries were not parties to the two Nile Waters Agreements of the twentieth century: the 1929 Anglo-Egyptian Treaty and the 1959 Egypt-Sudan Agreement. The earlier agreement allocated to Egypt 48 (57%) of the 84 billion cubic meters of annual flow through the Nile. Sudan received an additional 4 (5%) billion cubic meters of Nile waters. In addition, Egypt was granted veto power over construction projects. Thirty years later, the 1959 Egypt-Sudan Agreement increased water allocations to 55.5 (66%) and 18.5 (22%) billion cubic meters, respectively. Of note, this left only 10 billion cubic meters (12%) unclaimed, indicating the necessity of this resource to daily life in the region. A further stipulation agreed that any increases in yield shall be shared equally.[48]

Later in the twentieth century, continued industrialization led the independent states of the Nile basin to utilize the river waters for economic development other than irrigation. A Cooperative Framework Agreement (CFA) was drafted in 2010. Six nations have signed the CFA, including Ethiopia. The two downstream countries of Sudan and Egypt have abstained from the agreement, lobbying for a proposed amendment to Article 14(b). The original article

[47] Erlich, *The Cross and the River*, 45-47.
[48] Mwangi S. Kimenyi and John Mukum Mbaku, "The Limits of the New 'Nile Agreement'," *Africa in Focus* (blog), last modified April 28, 2015, https://www.brookings.edu/blog/africa-in-focus/2015/04/28/the-limits-of-the-new-nile-agreement/.

reads that signatories agree "not to significantly affect the water security of any other Nile Basin State." The proposed amendment from rain-poor Sudan and Egypt acknowledges their historic precedent to water use, agreeing "not to significantly affect the water security *and current uses and rights* of any other Nile Basin State" (emphasis added).[49]

Hydropower and Development in Ethiopia. Underlying Ethiopia's signature to the Cooperative Framework Agreement was a World Bank assessment that "The waters of the Nile probably constitute Ethiopia's greatest natural asset for development. … The development of the River Nile in Ethiopia has the potential to contribute significantly to poverty reduction, meet domestic power and food demands, and become a cornerstone of a future Ethiopian export strategy."[50] Emergent demographics within Ethiopia underscore the need to utilize the Blue Nile as a source of economic development. Six-three percent of the population is under 25 years old, generating a labor force that needs to be employed.[51] The United Nations Development Program's Human Development Index (HDI) furthers World Bank statements to reduce poverty. In 2017, Ethiopia's HDI rank was 173rd out of 189 countries.[52]

Despite these challenging demographics, Ethiopia has had success in terms of recent economic growth. "For more than a decade before 2016, Gross Domestic Product (GDP) grew at a rate between 8% and 11% annually – one of the fastest growing states among the 188" members of the International Monetary Fund[53] – and continued with 10.2% GDP growth in 2017.[54] This economic development, as demonstrated in electricity access, has not been

[49] Kimenyi and Mbaku, "The Limits of the New 'Nile Agreement'."
[50] Erlich, *The Cross and the River*, 7.
[51] Central Intelligence Agency, "Ethiopia," The World Factbook, accessed February 6, 2019, https://www.cia.gov/library/publications/the-world-factbook/geos/et.html.
[52] UNDP, "Human Development Data (1990-2017)," Human Development Reports, accessed February 6, 2019, http://hdr.undp.org/en/data.
[53] CIA, "Ethiopia," https://www.cia.gov/library/publications/the-world-factbook/geos/et.html.
[54] US Agency for International Development, *Ethiopia Fact Sheet* (Washington, DC: Power Africa, November 2018), 1, https://www.usaid.gov/sites/default/files/documents/1860/Ethiopia_-_November_2018_Fact_Sheet.pdf.

distributed evenly throughout the country. As of 2018, country-wide access to electricity was 40%, with urban areas enjoying 85% access rates in contrast to rural areas of 29% access.[55] An extensive electrification plan of hydropower plants and transmission lines are planned to achieve universal electricity access by 2030.[56] In addition to driving internal growth, surplus generation capacity will result in annual electricity exports forecasted in excess of $1 billion USD.[57] By the time it is completed, the Grand Ethiopian Renaissance Dam (GERD) is forecasted to produce more than 40% of Ethiopian generation capacity, making it an important component of the electrification scheme that will place Ethiopia as the powerhouse of East Africa.

Bolstered by an aggressive electrification plan and more than a decade of sustained economic growth, and further motivated by consistently inadequate scores in human development, construction of the GERD began in April 2011. Located approximately 20km from the Sudanese border in the Benishangul-Gumuz region, the 6,000MW GERD is the largest hydropower project in Africa and seventh largest in the world. By the spring of 2018, construction of the massive dam employed 8,750 Ethiopians and 250 international workers.[58] In addition to being built with predominately Ethiopian labor, the GERD is being financed by predominately Ethiopian funds. The Government of Ethiopia has raised taxes, sold bonds, and collected the equivalent of one month's salary from public employees to source funding for the dam.[59]

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[55] USAID, *Ethiopia Fact Sheet*, 1.
[56] USAID, *Ethiopia Fact Sheet*, 1.
[57] Ivan Cuesta-Fernandez, "Mammoth Dams, Lean Neighbours: Assessing the Bid to Turn Ethiopia into East Africa's Powerhouse," in *A New Scramble for Africa? The Rush for Energy Resources in Sub-Saharan Africa*, edited by Soren Scholvin (Burlington, VT: Ashgate Publishing Company, 2015), 93.
[58] J. Peter Pham, "Grand Ethiopian Renaissance Dam Marks Milestone, Approaches Completion," *AfricaSource: Strategic Insight on the New Africa* (blog), April 3, 2018, https://www.atlanticcouncil.org/blogs/africasource/grand-ethiopian-renaissance-dam-marks-milestone-approaches-completion.
[59] Kingsley Ighobor and Busani Bafana, "Financing Africa's Massive Projects," *Africa Renewal*, December 2014, https://www.un.org/africarenewal/magazine/december-2014/financing-africa's-massive-projects.

The main contractor to receive this funding is Salini Impregilo, an Italian firm that was awarded the contract in secret.[60] Hailing from Ethiopia's former occupying power and regional colonial power, Salini has a history of building dams in Ethiopia's Omo basin, which may have influenced the decision to contract with Salini without utilizing a competitive bidding process.[61] Although Salini is constructing the GERD with primarily Ethiopian labor, this increase in regional employment is offset by the expected displacement of 20,000 individuals.[62] Residing in the shadow of the 145m tall and 1.8km long GERD, these individuals will relocate outside of a reservoir that will retain a water volume that is equivalent to twice the capacity of Lake Tana.

Filling the reservoir behind the GERD creates tension between Ethiopia and the downstream states. Every drop of water held back in the reservoir is one that is not moving downstream for irrigation. Ethiopia is incentivized to fill the reservoir as quickly as possible to maximize electrical generation capacity. Conversely, Egyptian and Sudanese interests lie in filling the reservoir as slowly as possible to maximize their irrigation capabilities. Once filled, increased evaporation from the surface of the reservoir will further contribute to decreased flows downstream. The GERD began during the Arab Spring, mitigating attention from the surrounding states, especially Egypt. Tensions had escalated by 2013 when Egyptian President Mohamed Morsi declared at a rally that, "If [the Nile] loses one drop, our blood is the alternative." Later in the speech, President Morsi dialed back his rhetoric, "We are not calling for war, but we will not allow, at all, threats against our water security. … All options are open."[63]

[60] International Crisis Group, *Bridging the Gap in the Nile Waters Dispute* (Brussels, Belgium: Headquarters, March 20, 2019), 4, https://www.crisisgroup.org/africa/horn-africa/ethiopia/271-bridging-gap-nile-waters-dispute.
[61] Cuesta-Fernandez, "Mammoth Dams, Lean Neighbours," 104.
[62] Veilleux, "Human Security Dimensions of Dam Development," 5.
[63] Al Jazeera, "Egypt Warns Ethiopia Over Nile Dam," last modified on June 11, 2013, https://www.aljazeera.com/news/africa/2013/06/201361144413214749.html.

Despite this warning, Egypt joined Sudan and Ethiopia in signing the GERD Declaration on March 23, 2015. The parties agreed not to utilize the Nile waters in causing harm to any signatory, but to make just and fair use of the Nile. Goals of sustainable development and regional economic integration were reaffirmed as well as the principle of equal state sovereignty. Finally, the states pledged to resolve any future disputes using peaceful conflict resolution.[64] In May 2018, the parties signed an additional agreement to fund a scientific inquiry on environmental impacts. Although Egypt called for a halt in construction to await the scientific inquiry, construction on the GERD continued. To date, construction is 60-70% complete, with completion scheduled for 2022, five years behind the original completion date of 2017.

Analysis of Conflict Potential

International Conflict. Given the lack of precipitation over their soil, both Egypt and Sudan have a vested interest in maintaining their historic rights to access Nile waters as demonstrated through the millennia of civilization on the banks of the river and acknowledged in twentieth-century colonial agreements. The GERD, an obstacle on the river that denies downstream water use in the short-term as the reservoir is being filled and in the long-term by increasing evaporation rates, is a threat to these historic rights. Despite this zero-sum view of water usage, several factors mitigate the possibility of disputes over the GERD escalating into an international conflict: the costs of extending state power, firm borders, and mutually recognized state sovereignty.

[64] The Swedish Defense Research Agency, *The Wider Security Implications of the Grand Ethiopian Renaissance Dam (GERD) Dispatch no. 9* (Stockholm, SE: FOI Memo 5492:9): 2. Another reference obtained through the FAO program and forwarded to the author by Major Laura Perazzola.

Variable terrain, mobile inhabitants, and low population density created high costs to extend state power to the hinterlands. As this power concentrated in a political center,[65] a Yardaji villager summarized this practice in a maxim, "The limit of one's strength, that was the boundary."[66] Infrastructure development created inroads within the continent, projecting power along these corridors. A nineteenth-century Asante maxim that "No Asante is familiar with these places because the King's highways do not run there" resonated with contemporary colonizers.[67] In addition to knowledge of the hinterlands, these railroads and roads enabled the extraction of resources for profit and the movement of troops for control. Reflecting on these historical precedents, Ivan Cuesta-Fernandez, a scholar on state authority and spatial reach in Sub-Saharan Africa, noted that, "A renewed modernist drive – embodied in the large dams already constructed and the thousands of kilometers of power lines laid – could deliver for Ethiopia's political elite the political and economic capital that railway tracks yielded for the early twentieth century's imperial rulers."[68] The GERD assumes a prominent role in export electrification plan that, literally and figuratively, projects power through its transmission lines.

While the GERD enables Ethiopia to project its power across its borders, it does so within an African state system that maintains a footprint from the historical difficulty of broadcasting power into the hinterlands. In analyzing the state system that developed, Herbst concluded that:

> Rulers in Africa created a particular type of state system in order to help them confront the peculiar difficulties they were having in exercising their authority across the

[65] Herbst, *States and Power in Africa*, 46.
[66] Herbst, *States and Power in Africa*, 35.
[67] Herbst, *States and Power in Africa*, 42.
[68] Cuesta-Fernandez, "Mammoth Dams, Lean Neighbours," 107.

> territories they were said to control. Cooperation, rather than continual conflict, has characterized Africa during the last [twentieth] century of state-making, a vision that directly challenges traditional realist assumptions about the anarchical nature of international society and the importance of threat of force.[69]

The 2015 GERD Declaration and subsequent 2018 agreement for scientific analysis of environmental impacts are testaments to this spirit of cooperation. All three parties – Ethiopia, Sudan, and Egypt – affirmed shared goals of sustainable development and regional economic integration. Where Ethiopia's HDI places its human development in the bottom 10% of all countries, Egypt and Sudan are also behind the world average with HDI ranks of 115 and 167, respectively.[70] In addition to cooperating for the quality-of-life benefits for their citizens, the 2015 GERD Declaration pledge to resolve any future disputes using peaceful conflict resolution reaffirmed the principle of equal state sovereignty and maintained the prevailing attitude that borders are firm.

Local Conflict. Two dimensions will determine whether the GERD will contribute to local, or intrastate, conflict: how the ruling elites manage the water and electricity resources, and how the local population reacts to displacement and the distribution of benefits. With the completion of the GERD and associated transmission lines, Ethiopia will generate surplus electricity and possess a means to export it to neighboring countries. This abundance of resources makes the state susceptible to rent-seeking and economic instability. Non-state actors

[69] Herbst, *States and Power in Africa*, 26.
[70] UNDP, "Human Development Data (1990-2017)," Human Development Reports, accessed February 6, 2019, http://hdr.undp.org/en/data.

will be susceptible to grievances caused by the "illegitimate distribution of natural resource wealth and socioeconomic impacts of extractive operations."[71]

In order to avoid conflict caused by rent-seeking and economic instability, the ruling Ethiopian People's Revolutionary Democratic Front must avoid the temptation to siphon GERD assets for personal gain and astutely manage volatilities in water flows and electricity contracts. The concentration of GERD ownership by Ethiopian Electric and Power Corporation creates a single flow of funds which may tempt ruling elites to withdraw rents. However, debt obligations may prohibit the elites from withdrawing funds. As one of the fastest growing countries in the International Monetary Fund, Ethiopia has a growing need for electricity generation. Internal consumption of the resulting electricity aids in a social contract where Ethiopians pay the bills to benefit from an Ethiopian asset. However, as the proportion of electricity for export increases, the prospect of rent-seeking increases.[72] In contrast to oil, electricity is not tendered on the global market and therefore not susceptible to global price shocks in a commodity market.

How well the ruling elites can resist the temptation to siphon profits from the GERD will play a role in determining motivations for peace or violence by local non-state actors. Current electrification rates demonstrate that "urban groups with privileged access to many of the resources allocated by the state."[73] The Gumuz, Berta, and Amhara people living in the vicinity of the GERD lack electricity in the local villages, but remained optimistic regarding the economic development that would result from the dam, including "education, access roads and bridges, and healthcare clinics."[74] These expectations place a burden on the ruling elites to provide social services to the local populace in order to avoid the perception of relative

[71] Paul D. Williams, *War & Conflict in Africa* (Cambridge, UK: Polity, 2011), 74.
[72] Williams, *War & Conflict in Africa*, 74.
[73] Herbst, *States and Power in Africa*, 18.
[74] Veilleux, "The Human Security Dimensions of Dam Development," 10.

deprivation; "the discrepancy between what people think they deserve (value expectations) and what they actually think they can get (value capabilities)."[75] With that said, it is important to note the abundance of electricity is not an easily lootable asset that could be resold on an open market.

If state decisions to distribute wealth and local interpretations are long-term concerns of the GERD in operation, a short-term conflict potential exists with the displacement of 20,000 individuals to accommodate the dam. The Gumuz people are primarily subsistence farmers who harvest from separate fields during the wet and dry seasons.[76] Without a formal land ownership program, the Gumuz also "hunt wild animals, gather honey, wild fruits, roots, and seeds."[77] By harvesting from different plots of land based on the climate and supplementing their domesticated crop with foraged food, the Gumuz are modeling the adaptations that the IPCC cited as a method for acclimating to climate change. Furthermore, with little investment in the land, the Gumuz may demonstrate less interest to defend the land that they currently occupy.[78]

Entering its eighth year of construction, the GERD has not been implicated as a motivation for local violence. However, if the distance that the Gumuz are dispersed from the GERD sight increases, there is the potential to increase the probability of non-state violence. distance from the east and south, potential violence may result from land conflicts with the Oromos. The Uppsala Conflict Database records casualties between the Gumuz and Oromos people between 2007-2008. "Ethnic clashes between the Gumuz and neighboring Oromos over land rights occurred in 2008. The Oromos accuse the federal government and the regional state

[75] Williams, *War & Conflict in Africa*, 80.
[76] Veilleux, "The Human Security Dimensions of Dam Development," 10.
[77] Uppsala Conflict Data Program, "Gumuz," accessed on January 28, 2019, https://www.ucdp.uu.se/#/actor/899.
[78] Herbst, *States and Power in Africa*, 38.

of Benishangul-Gumuz of manipulating, mobilizing and arming the Gumuz to attack the Oromos."[79]

Analysis Toward Continued Cooperation

International Cooperation. The more that Ethiopia views its hope for development as concentrated on the GERD, the greater the probability that it will view its relationship with its downstream neighbors as a zero-sum proposition. If it can withdraw from this belief and focus on the tangible goals that the GERD is supposed to affect, there is an increased likelihood of cooperation. For example, focusing on electric generation, although the GERD will be the single largest generator in its electrification portfolio, Ethiopia has hydropower assets in the eastern Omo basin. Recognizing the value in a diverse portfolio, Ethiopia may be able to achieve stable electrification by increasing generation in the Omo basin and correspondingly decreasing generation from the GERD. Manipulating its electrification portfolio in this manner, Ethiopia can release more water through the GERD to satisfy downstream neighbors. In addition, international actors such as the U.S Agency for International Development's Power Africa can provide a diversified portfolio of power sources, including wind, solar, and geothermal to complement hydropower. Power Africa's 2030 Ethiopian pipeline includes 3,878MW of new generation capacity.[80]

Unlike Ethiopia, Egypt cannot focus on the benefits of hydropower production but is dependent on the direct consumption of Nile waters. It will seek to influence Ethiopia in two aspects of GERD management: 1) the rate at which the reservoir is filled, and 2) accommodating

[79] Uppsala Conflict Data Program, "Gumuz," https://www.ucdp.uu.se/#/actor/899.
[80] USAID, *Ethiopia Fact Sheet*, 1, https://www.usaid.gov/sites/default/files/documents/1860/Ethiopia_-_November_2018_Fact_Sheet.pdf.

annual monsoon rains. It is not clear that military action would further either of these goals. A military attack destroying the GERD will cause flooding in Sudan, inundating fishing locations, an artisanal gold mine, an agricultural area, and two villages.[81] If this destruction is insufficient in motivating Sudan toward cooperation, it is also motivated by reducing the silt buildup behind the Roseires Dam, approximately 100km downstream from the GERD.

Local Cooperation. Field research conducted in 2012 revealed that the local populace expected many benefits from the GERD, including access to markets, healthcare facilities, primary education, and fishing resources within the newly formed reservoir.[82] These benefits augmented the Gumuz' assumption that they would be provided with continued access to the reservoir. If the state fails to deliver services to the Gumuz, it is unclear whether the Gumuz will have a violent reaction to a lack of services that they may feel entitled to receive.

Due to the distance between the GERD and conflict areas between the Gumuz and Oromos, it is less likely that the GERD will cause further conflict between these two ethnic groups. However, the Oromos' lack of confidence in the regional state of Benishangul-Gumuz is disconcerting to further stability in the region. To the extent that the Oromos comprise the population within Benishangul-Gumuz, power-sharing agreements such as consociationalism can further reduce the probability of resumed conflict.

Summary of the Analysis

Generations have existed along the banks of the Nile and its two tributaries. Upstream agricultural societies relied upon rainfall while downstream societies along the Nile proper siphoned water from the river to irrigate fields. Precolonial rulers, European colonizers, and

[81] The Swedish Defense Research Agency, *The Wider Security Implications of the GERD*, 5.
[82] Veilleux, "The Human Security Dimensions of Dam Development," 9-10.

twentieth-century states struggled to project power upon variable terrain with a low population density and a mobile populace. As new forms of infrastructure were introduced to the region, rulers used these corridors to extend their power into the hinterland.

Entering into this historical context, the GERD is a cornerstone infrastructure development project that promises to bring electricity to underdeveloped East Africa. Disrupting the Blue Nile, it has invoked threats of violence from international neighbors that reside downstream. Despite these threats, Egypt and Sudan have signed agreements affirming their shared interest in regional economic development. Locally, the Gumuz demonstrate resiliency in their ability to move their farming operations with the changing wet and dry seasons. Combining this adaptability with an optimism regarding the benefits that the GERD will provide, the Gumuz have not demonstrated violent reactions to the building of the dam. Thus, on both an international and local scale, the actors involved have chosen strategies of cooperation over conflict.

CONCLUSION

Electrification through energy resource development can enable East African countries to overcome human development obstacles such as low education rates and poor per capita GDP. While these conditions drive a current need for electrification, young demographic profiles demand increased access to electricity in the future. Fortunately, East Africa is blessed with energy reserves that can fuel future electrification. In the nineteenth and twentieth centuries, colonial rulers influenced decisions to develop and manage these resources. Although the states of East Africa are sovereign today, international actors from outside the region continue to play a role in this sector, whether as a state, intergovernmental organization, or private corporation. As the East African states work with international actors to develop these resources, consequences will affect the potential for conflict or cooperation.

Working with international partners, Ethiopia is developing its segment of the Blue Nile into a powerhouse that can stimulate economic growth within its borders and within the region. Initially, the GERD sparked threats of violence from its downstream neighbor who feared that the project would result in a loss of water rights. Despite Egypt's initial threats, it joined Sudan and Ethiopia in signing development agreements for the continuation of the project. On a local level, the 20,000 individuals forecasted to be displaced by the reservoir maintain a livelihood that is adapted to a climate that forces mobility with the rainy and dry seasons. This culture of adaptability may be the very trait that keeps the local population from building the grievances associated with displacement. Short of these grievances, the population looks forward to development opportunities spurred by the dam as opposed to mobilizing in violence against the dam. In setting aside violent reactions, the local Ethiopian populations joined Egypt and Sudan in supporting the GERD in a spirit of cooperation rather than conflict. Thus, the case study provides

a positive path for not only other developing nations that might consider building a dam; benefiting from electrification instead of suffering from local or international conflict.

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