

Stopping the Floods: Policy Implications for Addressing the Root Causes
of Environmental Degradation in Egypt

Megan McGirt

Capstone Advisor: Dr. Robin Broad

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Outline

Thesis: The ultimate root cause of environmental degradation along the Nile in Egypt is the structure of power. Addressing this root cause at the national and local levels is sufficient and necessary in ending environmental degradation in the country.

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Starting a trend that would endure over four millennia, the earliest predecessors of Egyptian civilization moved east out of the emerging Sahara Desert to settle along the banks of the Nile. Even these early humans realized that life in a desert was dependent upon having a reliable source of water. Egyptians were dependent upon the annual Nile River floods to bring life into the desert. However, with the construction of the first Aswan Dam at the turn of the 20th century, the floods of water were stopped. Now, a century later, Egypt is struggling with floods of a different kind. Air, water, land and biodiversity degradation are inundating the country. This paper seeks to determine the ultimate root cause behind these issues along the Nile River.¹ In official rhetoric, the degradation has ultimately been attributed to poverty and overpopulation. However, this paper finds the deeper root cause that has influenced proximate causes like overpopulation, poverty, and unsustainable development is the unequal distribution of power. By definition, addressing the root cause is both sufficient and necessary in solving the environmental degradation and as such this paper offers policy implications to empower Egyptians on both the national and local levels.

Environmental Degradation in Egypt

¹ This paper does not deal with the Red Sea, the Eastern and Western Deserts or the Sinai as these have very different ecosystems with diverse problems.

Crossing the street in downtown Cairo is an acquired skill. At first, scurrying behind a local is generally the best course of action. Having been in Cairo for three months now, I am proud to say that I can cross most streets without assistance. But, this intersection is one of the exceptions. Four marked lanes lie between me and my destination, the Ramses Train Station. However, in Cairo four marked lanes generally mean seven or eight lanes of actual traffic. Plus, the area around the train station is also the unofficial public bus depot. This adds to the chaos two dozen mini-buses which do not generally come to a full stop for boarding passengers let alone pedestrians. Feeling a little overwhelmed, I opt for the scurrying technique and choose a middle-aged woman wearing a pink headscarf and sandals (which are coordinated to exactly match the pink flowers on her long dress). Seeing a break in the waves of traffic, the woman walks casually across the first few lanes. I hurry, much less casually beside her. We are now trapped in between two lanes while traffic speeds by us on either side. We wait for one final speeding taxi and then proceed across the next two lanes. Seeing an accelerating motorbike in the last lane, I sprint for the curb. My guide continues at her casual pace and the bike misses her by less than a foot. She of course regards me as strange for hurrying.



a. Air Pollution

I arrive in front of the station just in time for the mid-afternoon call to prayer. Echoes of “Allah Akbar” (God is Great) seem to emanate from every conceivable corner of the square. Looking up at the top of the station, though, I am reminded of what else floods Cairo at this time day. The top of the station is already concealed by the creeping cloud of smog. Soon it will completely descend to the level of the people, making the already suffocating city nearly unbearable.

Later from the train, I look back on the city center. From this distance, every building in downtown looks like it has recently been extinguished of a fire. What looks like smoke slowly rises from the tops of the buildings, as if they are still smoldering. However, this is only an optical illusion of the descending smog. Though air pollution is a concern throughout Egypt, in Cairo especially, the pollution rates have been reported as being ten times higher than what is recommended by the World Health Organization (WHO).²

Since 1999 Cairo has experienced a regular phenomenon of acute air pollution called the “black cloud.” The most severe occurrence of the black cloud descends on Cairo at dusk and eventually retreats in the morning. As if the suffocating effect of the degraded air were not bad enough during the day, at night it feels like someone is standing on my chest. While scientists attribute this phenomenon partially to Cairo’s topography which traps the cloud over the city, there is no denying the fact that the cloud itself would not exist without pollution.³

This inundation of pollution comes mostly from automobile emissions, industry emissions, and garbage burning.⁴ According to Al-Ahram, the official Egyptian newspaper, there are over 2 million vehicles in Cairo alone.⁵ The roads in Cairo are only built to accommodate a quarter of these automobiles so the result is severe congestion, which intensifies the pollution. Furthermore, sixty-five percent of the cars in the country are over ten years old and twenty-five percent are over 20 years old.⁶ These older models do not meet modern emissions standards and further increase pollution. The Egyptian Environmental Affairs Agency (EEAA) reports that automobiles and motorbikes account for almost two-thirds of carbon monoxide emissions and half of hydrocarbons and nitrogen oxides in the air.⁷

Industry emissions are also one of the major sources of air pollution in Egypt. Egypt’s largest industries are food processing, textiles, electrical goods

³ EEAA.(2006), p.31.

⁴ Ibid.

⁵ Ahmed. Please note that I am using some statistics from newspapers because official statistics can be unreliable and often unavailable.

⁶ HORIZON.

⁷ EEAA (2005), p.21.

manufacturing, chemicals, and industry inputs (such as cement production).⁸

Thirty-seven percent of these industries are located in Cairo and twenty-three percent in Alexandria adding to the already-concentrated air pollution from the traffic in the country's two largest cities. The EEAA points out that industries such as the cement industry are particularly harmful because in addition to their regular emissions, they also create cement dust that gets in the air.⁹

Solid waste burning is also serious issue in Egypt. It is reported that 12,000 tons of waste are burned annually because of the limitations of organized garbage collection in the country.¹⁰ Currently in Cairo only about one-third of the 13,000 tons of garbage produced daily is collected so residents are often left with the question of what to do with the rest of the waste.¹¹

The social and economic repercussions of the air pollution are enormous. Studies conducted by the EEAA have shown that the air pollution is related to higher rates of cardiac and respiratory disease and higher mortality rates from lung cancer.¹² Currently, hospital reports indicate that pollution is responsible for 5,000 deaths in the capital each year.¹³ It is predicted that 500,000 people in the Cairo area will develop respiratory problems and fatal cancers in the next 5-25 years.¹⁴ Though much of this section has focused on the phenomenal level of air pollution in Cairo, the mobility of air pollution means that most of the other inhabitable areas of Egypt are also affected by air pollution. There is also a

⁸ Ibid, p. 31.

⁹ Ibid, p.31.

¹⁰ Epstein (2006).

¹¹ Epstein (2006).

¹² EEAA (2005), 22.

¹³ Navarro, (2006).

¹⁴ Ibid.

study by N.M. Abdel-Latif that emphasizes the impact of this air pollution on agriculture.¹⁵



b. Water Degradation

With Ramses station about half an hour behind us, we finally leave the Cairo metropolitan area and enter a more rural landscape. At first, on the fringes of the city, cultivated plots are intermingled with apartment buildings, but further from Cairo, the cropland increasingly dominates. The various shades of gray cement in the city slowly transform to bright greens and earthy browns. Agriculture is central to life in these areas and small villages are concentrated around the inevitable irrigation canals on which their crops depend.

From my seat on the train I can see down into the canals. Garbage heaps extend upwards a good fifteen feet from the canal bottom to the top of its walls. Some even overflow into the street beyond the barrier of the canal. White birds and large rodents scurry over and through the garbage making the piles look alive. The remains of what I can only guess were once a horse float at the bottom of one such pile, one of the ever-present white birds perched on its head.

¹⁵ Abdel-Latif, (2003), 232.

A little further down, an old man in a long, green galabiyya waters a herd of respectable-looking cattle and two boys play waist-deep in the middle of the canal, splashing about in the green-tinted water. I cringe thinking about the fact that the sewage from their village is probably also piped directly into the canal. The visible pollution in the water is probably nothing compared to the hazards from this sanitary discharge and the agricultural runoff from the fields. Furthermore, all of this does not even consider the fact that the canal water originates from the Nile River which itself is highly degraded.

Egyptian water sources are so highly degraded that any contact with the canals or the Nile is discouraged. But most Egyptians cannot avoid contact with the water. Health risks from the water range from contracting liver-eating parasites and E.coli to pesticide or metals poisoning.¹⁶

Water should be Egypt's most pressing environmental issue, which consequentially means that the Nile River should be the country's largest concern. The Nile represents 96% of Egypt's renewable freshwater resources, providing 55.5 billion cubic meters of water each year.¹⁷ However, the river that the pharaohs once sailed is now so degraded that even wading is not recommended. The River Nile and the prosperity it brings to Egypt are threatened both by pollution and man's attempt to control the resource.

Pollution of the Nile comes from four main sources: sanitary discharge, industrial effluent, agricultural runoff, and improper solid waste disposal.¹⁸ The pumping of sanitary discharge or wastewater into the Nile is a major source of

¹⁶ EEAA (2006), p.68.

¹⁷ Ibid, p.65.

¹⁸ Ibid, p. 67-68.

pollution. There are two common situations in which this occurs. First, while most rural villages do have piped water, many lack sewer lines. For some of these villages, wastewater is dumped or piped directly into the river. In villages that use latrines which are often not properly lined the waste will frequently seep back to the Nile.¹⁹ Generally people in urban areas have access to improved sanitation, but they still release a significant amount of their untreated wastewater into the Nile. This problem has arisen because neither the treatment facilities nor the sewer lines are not equipped to handle the volume of wastewater produced and so the excess overflows directly into the Nile or backs up into the streets. In some areas this is a daily occurrence, because the population level has reached so far beyond the treatment facility's capacity.²⁰

A second major pollutant of the Nile is industry effluent. In theory, industries are required to either treat their own effluent or send it to wastewater treatment plants, but there are still a number of companies that do not comply. While the polluted water from industries is a very small portion of water used annually, the pollutants that are released by the industries can potentially cause significant damage.²¹

A third major pollutant of the Nile is agricultural runoff. The modern Nile has been equipped with an elaborate system of irrigation canals which deliver water to fields that would otherwise be barren. However, these canals also carry the agricultural runoff back to the Nile, adding fertilizer and pesticide pollution to the river. According to the World Bank, Egypt uses 7,330 grams of fertilizer per

¹⁹ Ibid, p. 67.

²⁰ Personal experience in Egypt.

²¹ There is a very limited amount of data on pollution of industries in Egypt, probably due to the fact that the government does not want to do anything to threaten business.

hectare of arable land, a rate that is six times higher than that of the United States.²² Additionally, the country used over 14,000 tons of pesticides in the most recent year surveyed (1988).²³ Again, while runoff from agriculture represents a small proportion of total discharges into the Nile, the types of pollutants in this runoff are extremely degrading even in smaller quantities. Furthermore, while these canals were built for irrigation, the water is also used as a source of water for the people living along them and settlements are often clustered around these canals since they are the nearest source of water. Concentrations of pollutants in the canals are exponentially higher since the runoff has not yet been diluted in the river.

Finally, the fourth major pollutant of the Nile is solid waste. Again because of insufficient or nonexistent garbage collection residents are left with the question of what to do with their waste. Often this results in the dumping of waste into the Nile or its irrigation canals.²⁴ The piles are large enough in some places that they block the flow of water in the canals. It is worth mentioning that garbage is a much broader term in Egypt than in the West. Garbage can mean anything from discarded plastic bags to dead livestock. It is not uncommon to see a bloated cow or chicken floating along the Nile.

One fact that needs to be taken into consideration when it comes to the pollution of the Nile is that Egypt is not the first country with access to the river. In fact, it is the last. The part of the Nile that flows through Egypt is fed by the White Nile originating from Lake Victoria and the Blue Nile originating in Ethiopia.

²² World Bank Group.

²³ Dinham (1993), p. 142.

²⁴ EEAA (2006), p. 68.

The White Nile provides much of the regular flow of the river, while the Blue Nile is responsible for the annual flood. The quality of water that reaches Egypt is directly dependent upon these two countries and how they have treated the river. In other words, even if all the water pollution in Egypt could be eliminated, the water could still be polluted from the countries upstream.

The second class of issues contributing to the degradation of the Nile in Egypt is Egyptian (and British) attempts to control the river. Attempts to control the Nile are by no means a modern phenomenon. The ancient Egyptians built dams and irrigation systems, but these were never extensive enough to upset the delicate, biological balance of the river. However, at the dawn of the 20th century technology caught up to Egypt's long-time desire to better control its water supply. In 1902 the first Aswan Dam was built, followed by the Aswan High Dam half a century later. The first Aswan Dam sought to harness the hydroelectric capabilities of the Nile and control the annual flood.²⁵ The High Aswan Dam accomplished these two tasks on a larger scale as well as sending water to be stored in the new reservoir, Lake Nasser. Another consequence of being upstream of Ethiopia and the Sudan is that theoretically these countries could cut off Egypt's water supply. Also, if the river flow was particularly low one year, Egypt would be the last to get water and would be most danger of a shortage. The reservoir was a response to these fears. In theory, the water in Lake Nasser could sustain Egypt during a few years of drought.²⁶

²⁵ Collins (2002), p. 144.

²⁶ Ibid, p. 10.

The Aswan Dam greatly altered the composition and the flow of the Nile. The change in composition of the Nile will be dealt with in more detail as it related to changes in the land and biodiversity loss. However, the most obvious change in flow is that the annual Nile flood no longer occurs. In addition to its benefits to the land, the Nile flood also acted as a natural cleaning mechanism. The extra water diluted the polluted waters and the enhanced current sent much of the degraded water into the Mediterranean. In terms of water degradation, the absence of the annual flood means that the Nile has not been cleansed in nearly a century. This in theory has accelerated its degradation.



c. Land Degradation and Desertification

Mosques in Egypt are not particularly synchronized, and the fourth call to prayer seems to follow our train for half an hour, emanating from each new minaret that comes into view. The tall towers are decorated with green lights and banners, the favorite color of the Prophet. However, in Egypt this color is important for another reason. It represents fertility. Looking out into the

distance, it is easy to see why cultivatable land is so precious to the Egyptians. Not more than fifty feet from the edge of the cropland, the landscape turns to complete desert.

For three thousand years, the annual Nile floods provided Egypt with some of the most fertile land in the region and agriculture along the Nile flourished. Even now, nearly a century after the last flood, agriculture is still an important part of the Egyptian economy. However, the conditions that sustained the land for so many generations are no longer present and the consequences of misuse are beginning to emerge and in Egypt, land that becomes too degraded is consumed by the desert.

Though only about 3% of Egypt's land is arable, agriculture still occupies an important place in the economy.²⁷ In terms of the number of people it employs, agriculture is second only to the service industry with 30% of Egypt's employed population working in this sector.²⁸ This, along with the fact that the country depends on the land for most of its food, makes land degradation a critical issue.

The major sources of land degradation in Egypt from human activity are waterlogging and soil salinity, pollution and decreased soil fertility according to the EEAA.²⁹

Increased soil salinity and waterlogging are a result of intensive irrigation practices in the country. One hundred percent of Egypt's arable land is irrigated.³⁰ When Egypt relied on the Nile flood for irrigation the country only had

²⁷ The World Bank Group.

²⁸ Ibid.

²⁹ EEAA (2006), p. 108.

³⁰ The World Bank Group.

one cultivation season per year. Now, more control has allowed farmers to move to perennial irrigation and three seasons of cultivation per year. However, this does not allow the land time to recover and the result is increased salinity and waterlogging. According to the EEAA, 30% of Egypt's irrigated land faces problems of increased salinity.³¹ Irrigation is essential to Egypt's agriculture, but it must be practiced in a sustainable way with proper drainage and fallow periods.³²

Pollution from degraded water also contributes to desertification. The irrigation systems used by farmers come from the Nile, so all the pollutants contained in the river are being put onto the land. These include chemicals from industrial processes and raw sewage. Furthermore, the use of reclaimed water also degrades the land. Reclaimed water is wastewater that has been initially treated, but it still not up to drinking water standards. Finally, many farmers recycle the water they irrigate with which is tainted by the fertilizers and pesticides they use. Putting this water back on the land puts more chemicals in the ground and further degrades the land.

Decreasing soil fertility is also a threat to the land. For thousands of years the flood of the Nile brought rich sediment from Ethiopia and deposited it in the fields of Egypt making it some of the most fertile land in the region. In this way, the river was a renewable source of natural fertilizer for the land it flooded. While the dam does keep areas along the Nile from being inundated each year, it also

³¹ EEAA (2006), p.108.

³² Goldsmith (1990), 112.

keeps the fertile lands from being naturally rejuvenated. The water that previously brought rich sediments to the fields can no longer reach the land.

Furthermore, even if the dam still allowed the river to flood, the sediments are no longer carried any further than Aswan.³³ The dam prevents the sediments from moving any further downstream and instead deposits them in Lake Nasser. Soil fertility in Egypt has plummeted since the building of the Aswan Dam and as a result, farmers have had to turn to artificial fertilizers in large numbers. Egypt uses 7,330 grams of fertilizers per hectare of arable land, six times as much as what is used on arable land in the United States.³⁴

In addition to fertilizing the land, these sediments were important to Egyptian land for many other reasons. The sediments counteracted erosion on the Mediterranean coast.³⁵ The annual deposit of silt from the Nile replaced much of the land lost to erosion on the sea. Erosion has increased greatly since the dam was built. The absence of the sediments also changed the composition of the water both in the Nile itself and along the northern coast, but this will be examined further when discussing biodiversity loss.

It should be noted that responsibility for Egypt's land degradation cannot be placed solely on its citizens. Some desertification occurs naturally. Wind erosion and the formation of sand dunes are problems that cannot be directly related to the actions of Egypt's citizens. However, these problems can be indirectly related in that they are occurring at an increasing rate due to climate change.

³³ Ibid, p. 190.

³⁴ World Bank Group.

³⁵ Ibid, p. 192.



d. Biodiversity Loss

Looking out the window, I can tell when we are nearing Alexandria because the streets of the small towns are lined with vendors selling all different types of fish. The fishermen stand behind the baskets of their bounty, and try to get a better price from their customers. The fish that are still alive flop around in their baskets. Every so often one makes it out onto the concrete and it must be wrestled back into its container. Fishing in Alexandria is a staple in the economy. However, reductions in fish populations have many people worried about the long-term sustainability of their livelihoods.

Loss of biodiversity is an increasing problem in Egypt. As already mentioned, this paper's focus is on the environmental problems specifically along the Nile and in the northern delta. It is important to note that this intentionally excludes the Red Sea and the deserts from the biodiversity discussion, as these areas are completely different ecosystems. Biodiversity loss along the Nile is focused on marine life in three areas: Lake Nasser, the northern freshwater lakes, and along the Mediterranean coast.

Lake Nasser has proven to be a terrible experiment in biodiversity loss. The sediment that is deposited in the reservoir encourages the growth of algae that consume the oxygen many other aquatic species are dependent upon.³⁶ Eventually this process can lead to eutrophication or the dying of a lake. Additionally, the introduction of the cannibalistic Nile perch has also put pressure on many other fish species which have subsequently died out in the reservoir.³⁷

The northern lakes of Manzala, Burullus, Edku and Mariut are known locally as the Four Sisters and provide Egypt with 28 percent of its national fish production.³⁸ However, these lakes are fed by the degraded waters of the Nile and are therefore also becoming degraded, endangering the fish populations that live there. The Aswan Dam has exacerbated the problem because the Nile floods used to flush some of the pollutants out of the river.³⁹ According to Bush and Sabri, the pollution has led to “fewer fish, fewer kinds of fish, and lower fish quality.”⁴⁰ In addition to pollution, fish populations are being threatened by overfishing especially through the use of “fish fry” techniques which take the small fish from the lake before they reach maturity.⁴¹ This unsustainable technique is most extensively used by private fish farms which have increasingly replaced small-scale fishermen.⁴²

The coast around the Mediterranean has also experienced biodiversity loss in recent decades. Many scholars believe that it is highly likely that this loss

³⁶ Collins (2002), p. 190.

³⁷ Ibid.

³⁸ Bush and Sabri (2000), p. 20.

³⁹ Ibid.

⁴⁰ Ibid, p.21.

⁴¹ Ibid, p. 21.

⁴² Ibid, p. 20.

is due to the change in water composition as a result of the Aswan Dam.

Sardine fishing has been especially hard-hit as the fish were dependent upon the rich silt carried to the sea by the Nile.⁴³ Overall, biodiversity loss along the Nile is closely related to the degradation of the river.

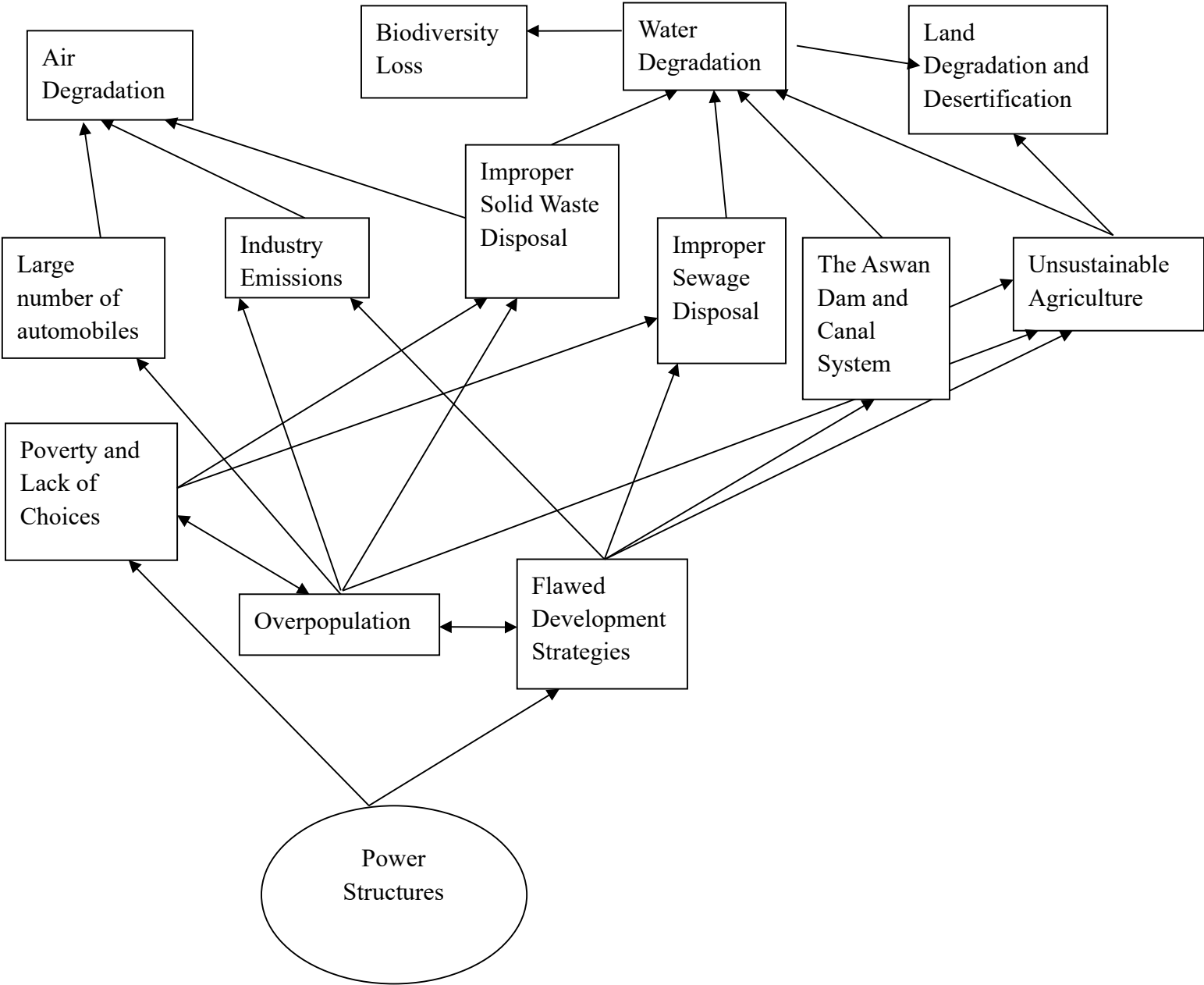
II. Root Cause Analysis

Dr. Nicholas Guppy compares root cause analysis to a “multi-layered cake”.⁴⁴ The top layers represent the proximate causes and one must slice down to the bottom of the cake in order to discover the ultimate root cause or causes. This section examines potential root causes in two ways. As Dr. Guppy suggests, it looks at whether the potential root cause has a deeper source. If this is the case, then the potential root cause is not in the bottom layer of the cake and is thus a proximate cause. In other words, it is not necessary to address this potential cause in order to solve environmental degradation. Second, the potential root causes are examined to see if they are sufficient enough to solve environmental degradation in Egypt. If addressing a potential root cause is necessary, but not sufficient, it can still be one of several root causes, it just cannot be the sole root cause. However, if addressing a potential root cause is not necessary in solving environmental problems it can be neither a root cause nor the root cause. The section begins with what the official government environmental agency believes the root cause to be and then attempts to continue cutting the cake from this starting point. The findings of the root cause analysis are summarized in the following table:

⁴³ Collins (2002), p. 192.

⁴⁴ Guppy (1984), p. 932.

Root Cause Analysis Table:



a. Overpopulation

Many scholars consider overpopulation to be a root cause of environmental degradation. This theory has to do with carrying capacity and the fact that the Earth can only support so many people. Relating overpopulation to the Tragedy of the Commons, Hardin argues that the only way to return to sustainable levels of pollution and use of the commons is by reducing the number of people.⁴⁵ He states that on an individual level rational people will always choose to use or pollute the commons, because the utility lost by the commons is only a fraction of what the individual will gain.⁴⁶ This becomes a problem, however, when there are billions of people polluting or degrading the same commons. Ehrlich and Ehrlich concur with Hardin and comment that overpopulation prevents the world from being able to address environmental degradation.⁴⁷ They also offer the I=PAT formula to help explain why overpopulation is a root cause of environmental degradation.⁴⁸ This formula summarizes the Ehrlichs' belief that (I)mpact on the environment is the product of (P)opulation, their (A)ffluence or consumption level and the destructiveness of the (T)echnologies used.⁴⁹

In Egypt, population has emerged as an enormous problem. Stedman - Edwards identifies two types of population growth, "absolute growth" and "local growth".⁵⁰ High rates of "absolute growth" are the result of a country having more

⁴⁵ Hardin (1968), 43.

⁴⁶ Hardin (1968), p. 37-38.

⁴⁷ Ehrlich and Ehrlich (1990), p. 29.

⁴⁸ Boyce (1990), p.24.

⁴⁹ Ibid.

⁵⁰ Stedman-Edwards (1998), p. 31.

births than deaths in a given period.⁵¹ On the other hand, “local growth” is a fluctuation in population due to migration. Egypt struggles with both of types of growth.

The most recent estimate puts Egyptian population at over 75 million. Taking the land area into consideration, this constitutes a population density of 72 people per square kilometer, about twice that of the United States.⁵² However, these statistics assume even population distribution throughout the country and while this is not really the case in either country, Egypt is an extreme example. In Egypt, the population is extremely concentrated with 95% of the people living within 12 miles of the Nile River.⁵³ With the exception of a few scattered oases, the rest of the land is uninhabitable desert. The extreme concentration of the population increases the overpopulation problem considerably. Twenty million people reside in the metropolitan area of Cairo, Egypt’s capital and largest city. Such high population density obviously creates many problems.

Overpopulation in Egypt has been linked to many of its environmental issues. While much of the argument is convincing, there are many flaws in this logic. It cannot be denied that there is a direct connection between the population size and the number of automobiles in Egypt. If there were fewer people, there would be fewer cars and thus fewer emissions. The Egyptian Environmental Affairs Agency also blames a portion of the industrial air emissions on overpopulation.⁵⁴ They state that one of the biggest industrial

⁵¹ Ibid.

⁵² World Bank Group.

⁵³ Middle East Online.

⁵⁴ EEAA (2006), p.31.

contributors to air pollution is the dust from the cement industry and that the growth of this industry has come about as a result of overpopulation and the need for more building materials for housing.⁵⁵ With fewer people, there would be less demand for housing and therefore less demand for cement. Also, the solid waste problem in Egypt is exacerbated by overpopulation. Fewer people would mean less garbage, which would mean less garbage burning and less garbage dumping. This would decrease degradation of both air and water.

Other sources of water pollution are also blamed on overpopulation. The EEAA reports that raw sewage in crowded areas overflows into the Nile and backs up into the streets because the treatment plants and sewage systems cannot handle the amount of wastewater produced by such a large population.⁵⁶ They reasonably hold that if the population were reduced to a level at which the wastewater treatment facilities were not overloaded, then wastewater would not back up into the streets nor be diverted into the Nile. It can also be argued that water degradation from agricultural runoff has increased as Egypt scrambles to attempt to feed its growing population. The scramble to feed Egypt can also account for intense irrigation schemes and growing patterns that ultimately degrade the land and lead to desertification.

While there are many environmental problems that can be linked to overpopulation, there are many that cannot. Additionally, many of the problems that seem linked to overpopulation would not completely be solved by addressing overpopulation. For example, while production in certain industries such as

⁵⁵ Ibid.

⁵⁶ Ibid p. 67.

cement can be linked to overpopulation, many cannot. A reduction in the population would not have as direct an effect on other industries such as steel, chemicals and textiles. Furthermore, population reduction would by no means solve the solid waste problem in Egypt. It could reduce the volume, but there would still be garbage and people would still struggle with what to do with it. In terms of wastewater discharge, addressing overpopulation does not change the fact that many villages along the Nile are not even connected to wastewater plants. If the populations of these villages were smaller, there would be less wastewater discharge into the Nile, but it would not eliminate the problem. So, addressing overpopulation is not sufficient in solving the environmental degradation problems in Egypt.

The next question is whether addressing overpopulation is necessary in solving environmental issues. In other words, is there a layer below overpopulation which makes it a proximate cause? It would seem so. Many factors have influenced overpopulation in Egypt. Stedman -Edwards maintains that overpopulation is linked with poverty and the norms that are associated with poverty.⁵⁷ These norms include viewing children as an economic resource or placing social value on large families.⁵⁸ In Egypt, while it is probably true that poorer families view more children as an economic resource, many people, both rich and poor see the social and religious value of large families. Muslims, much like Catholics, do not officially believe in birth control and children, especially sons, are viewed favorably.

⁵⁷ Stedman-Edwards (1998), p. 31.

⁵⁸ Stedman-Edwards (1998), p. 31.

The “absolute growth” of the Egyptian population, as in most developing countries is partially due to advances in medicine that have eradicated various diseases. But, in Egypt specifically, unsustainable growth has come about also as a result of flawed development strategies namely the Aswan High Dam and the canal irrigation system. The natural water resources in Egypt would never have been able to support the number of people that currently live there and only with manipulation has this been made possible.

The idea that the population growth was partially caused by the development strategies, is somewhat disturbing. There is no doubt that the canal irrigation system and Aswan High Dam artificially increased the carrying capacity of Egypt’s limited resources by increasing food production.⁵⁹ These measures have allowed the population to grow beyond natural capacity. The rather disturbing, though probably accurate, assumption is that if these measures had not been put in place the population would be much smaller today because the lack of food would have controlled the population. While this is not the only cause of overpopulation, it has definitely played a large role.

It would seem that overpopulation is a scapegoat on which it is easy to blame environmental degradation in Egypt. Indeed, even the Egyptian Environmental Affairs Agency seems to consider overpopulation as at least a root cause, if not the root cause.⁶⁰ However, solving the overpopulation problem in Egypt is neither necessary nor sufficient in addressing environmental degradation in the country. In Egypt, while overpopulation is a major problem, it

⁵⁹ Collins (2002), p. 139.

⁶⁰ EEAA (2005), 21.

is not the bottom layer of the cake and as such is only a proximate cause of environmental degradation in the country.

b. Poverty

Another commonly held assumption is that poverty is the root cause of environmental degradation and that this degradation then perpetuates the poverty in a vicious cycle. And since poverty at least partially contributes to overpopulation in Egypt, this seems like the next logical candidate. The idea behind poverty's connection to environmental degradation is that poverty creates a situation that forces people into unsustainable practices. There is no disputing the fact that Egypt has a rampant problem with poverty. Nearly half of the population (44%) lives on less than 2 dollars per day.⁶¹ Officially, the government reports the unemployment rate at 11%,⁶² but taking underemployment into account, unofficial estimates place the statistic around 40%.⁶³

On the surface, it would seem that poverty in Egypt is directly related to environmental degradation since evidence of environmental issues is much more visible in impoverished areas. In poorer urban areas, sewage lines back up and overflow into the streets and garbage heaps occupy nearly every corner. In the most affluent areas of Cairo like Nasser City, one might not even realize that Egypt faced such problems. The most affluent in Cairo have even escaped the "black cloud" for the most part by establishing their suburb away from downtown. (I find it rather unjust that the people who can afford to drive the few Hummers,

⁶¹ World Bank Group.

⁶² Ibid.

⁶³ Hedges(1995).

Land Rovers and Lexus SUVs that exist in Cairo can also afford to live outside of the smog their emissions help produce.)

As it relates to environmental degradation in Egypt, poverty equates a lack of choices. In poorer areas people do not have the ability to choose not to pollute. If there is no garbage collection, then people either have to burn their waste or dump it. A similar logic applies to wastewater dumping and the use of older cars with failing emission standards. The people living in affluent neighborhoods have an organized garbage service and modern sanitation facilities. It is true that if the poor people could afford to live in Nasser City then they would not dump garbage or sewage into the Nile, because they could choose not to. They could also choose to drive a newer, more efficient car. However, it is also true that if poverty were eliminated in Egypt there would still not be enough wastewater facilities or garbage collection to serve the population. People would still be at a loss of what to do with excess garbage and sewers would still back up. Even though, the cars that poorer people own tend to be older and less efficient, lower class people are also much more likely to use public transportation. Addressing poverty in Egypt is not sufficient to fix the environmental problems.

Bush and Sabri write that,

Persistent neo-Malthusian beliefs—blaming the poor for lifestyles that undermine the environment and suggesting that fewer people would ipso facto mean more efficient resource use—generate a

crisis management mentality that distracts attention from actual processes of impoverishment of people and their environments.⁶⁴

But what are these processes? What causes poverty in Egypt? Overpopulation definitely plays a role. Much of the unemployment and underemployment can be blamed on the fact that Egypt has too many people for too few jobs. However, overpopulation has already been dismissed as a root cause and so there must be something deeper. If poverty in Egypt is represented by a lack of choices when it comes to environmental matters, then who is responsible for taking away these choices? The overwhelming conclusion is the government.

c. Ignorance

Sometimes the assumption is made that people in developing countries pollute because they do not know better. In other words, a lack of education about the detrimental effects of their actions leads people to destroy the environment. This is often related to poverty with the idea that poorer people are less educated.⁶⁵ This paper does not consider ignorance to be a potential root cause or a proximate cause in Egypt, and so the reasoning behind this conclusion is worth mentioning.

Several studies have been conducted that negate the claim that average Egyptians are ignorant about environmental issues in the country. One such study conducted by Nicholas Hopkins et al. is particularly relevant because it surveyed people from the working-class in three different areas of Cairo and one rural area in the Delta. It found that 53% of men and 48% of women are “very

⁶⁴ Bush and Sabri (2000), 21.

⁶⁵ Stedman and Edwards,

concerned” about the environment.⁶⁶ Furthermore, 44% of those studied ranked garbage as the highest environmental concern and 72% consider “dumping in the Nile” to be the major source of water pollution, implying that people do realize that their actions impact the environment.⁶⁷ Ignorance is often linked to poverty along the line of thinking that poor people receive less education. The study illustrates why this assumption is flawed in Egypt.

So if average Egyptians are concerned about the environment and they realize that their actions are contributing to its destruction, then why do these degrading activities perpetuate? This paper holds that it is because these people do not have access to any alternatives. Practices such as dumping garbage and sewage into the Nile have emerged because of a lack of other options. Along these same lines, a man who practices unsustainable fishing methods commented that, “this [the unsustainable method] is destroying our future, but my family has to eat today”.⁶⁸

d. Unsustainable Development Models

The idea that unsustainable development models cause environmental degradation often has to do with international organizations dictating a pathway toward their definition of development. Often the concept of development as it is known in institutions such as the World Bank neglects to consider environmental ramifications of economic development. Conca and Dabelko write that, “Practices such as international trade, foreign investment, technology transfer, and development assistance can have effects that cut across issue-specific

⁶⁶ Hopkins (2001), p. 74.

⁶⁷ Hopkins (2001), p. 77.

⁶⁸ Bush and Sabri (2000), p. 45.

environmental concerns”.⁶⁹ In Egypt’s case the terms for economic growth were not really forced upon the country by any international organization, but that did not stop the government from adopting a flawed plan nonetheless.

Until relatively recently, Egypt embraced the Frontier Economics attitude of development at any cost. The environment was not taken into consideration and development was completely measured in economic terms. The two most prominent manifestations of Egypt’s flawed development strategies are the Aswan High Dam and the canal irrigation system. There is no doubt that these systems were intended to aid in Egypt’s economic development by providing energy and extending land resources. Even though some engineers raised concerns about the long-term effects of trying to control the Nile, the environment was not taken into consideration when the systems were built.⁷⁰ The ultimate idea behind Frontier Economics is that if a country pursues economic development, it will eventually be able to clean up the mess it has made in the process. For Egypt, the Aswan High Dam and the canal irrigation system have caused many more problems than they have solved, some of which may not be able to be rectified.

The main economic benefits for Egypt from the Aswan High Dam were from the hydroelectric power it provided.⁷¹ However, today, the power the structure provides is not what was expected. Furthermore, there are many fundamental problems with the reservoir, Lake Nasser. First, the rich silt that is deposited there and sand blown in from the desert are eventually going to fill up

⁶⁹ Conca et al. (2004, p. 185.

⁷⁰ Collins (2002), p. 193

⁷¹ The World Bank Group.

the lake. These forces have already decreased the holding capacity of the lake substantially.⁷² Second, and perhaps most importantly, Lake Nasser loses 9% of the Nile's annual flow to evaporation.⁷³

The extensive canal irrigation system in Egypt was built by Muhammad Ali in the nineteenth century in order to expand agriculture in the country. The system allowed Egypt to cultivate more water-intensive crops like cotton and rice and expanded the land area that could be cultivated.⁷⁴ However, this system, as previously mentioned, has led to many detrimental effects such as land salinization, unsustainable agriculture, desertification, and Nile degradation.

In addition to these specific manifestations of flawed development strategy, the general strategy of economic development at any cost has led to even further environmental ramifications. The government is focusing on developing export industries at the price of sustainability. Two of these export industries are fish and cotton. The cultivation of cotton and the irrigation it requires is behind a significant portion of the soil salinization. Fish are also an emerging export industry, one that was highly recommended by USAID. This has led to large, private fish farms that practice unsustainable methods.⁷⁵ Small-scale fishermen have been pushed out or are forced to overfish because of these conditions.⁷⁶

Recently unsustainable development strategies have even struck a blow at arguably one of the most successful environmental operations in Egypt: the

⁷² Collins(2002), p. 191.

⁷³ Ibid, p. 193.

⁷⁴ Metz (1990).

⁷⁵ Bush and Sabri (2000), 21.

⁷⁶ Ibid.

zabaleens. The zabaleens are the garbage collectors in Cairo. They are mostly Coptic Christians and live in their own part of town.⁷⁷ The group makes a living by collecting garbage and then sorting and recycling it. It is estimated that the zabaleen recycle 85% of what they collect.⁷⁸ In the past few years Egypt has begun hiring foreign firms to handle its trash and replace the zabaleens.⁷⁹ There is no arguing the fact that the current number of zabaleen are not enough, but the idea of totally replacing them seems absurd. Many people think that the government is reacting to a fear of the organization of the Copts.⁸⁰ This is definitely a possibility, but more likely, the government is hiring foreign companies as part of its development strategy to encourage foreign direct investment.⁸¹

Unsustainable development strategies seem to have a symbiotic relationship with overpopulation in Egypt. The strategies, especially the Aswan Dam and the canal irrigation system have both fed and been fed by Egypt's population explosion. As already discussed, overpopulation is at least partly a result of these flawed models. Inversely, the overpopulation has also influenced the adoption of these unsustainable development strategies. Attempts to control Egypt's water and expand food production were at least partially influenced by Egypt's exploding population and the struggle to feed it.⁸² Since overpopulation has been determined to be a proximate cause, then this relationship implies that the unsustainable development model is also a proximate cause.

⁷⁷Epstein (2006).

⁷⁸ Ibid.

⁷⁹ Fahmi (2006),p. 2.

⁸⁰ Epstein (2006).

⁸¹ Fahmi (2006), p. 2.

⁸² Collins (2002), p. 144.

So the question is what would cause Egypt to adopt such a development model and more importantly, why is the country still clinging to this flawed design? This paper holds that the answer to this question lies in the distribution of power.

e. Domestic Power Imbalance

Power imbalance translates into a potential cause for environmental degradation when the environmental policies are enacted by elites that do not necessarily have to deal with the problems their policies cause or in Egypt's case, when the government ignores environmental problems that do not affect the elite.

The power distribution in Egypt is extremely top-heavy. While officially the country is listed as a democracy with separate executive, legislative, and parliamentary branches, in practice, the government is in reality more like a dictatorship. Theoretically, the constitution dictates checks and balances among the different branches, but these are generally ignored by the president in practice.⁸³ The president either directly or indirectly controls the Parliament, the courts, the military and police forces, regional governors and the Cabinet and all of its ministries. Elections in the country are a farce and the president's party, the National Democratic Party, dominates the few opposition candidates that are allowed to run. Examples of election fraud range from voter intimidation to buying votes to reporting outright fraudulent results. Egyptian President Hosni Mubarak is currently in his fifth term and has ruled the country for nearly twenty-seven years. Up until 2005, the presidential election was a referendum in which

⁸³ Mertz (2000).

the population voted either “yes” or “no” for the current leader.⁸⁴ Most people in the country have become disillusioned with Egypt’s version of “democracy” and voter turnout is dismally low.⁸⁵ Neither the president nor his government is accountable to the general population and from this lopsided power structure a solid class of Egyptian elite has emerged. Policies enacted by the government overwhelmingly benefit the elite since the government is mainly comprised of these elite.

The government’s tendency to focus on the needs of the elite and the fact that it is not accountable to the rest of the population, has led to many of Egypt’s environmental problems. Often, dealing with problems that overwhelmingly affect the poor is not in the government’s interest. For example, while installing sewer systems and wastewater treatment plants in small rural villages would be beneficial for the environment and the people who live there, the current government would gain nothing from this.

In Egypt, the concentration of power in the hands of the elite has also led to many of the proximate causes that have already been identified. The most obvious result of the unequal power distribution is the perpetual poverty that plagues much of the country. Policies that benefit the elite and ignore the large majority of the population increase the gap between the rich and the poor. This imbalance of power has also led to the adoption of unsustainable development models using a flawed definition of development. Egypt’s use of economic development as the ultimate policy goal generally benefits the elite in Egypt. For

⁸⁴ Ibid.

⁸⁵ Ibid.

example, a policy that induces expansion in exporting industries favors the Egyptian elite because they are the ones that own these industries. This paper holds that the government favors a Frontier Economics development strategy at least partially because it abides by the government's general trend of benefitting the elite.

This imbalance in which the few rule the masses creates a situation in which the government fears the people, because of their potential for organization. To avoid this situation, the Egyptian government generally dissolves any emerging movement. Speaking out against the government is not an option and in the past the military has been mobilized against the people who have organized resistance. The most notable example of this occurred in 1977 when the military killed 150 Egyptians while suppressing riots over the price of bread.⁸⁶ Environmental demonstrations have met a similar fate. In the 1980s fishermen from Lake Mariut protested the pollution of the lakes along the Cairo-Alexandria Highway, and were summarily dispersed by the government.⁸⁷ Acts like these have created a situation of mutual distrust between the government (and the elite) and the rest of the population.

This paper holds that addressing the imbalance of power is both necessary and sufficient in solving environmental degradation in Egypt. It is necessary because there is no deeper cause of the imbalance of power. Furthermore, the distribution of power is sufficient in explaining environmental degradation in Egypt because it either directly or indirectly leads to the proximate

⁸⁶ Cleveland (1994), p. 368.

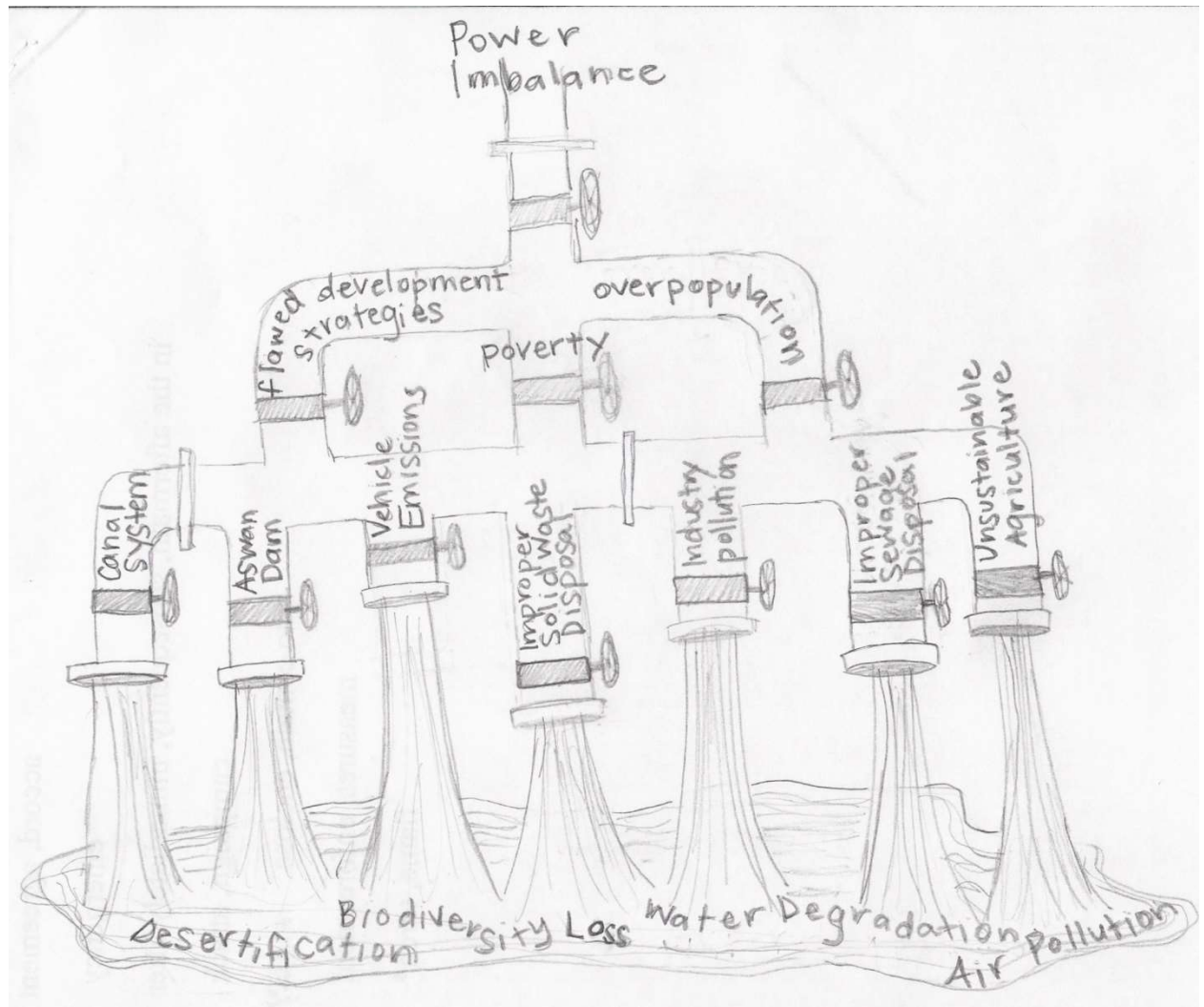
⁸⁷ Bush and Sabri (2000), p. 22.

causes. The lop-sided distribution of power as already discussed leads to both poverty and unsustainable development strategies. Both of these proximate causes have a symbiotic relationship with overpopulation. The power imbalance is the root cause of environmental degradation in Egypt.

III. Policy Implications

Thus far this paper has employed Dr. Guppy's "multi-layered cake" metaphor to explain the relationship between proximate causes and the root cause. However, for this policy section a new metaphor may be in order. In the diagram below, the root cause analysis discussed earlier is portrayed as a system of pipes and valves. The liquid represents environmental degradation in Egypt and each branch of the pipes represents a different source or proximate cause of the degradation. The single pipe at the very top represents the root cause of environmental degradation. The purpose behind this diagram is to show that the most efficient way to address environmental issues in Egypt is by dealing with the imbalance of power and metaphorically closing the valve at the very top. Since this paper has presented the root cause as both sufficient and necessary in solving environmental degradation, this single, initial pipe is appropriate. Ideally, policy implications that address the root cause are preferable to those that only address proximate causes. However, some policy changes are not realistic given the current situation in a country. The depiction also offers a second-best situation. If for some reason it is not possible to change the balance of power, then the next best policy would address the three proximate causes closest to the root cause: overpopulation, flawed development

strategies, and poverty as it relates to a lack of choices. It should be noted that this diagram does not allow horizontal relationships to be shown, meaning, for example, that it does not depict the symbiotic relationship between flawed development strategies and overpopulation.



The remainder of the policy implications section is divided into three sub-sections. The first part is a discussion and critique of Egypt's current environmental policy. The second sub-section includes domestic policy

suggestions for addressing the root cause of power imbalance. And, finally, there is a short discussion of international measures and limitations of the study.

a. Current Legislation

The current legislation in Egypt regarding the environment is Law 4 of 1994. This extensive law covers a broad range of issues. From the outside, it would seem that the passing of this law is cause for celebration. In addition to better defining the Egyptian Environmental Affairs Agency (EEAA), the most notable of the regulations restrict garbage dumping and burning, set vehicle emissions and industrial effluent standards and require environmental assessments for new industries.⁸⁸

It can be argued that the fact that this law was even passed is a step in the right direction, but its merits end there. First, this law does not suggest a plan to implement the standards it includes. Restricting people from dumping into the Nile is a good thought, but it should also be accompanied by plan to dispose of the garbage. Second, the law ignores some fundamental sources of pollution. While multiple articles are devoted to what cruise ships should do with wastewater, there is no mention of municipal sewage.⁸⁹ Third, for the law to be effective, the standards must be enforced and this has not been the case. The UNDP notes that “Egypt has a long history of environmental legislation, but compliance is weak”.⁹⁰ Finally, the law is flawed (in my opinion) because it does not address any root cause. Even though the EEAA has stated that they believe overpopulation is at least one of the major root causes of environmental

⁸⁸ EEAA (2004).

⁸⁹ Ibid.

⁹⁰ UNDP (2005) p. 158.

degradation in Egypt, their law does not reflect this idea. Instead, the regulations attempt to solve very specific problems and ignore any overarching connection. The law is merely a large box of Band-Aids. Admittedly, population control is a very hard sell in a Muslim country, but less controversial policies that target “local growth” could at least reduce the concentration of the population. To be clear, this is not a policy suggestion of this paper, but a hypothetical of what the Egyptian government could have done if it really believed that overpopulation was a root cause.

b. Addressing Power Imbalance

Since the current environmental measures seem to be lacking, perhaps a new strategy is in order. Based on this paper’s finding that domestic power imbalance lies at the bottom of the cake, the major policy implications deal with resolving this inequity. The obvious way to address an imbalance of power is to empower the groups that are marginalized. This empowerment can come in the form of national or local empowerment, or perhaps even more ideally, a combination of the two.

This paper’s first policy implication deal with National empowerment of Egypt’s marginalized citizens. In order to address the imbalance of power, the political situation needs to move away from the dictatorial style. Some power must be given back to the people and the government must be accountable to the people. If the government did actually have to answer to all of the people, it would then be in the government’s interest to enact policies that improve the lives of the majority of the people.

The second policy implication involves local empowerment. Egyptians need to organize themselves at the community level in order to encourage sound environmental practices. As already mentioned, average Egyptians are concerned about the environmental problems their country faces.⁹¹ They also recognize the major sources of pollution in their communities with relative accuracy.⁹² These two factors mean that the local populations are in a good position to spearhead environmental change in their communities. This also encourages the development of environmental policies from the bottom up rather than top-down. One example of this type of organization already exists in the zabaleens of Cairo. Instead of adopting less efficient models, Egypt should be looking at ways to encourage the expansion of these communities in Cairo and throughout Egypt.

Furthermore, the government should encourage the formation of cooperatives in important sectors, such as fishing and agriculture. The small-scale fishermen should be the ones fishing the northern lakes, not the huge companies. Agriculture could really benefit from bottom-up cooperation to spread the ideas of sustainable practices. Irrigation is a necessity in Egypt, but taking certain measures can make it a more sustainable practice. Combining crop rotation, proper drainage systems, and sufficient fallow periods would help heal the degrading land.⁹³ The government should support these efforts in whatever way possible, but the organization should come from the people.

⁹¹Hopkins et al. (2001), p.74.

⁹² Ibid p.82-83.

⁹³ Goldsmith (1984), 112.

This local cooperation would also create jobs in a country that has a history with unemployment.

While this paper believes that addressing the power issue in Egypt is the most efficient way to solve environmental problems in Egypt, it is not the most realistic. Barring the possibility of a democratic coup, neither one of these recommendations for changing the balance of power is feasible in Egypt today. President Mubarak would never relinquish his dictator-like role and his government would never allow people to organize locally because they are truly afraid of the power of the people.

c. Second-Best Solution

Since addressing the root cause is not currently realistic in Egypt, perhaps the second-best scenario can be utilized. As previously mentioned, the next best policy would need to address three issues simultaneously: flawed development strategies, overpopulation, and poverty. Overpopulation could be attacked through by encouraging a more even distribution of population, since the idea of family planning is not a culturally acceptable idea. Poverty and lack of choices could theoretically be addressed by the government paying more attention to the needs of poorer communities despite the fact that it is not in the government's interest. Finally, Egypt could adopt a new definition of development that that is along the lines of sustainable development. These changes are unlikely under the current regime, but they are much more realistic than directly addressing the imbalance of power.

d. Regional and International implications

One limitation this paper has discovered is a lack of information on what to do about a large dam like the one at Aswan. Even if the government changed to a democracy and public outrage at the structure's inefficiencies required that something be done about the Aswan High Dam, there are really no suggestions about possible courses of action. The United Nations Commission on Dams Report carefully outlines all the reasons one should not adopt a large dam, but it does not have any suggestions as to what could be done if the huge dam already exists.⁹⁴ Short of completely destroying the dam, there are no real implications. A new government, backed by the will of the people would not make a mistake as huge as the construction of the dam unlikely in the future because the government would be held accountable for its adverse effects.⁹⁵

On an international level, one helpful measure would be if international organizations such as the World Bank and the IMF and developed countries adopted a different definition of development that does not solely consider economic growth. While this paper holds Egypt's power structure ultimately responsible for adopting the flawed definition of development, changing this idea on an international level might encourage Egypt to reconsider its current course of action.

Furthermore, one additional suggestion is for Egypt, Sudan, and Ethiopia to work together to try to reduce pollution of the Nile. Many scholars foresee the possibility of future disputes over the Nile as it becomes more degraded.⁹⁶ It is

⁹⁴ World Commission on Dams (2000).

⁹⁵ The literature was pretty clear that huge dams are terrible for the environment and should not be built. However, there were no suggestions short of starting over, as to what to do if one already had a huge dam.

⁹⁶ Beschoner (1992), p. 60-61.

in Egypt's interest to work with these countries to protect what is arguably the most valuable resource in the region.

The majority of people in Egypt have to deal with environmental degradation every day. They cannot sit on a train and watch through the window as it passes. Egypt, like many other developing countries, has adopted a Band-Aid approach to dealing with environmental degradation. This paper has proposed policies that require a shift away from this approach and towards a Political Ecology paradigm. But, this shift is not going to occur on its own. Some massive event is needed to trigger this change. Currently the Egyptian government is struggling to dispel a massive bread crisis—an indicator of the imbalance of power. News of riots have even reached the Western media. Perhaps this will be the trigger the country is waiting for. In this way the food crisis in Egypt actually offers a little hope.

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