Ethical Dilemma: The Blue Nile Dam

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**Preface**

Tensions are high on the African continent. With topographical maps spread out on boardroom tables, contingency plans are being drawn as we speak for a pre-emptive military strike by Egypt on a dam under construction in Western Ethiopia. At issue is the question of a sovereign country’s right to complete dominion over internal waterways within its borders. Namely, may a country do as it wishes with rivers that pass through its territory if such alterations negatively impact neighboring countries, the environment, or in any way harm the people of its own country? Can the application of ethical orthodoxy assist us in determining the correct path for a country to follow? I believe it can; and I believe that it will lead us to the conclusion that the construction of this dam is morally unsupportable. It violates both utilitarian and deontological precepts. It flies in the face of the basic principle of utilitarianism in that it will not provide happiness for the greatest number of people (1) . Deontologically, it ignores the categorical imperative of Kantian ethics by treating people as a means to an end and not as the end itself (2). In complete disregard for its duty to treat its people fairly and the right of the people to expect justice and equanimity from their leaders, the Ethiopian government has already begun work on the massive project. Lastly, but foremost in challenging the project, is the existence of ethically sound alternatives to the construction of what threatens to be the seventh largest dam in the world (3).

**Introduction**

The Al-Monitor, an online news journal which hails itself as ”The Pulse of the Middle East”, published an article (4) in late 2016 reviewing the status of the massive Grand Ethiopian Renaissance Dam on the Nile River. Under construction since 2010, the dam, when completed, will be the seventh largest in the world (5). The article highlights the controversy surrounding the dam and its effect on Egypt (6), a riparian country that borders the Nile downstream, for which the Nile River is the sole source of fresh water. With a population of over 90 million (7), Egypt is concerned that any diminution in the flow of water will affect the people directly and have a measured and strongly negative impact on Egyptian agriculture as well. Energy-poor Ethiopia sees the dam as a legitimate carbon-free alternative to energy generation; excess energy will be sold and is a potential source of additional income for the country.

While we may not be able to stop the construction of the dam, as Public Health professionals we have a responsibility to help society transition away from hydroelectric power. With our present-day shift toward evidence-based decision-making, we must commence data collection now as a base line reference level for the dam and for the region. Subsequent longitudinal studies of disease incidence rates will provide needed insight. This data will be instrumental in convincing international water rights agencies to more closely monitor, vet, and restrict the proliferation of dams worldwide. Alternative energy sources are plentiful. Spain and Morocco have successfully constructed solar towers which have zero impact on the environment and efficiently provide energy to entire cities.

To students of public health anxious to enter the fray, Ethiopia may seem an attractive venue as a LMIC (low and middle income countries) country with many natural resources and dependent on assistance from the Global North (8). Unfortunately, it is also one of the most dangerous places to volunteer (9). In addition to the already existing health hazards of yellow fever, polio, and schistosomiasis (10) , there is a level of lawlessness that the US State Dept. rates, as of this date, as “high” (11). In addition, with the construction of the hotly debated mega-dam nearing completion there is a clear and present risk of open confrontation with Sudan and/or Egypt (12).

The greatest danger, however, has yet to surface. Once complete, the dam will amass a reservoir of standing water of enormous proportion, a perfect breeding ground in a tropical environment for snail sporocysts (13) and with that, the likelihood of an unparalleled epidemic of schistosomiasis.

For many of us, the construction of this dam is a missed opportunity for strengthening of ties between friction-prone neighboring nations. With the guidance of seasoned negotiators and policy experts, Sudan, Ethiopia, and Egypt could have participated jointly in the construction of a solar tower in the Sahara with each contributing workers, security forces, and sharing of the energy produced. Instead we see an ethically dubious decision to construct the dam and a strongly fissiparous result which could very quickly evolve into armed conflict. (14)

**Analysis**

Ethiopia insists that the dam will benefit all; that it is as much for the benefit of the entirety of the African ecumene as for the riparian countries of Ethiopia, Sudan and Egypt. Those in favor of the construction of the dam cite the following reasons:

* The dam will provide an abundant supply of hydroelectric power.
* By selling the excess power to neighboring countries the dam will provide an additional source of needed revenue to the great benefit of the largely impoverished inhabitants.
* The dam will not pollute the environment in the same way that coal will or nuclear plants might.

These arguments, however, do not justify a project that will have a catastrophic impact on all countries in the region. It turns a blind eye toward the long-term and widespread detrimental consequences which include:

* The dam will deprive Egypt of needed fresh water for its population and mineral rich silt for its agricultural industry resulting in high use of chemical fertilizer supplements downstream.
* The reservoir created behind the dam will result in enormous loss of available water to Ethiopia and its neighbors through evaporation in the tropical environment.
* The reservoir will create a huge shallow wetland area upstream that will serve as a breeding ground for malaria-ridden mosquitoes and parasite-bearing snails (the main source of infection for schistosomiasis).
* The erosive force of the outflow through the dam will strip many kilometers of the Nile river bottom of silt and gravel necessary for fish spawning, and erode riverbanks far downstream.
* Trading between countries which use the river for transport will be entirely blocked by the dam. (In a region largely without major roads, blocking the river would effectively prevent transport between countries.)

**Deontological ethics**

From a deontological or *nonconsequentialist* perspective, the Ethiopian government has certain absolute duties that must be respected. First described by Samuel von Pufendorf in the 17th century, they are, “avoid wronging others, treat people as equals, and promote the good of others (15)”. These duties imply certain corollaries, namely, the rights of the affected people. First espoused by John Locke in the 17th century, they include the right to “life, health, liberty or possessions (16)”.

Immanuel Kant, following Locke’s teaching, condensed the concept further by introducing the categorical imperative, viz.,” Treat people as an end, and never as a means to an end” (17). In other words, people must always be treated with dignity. As such, the construction of the dam violates the “Rights Theory”, where there is a moral obligation to respect the rights all persons affected. By extension, that includes not only the human population, but the wildlife and environment as well. Namely:

* The people have the right to a home, food for themselves and their families and safety from disease.
* The living creatures that make up the ecosystem have the right to a food supply and the ability to defend themselves from predators.
* The people have a right to make use of the river for transport of goods, bathing, fishing, or for their personal farms.
* The people have a right to expect protection from harm, including that of exposure to potential disease.

**Prima facie duty of beneficence**

In response, the Ethiopian government may insist that their actions are morally correct by citing their prima facie duty of beneficence (18). First described by W.D. Ross in the 18th century, the prima facie duties are obligatory guidelines to proper behavior. The construction of the dam, Ethiopia may contend, will give it the resources to build hospitals and schools; and they will relocate the people affected by the dam as well as provide generous compensation to all those adversely affected.

Such motives, at first glance, appear valid. However, destruction of the ecosystem and with it existing farms, open farmland, and fish spawning zones, invalidates their argument. Although the dam may be a significant help in the future if schools and hospitals, etc., were built, the present population would not benefit and would be used as a means to that end. This violates the Kantian rule that the people must *be* the end and not the means.

Besides, what guarantee do the people have that the promised improvements in their lives would actually occur? Such benefits would need to apply to all the affected people, which include those living in Sudan and Egypt as well as in Ethiopia. With the political instability that has plagued the region for the past many decades, it is unlikely that the dam will be successful in changing long-standing intransigent dictatorial attitudes.

**Alternatives**

The overriding pivotal question, however, is why the Ethiopian government has turned to hydroelectric power when there are alternatives that do not destroy the ecosystem, introduce infection, destroy farmlands, or interfere with navigation on the river. Those alternatives are: Solar and wind energy farms. That there are viable alternatives to a dam as a source of energy production, casts a long shadow over the legitimacy of the project and effectively invalidates any ethical argument in its favor. Invoking again deontological ethics, where the loupe of ethical inspection is focused on motive, the people are being used as pawns in an endgame that ignores their right to be treated honestly and with dignity.

**Utilitarian Ethics**

In contrast, utilitarian ethics, where the *consequences* of one’s actions are the critical determinant, the proper action in a given situation is the one producing the greatest amount of utility (or happiness). With the goal of quantifying the happiness produced in any given situation, Jeremy Bentham devised the Hedonistic Calculus (1). Ostensibly, the Calculus can reveal to what degree an action is justified, based on the degree of happiness produced. Such quantification, however, in evaluating the construction of the Blue Nile Dam from an Act Utilitarian viewpoint would be tedious and impractical. It would require answers to the following questions:

* Will the Ethiopians permit silt pass-through periodically to allow nutrient rich effluvium and fresh water to reach downstream farms; and if so, to what degree?
* If the fresh water that is allowed to flow downstream to Egypt is insufficient to meet that country’s needs, will the Egyptians be able to make up for the difference through alternate technologies (desalination plants)?
* Will necessary anti-malarial and snail removal measures be instituted, and how effective will they be in a region of the world where such diseases are endemic and disease prevention has been largely hit or miss (19)?
* Will the dollar savings in energy cost by utilizing the dam be shared with the people of Ethiopia or remain in the hands of the governing few; and will it result in an improvement in the quality of life in the ecumene?
* Will the dam include locks which permit passage around the dam?
* Will there be bypass channels for spawning fish? Will there be permanent elimination of fish or other species, as almost happened with the Nile crocodile (20)?

**Health Risks**

The primary objective of the dam is the generation of energy, not an improvement in the standard of living for the country’s inhabitants. In support of this claim, I have considered the dam’s effect on the farms that border the river upstream. They will be submerged beneath the waters of an enormous reservoir. The potential for countless cases of illness from the insects breeding in the newly created wetlands is very likely. The most devastating of these diseases is that of schistosomiasis, also known as snail fever.

Fresh water snails live in the lakes and slow moving waters of tropical countries in Africa and Asia. Parasites endemic to those waters enter the snails’ bodies where they lay eggs which are then released into the surrounding waters in the millions. As the eggs mature they develop into larvae which are attracted to the fatty acids given off by human skin. Within a few seconds and completely unnoticed by the victim, the larvae penetrate the intact skin of bathers, fishermen, or anyone who exposes their skin, even briefly, to the infested water. Once within the human body the parasite causes protracted and severely debilitating disease or death.

The vast reservoir of shallow wetlands that will result from the creation of the Blue Nile Dam will *significantly* boost the population of infected snails and with that the number cases of schistosomiasis. The World Health Organization reports that schistosomiasis, second only to malaria in prevalence, presently infects nearly 200 million people, with 600 million people at risk world-wide (19).

**Doctrine of Double Effect**

Proponents of the project may cite Thomas Aquinas’ Doctrine of Double Effect (DDE), admitting an awareness of the negative effect on the riverine villages, and of the increased disease (21). They may insist that the quality of life for the people of the region will, nevertheless, be greatly improved. However, the DDE does not support their argument. Condition 1 of “The Nature of the Act Condition” of the DDE, states that the action must be good or morally neutral (21). The construction of the dam, given the existing alternatives, is *not* good. As well, with Condition 4, “The Proportionality Condition”, the good effect must be at least equivalent in importance to the bad effect (21). Although we cannot quantify the number of people who die or are incapacitated from the vector-borne diseases, we can safely project from the sheer size of the upstream reservoir that many hundreds of kilometers will be inundated and tens of thousands will be subject to the misery of the ravaging mosquito and snail populations.

Furthermore, what will be the impact of such a project on people who navigate the river to trade with Sudan and Egypt? Navigation on the river will no longer be possible. With locks, what will passage cost? Will small traders be able to afford the cost? These are unanswered questions that have not been adequately addressed by the Ethiopian government and attest to the low level of regard for the well-being of the rural inhabitants.

**Ecosystem**

Studies by Snoussi et al. (22) have documented a measurable increase in downstream water salinity. Further, they report that downstream riverine soil analyses confirm elevated salinity as well. The ultimate impact on downstream riverine agriculture, in a region where floodplain farming has been an integral part of Egypt’s history over millennia, is as yet unknown. Braatne et al. (23) have shown that damming, with its interruption of the cycle of seasonal flooding, deprives the downstream floodplain of the natural erosion and deposition of occasional floods. Such flooding, they explain, “can immediately have dramatic impacts on aquatic and riparian zones. Floods often enable bursts of recruitment by riparian plants and some other biota and thus, the initial “destruction” may be followed by ecosystem rejuvenation…” (p. 277-278).

Equally important is the impact of the dam on the other residents of the region: The animals. As living beings, do they not also have a right to live unmolested in their natural habitat, an ecosystem finely tuned over millennia to meet their specific needs? The dam will convert the flowing water of the Nile into a shallow reservoir of still water upstream; it will interpose an impenetrable barrier; and, downstream, the river bottom, previously covered with gravel and fine silt, will be stripped bare by the erosive action of the dam’s outflow. Clark et al. (24) have determined that with decreased river flow following damming, the oxygen content of the water is considerably less. Aquatic creatures like turtles that depend on high aquatic oxygen concentration in order to dive deeply, are unable to do so. Mortality rates for such creatures will be increased in that environment.

Not long ago the Nile crocodile was nearly wiped out by a similar dam (20). However, the main casualty here will be the fish that require sand, silt, and gravel to spawn. Thus, I give the animals a solid proxy vote of “No happiness” in the utilitarian equation.

Thus, from the greater perspective of Rule Utilitarianism, could the creation of *any* dam today be ethically justified (25)? In earlier decades, when the Hoover Dam or Aswan Dam was constructed, the balance was tilted much more in favor of ethical legitimacy due to the absence of alternative sources of energy. That, however, is no longer the case with present day technological advances.

**Conclusion**

The simmering discontent between Egypt and Ethiopia over the Blue Nile project, although untimely in view of present day political turmoil, demands the world’s prompt attention. The dispute has moved well beyond that of being an issue of national sovereignty into the arena of ethical propriety. As such, I have presented the ethical arguments both for and against the construction of the dam. I have taken into consideration its impact on the inhabitants of the region and on the environment. I have demonstrated that while it is not possible to accurately account for all conceivable ramifications, the dam will have a strongly negative effect on the people of region and on the ecosystem itself. There is little doubt that it will contribute to the spread of debilitating and deadly disease. In an era when viable less controversial alternatives to clean energy production exist, the construction of the Blue Nile Dam is no less than a present day anachronism that portends great harm to the ecumene. (26)

**Works Cited**

1. Bentham J. The collected works of Jeremy Bentham: An introduction to the principles of morals and legislation. Clarendon Press; 1996.

2. Kant I, Gregor CM. Kant: Groundwork of the metaphysics of morals (Cambridge texts in the history of philosophy). 1785 [cited 2017 Apr 20]; Available from: https://scholar.google.com/scholar?q=Kant%2C+I.+%281785%29.+Groundwork+for+the+Metaphysics+of+Morals.+&btnG=&hl=en&as\_sdt=0%2C5

3. Grand Ethiopian Renaissance Dam Project, Benishangul-Gumuz, Ethiopia [Internet]. Water Technology; [cited 2017 Apr 1]. Available from: http://www.water-technology.net/projects/grand-ethiopian-renaissance-dam-africa/

4. Aman A. Dam construction going full steam ahead while Egypt-Ethiopia talks stall. [Internet]. Al-Monitor: The Pulse of the Middle East. 2016 [cited 2017 Mar 31]. Available from: http://www.al-monitor.com/pulse/originals/2016/08/egypt-ethiopia-renaissance-dam-construction-progress-talks.html

5. Davison W. Ethiopians Rally Olympic-Style, Chip in on Bonds for Dam - Bloomberg [Internet]. Bloomberg. 2015 [cited 2017 Apr 6]. Available from: https://www.bloomberg.com/news/articles/2015-05-12/ethiopians-rally-olympic-style-chip-in-on-bonds-for-dam

6. Ingram E. Ethiopia says planned attack on Grand Ethiopian Renaissance Dam stopped - HydroWorld [Internet]. HydroWorld International. 2017 [cited 2017 Apr 1]. Available from: http://www.hydroworld.com/articles/2017/03/ethiopia-says-planned-attack-on-grand-ethiopian-renaissance-dam-stopped.html

7. CIA. The World Factbook — Central Intelligence Agency [Internet]. The World Factbook. 2017 [cited 2017 Apr 1]. Available from: https://www.cia.gov/library/publications/the-world-factbook/geos/eg.html

8. Ouma B, Dimaras H. Views from the global south: exploring how student volunteers from the global north can achieve sustainable impact in global health. BioMed Cent Glob Heal [Internet]. 2013 [cited 2017 Mar 28];9(32):1–6. Available from: http://download.springer.com/static/pdf/334/art%253A10.1186%252F1744-8603-9-32.pdf?originUrl=http%3A%2F%2Fglobalizationandhealth.biomedcentral.com%2Farticle%2F10.1186%2F1744-8603-9-32&token2=exp=1490699717~acl=%2Fstatic%2Fpdf%2F334%2Fart%25253A10.1186%252

9. Message for U.S Citizens | Embassy of the United States Addis Ababa, Ethiopia [Internet]. United States Embassy Addis Ababa. 2017 [cited 2017 Apr 6]. Available from: https://ethiopia.usembassy.gov/warden\_information/elevated-kidnapping-threat-for-u.s.-citizens-in-somali-region-of-ethiopia

10. Health Information for Travelers to Ethiopia - Clinician view | Travelers’ Health | CDC [Internet]. Centers for Disease Control and Prevention. 2017 [cited 2017 Apr 6]. Available from: https://wwwnc.cdc.gov/travel/destinations/clinician/none/ethiopia

11. US\_State\_Dept. Ethiopia: International Travel [Internet]. 2017 [cited 2017 Apr 1]. Available from: https://travel.state.gov/content/passports/en/country/ethiopia.html

12. Stratfor. How Egypt Might Try To Stop Ethiopia’s Dam Project [Internet]. Forbes. 2013 [cited 2017 Apr 6]. Available from: https://www.forbes.com/sites/stratfor/2013/06/13/how-egypt-might-try-to-stop-ethiopias-dam-project/#4c8d1c71ea99

13. CDC - Schistosomiasis - Biology [Internet]. CDC: Parasites - Schistosomiasis. 2017 [cited 2017 Apr 6]. Available from: https://www.cdc.gov/parasites/schistosomiasis/biology.html

14. Levitt WL. Re: Current Event Posting [Online discussion post] International Travel Preparation, Wellness, and Safety. [Internet]. Baltimore: Johns Hopkins School of Public Health; 2017. Available from: www.jhsph.edu

15. Pufendorf S von, Tully J, Silverthorne M. Pufendorf: On the Duty of Man and Citizen According to Natural Law [Internet]. 1991 [cited 2017 Apr 20]. Available from: https://books.google.com/books?hl=en&lr=&id=vx75FeIRcRYC&oi=fnd&pg=PR9&dq=pufendorf+duties&ots=t0jZCgTL17&sig=kqb5ERr5j02bXVp7qxb8iawF8KE

16. Ashcraft R. Locke’s Two Treatises of Government (Routledge Library Editions. [Internet]. Taylor and Francis; 2009 [cited 2017 Apr 20]. 516 p. Available from: https://books.google.es/books?hl=en&lr=&id=jbBTAQAAQBAJ&oi=fnd&pg=PP1&dq=Locke,+J.+(1689).Two+Treatises+of+Government&ots=ITjKD0Jrhm&sig=voNAvU-siWTlJP8WhKrFFUVyZwA&redir\_esc=y#v=onepage&q=Locke%2C J. (1689).Two Treatises of Government&f=false

17. Paton H. The categorical imperative: A study in Kant’s moral philosophy [Internet]. 1971 [cited 2017 Apr 20]. Available from: https://books.google.com/books?hl=en&lr=&id=8Y7RS1cM9KUC&oi=fnd&pg=PA13&dq=categorical+imperative+kant&ots=L0U\_Z9bRW7&sig=ZXXoW-60X5htlg4jrY-wbAieCNI

18. Ross W, Stratton-Lake P. The right and the good [Internet]. 2002 [cited 2017 Apr 20]. Available from: https://books.google.com/books?hl=en&lr=&id=XMMLqGiDitYC&oi=fnd&pg=PR9&dq=prima+facie+beneficence+Ross&ots=Uv3LTHbQs-&sig=Zm1fDPrl7kaZlQUFwYs3Lc33dCI

19. Organization WH. WHO Country Cooperation Strategy Thailand, 2012-2016. 2012 [cited 2017 Apr 20]; Available from: http://apps.who.int/iris/handle/10665/161157

20. Botha H, Hoven W Van, Jr LG. The decline of the Nile crocodile population in Loskop dam, Olifants River, South Africa. Water SA [Internet]. 2011 [cited 2017 Apr 20]; Available from: http://www.scielo.org.za/scielo.php?pid=S1816-79502011000100013&script=sci\_arttext&tlng=en

21. Aquinas T. Summa theologica. Xist Publishing; 2015.

22. Snoussi M, Kitheka J, Shaghude Y, Kane A. Downstream and coastal impacts of damming and water abstraction in Africa. Environmental [Internet]. 2007 [cited 2017 Apr 20]; Available from: http://link.springer.com/article/10.1007/s00267-004-0369-2

23. Braatne J, Rood SB, Goater LA, Blair CL. Analyzing the impacts of dams on riparian ecosystems: a review of research strategies and their relevance to the Snake River through Hells Canyon. Environ Manage. 2008;41(2):267–81.

24. Clark NJ, Gordos MA, Franklin CE. Implications of river damming: the influence of aquatic hypoxia on the diving physiology and behaviour of the endangered Mary River turtle. Anim Conserv. 2009;12(2):1.

25. Mill J. Utilitarianism. 1901;

26. Levitt WL. Blue Nile dam: ethical considerations [Internet]. 2014 [cited 2014 Nov 16]. Available from: http://contentdm.umuc.edu/cdm/ref/collection/p15434coll5/id/1284