THE FRUITS OF DEVELOPMENT IN A DESERT ECOLOGY: INVESTIGATING EGYPT'S EXPORT-BASED AGRICULTURAL ECONOMY AND ITS IMPLICATIONS ON ECOLOGY AND WATER AVAILABILITY IN AN ARID REGION.

A Thesis

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Authorization to Submit Thesis

This thesis of Amy Elizabeth Swoboda is submitted for the degree of Master of Science with a major in Water Resources and titled "*The fruits of development in a desert ecology: investigating Egypt's export-based agricultural economy and its implications on ecology and water availability in an arid region*," has been reviewed in final form. Permission, as indicated by the signatures and dates given below, is now granted to submit final copies to the College of Graduate Studies for approval.

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Abstract

Water is a vital resource for life. Environmental lawyer Stephen C. McCaffery identifies "two ominous phenomena relating to fresh water: increased water usage and increased global population numbers." This combined increase in population and water scarcity has been labeled as a potential cause for future conflicts and wars. No place on earth is this clash more apparent than the Middle East North Africa Region, especially in the state of Egypt. Given the large population in Egypt and the lack of water, this thesis, using the lens of political ecology, explores how historic and contemporary water policies and laws have influenced water quantity and access to water, and, evaluates whether contemporary agricultural policies will aggravate or improve water management in Egypt in relation to water quantity and accessibility. Scarcity, corruption, and ineffective laws and policies have had a negative effect on water quantity and accessibility, ultimately undermining the sustainability of Egypt's use of a scarce natural resource, the River Nile.

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Chapter One

Introduction

Water is a vital resource for life. Environmental lawyer Stephen C. McCaffery identifies "two ominous phenomena relating to fresh water: increased water usage and increased global population numbers."[1] This combined increase in population and water scarcity has been labeled as a potential cause for future conflicts.[2] There have been documented armed conflicts over water,[3] and as this resource is finite,[4] tensions over water will continue to increase as the earth's population grows. The Middle East North Africa (MENA) region, roughly estimated at five percent of the world's population,[5] and specifically Egypt, is a location where the combined phenomenon of increasing population growth and increasing water scarcity is pronounced. The population of Egypt, which is mainly confined to the geographical areas of the coastal areas, the delta, and the Nile valley, has grown over the past thirty-five years from about 40 million in 1978 to 82 million[6] and currently is listed as the sixteenth most populated country in the world.[7] The population is estimated to continue to grow to between 85 to 95 million within the next ten years.[8] Some already estimate the

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[1] Stephen McCaffrey, *The Evolution of the Law of International Watercourses*, 45 Austrian J Public and Int'l L., 88 (1993).
[2] Jerome Delli Priscoli & Aaron T. Wolf. *Managing and Transforming Water Conflicts*. Cambridge University Press, New York, 1 (2009).
[3] *Id*. at 10, Examples include Middle East, South Asia, and South America, http://www.prb.org/pdf13/2013-population-data-sheet_eng.pdf
[4] Arab Republic of Egypt Ministry of Water Resources and Irrigation, Water for the Future: National Water Resource Plan 2017 xvii (2005).
[5] Population Reference Bureau. *World Population Data Sheet*. http://www.prb.org/Publications/Datasheets/2013/2013-world-population-data-sheet/world-map.aspx
[6] Mohamed A. El-Nahrawy. *Egypt; country pasture/forage resource profiles*. Food and Agriculture Organization. http://www.fao.org/ag/AGP/AGPC/doc/Counprof/Egypt/Egypt.html.
[7] Central Intelligence Agency. *The Worldfact Book, Egypt*, https://www.cia.gov/library/publications/the-world-factbook/rankorder/2119rank.html.
[8] Arab Republic of Egypt Ministry of Water Resources and Irrigation, Integrated Water Resources Management Plan (2005).

population to be around 90 million. In the Nile Basin, upper riparian states such as Sudan and Ethiopia are also experiencing increases in populations.[9] As these countries develop their water resources and their own populations grow, the upper basin states will impact the lower riparian states such as Egypt, which will further impact its already constrained use of the Nile waters.

To address the implications of its expanding population, Egypt has been proactive in establishing goals and plans for managing population growth and its natural resources. Two major goals of the Egyptian government are to ensure food security for the country and water security for its increasing population.[10] With regard to food security, the Egyptian government is increasing the amount of land that is reclaimed and irrigated in order to improve agricultural output for both domestic and international markets.[11] With regard to water security, the Egyptian Government is implementing an "Integrated Water Resource Management" (IWRM) plan to manage land and water resources "in order to maximize economic and social welfare and ensure equity and sustainability of environmental systems."[12] With the implementation of these policies and plans, Egypt hopes to address water and land scarcity issues to ensure a sustainable food and water supply.

Due to the geography of the state, Egypt is very pressed for additional land to support these two major goals. Most of the Egyptian population is concentrated in the Nile Valley and Nile

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[9] Ashok Swain, *The Nile River Basin Initiative: Too Many Cooks, Too Little Broth*, 22 SAIS Review 2 294 (2002).
[10] Arab Republic of Egypt Ministry of Water Resources and Irrigation, *supra* note 8, at 19.
[11] Brian Chatterton, *The Politics of Water Scarcity in Egypt*, The Environment and the Middle East: pathways to Sustainability Vol. 1, 35 (2011).
[12] Arab Republic of Egypt Ministry of Water Resources and Irrigation, *supra* note 8, at 19.

Delta Region.[13] There is little additional arable land on which people can live that is also suitable for growing crops with limited water resources to support a growing population along the Nile Valley. For example, on either side of the valley stretch great deserts over vast distances. One solution that has been proposed by governmental and development agencies alike, however, is to actually expand into the desert beyond the valley. This proposed push into the desert has many implications for the growing population and the health and sustainability of the Nile River and its water resources.

The push into the desert has been driven by policy goals of raising higher value crops for food security. Many international organizations like the International Fund for Agriculture[14] and USAID[15] have focused on assisting Egypt in implementing programs to target poverty and increase food security in impoverished areas. These programs, which were developed to support the Government of Egypt's food and agricultural policies, target rural communities for agricultural development and implement training programs designed to increase export-oriented opportunities. Goals of these programs include growing higher-valued crops, so that these crops can be traded on the international market for food staples, thus increasing food security as it is defined by the Egyptian Government. An issue is whether these programs are using valuable water resources to produce crops that are transported outside of Egypt to be sold, which may be at the expense of local subsistence farming that produces food staples for Egypt's growing population and that retains valuable water resources in Egypt. The underlying assumption regarding production of high-value crops for the international market

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[13] *Id*.
[14] International Fund for Agricultural Development, Egypt: Promotion of Rural Incomes Through Market Enhancement (Prime) Project, Final Project Design Report (2011).
[15] USAID, Egypt: Agriculture and Food Security, http://www.usaid.gov/egypt/agriculture-and-food-security.

is that greater distribution to foreign markets, where farmers would likely receive higher prices for their produce, will increase average household income, thereby reducing poverty levels.[16] These current agricultural practices, including the production of high-value crops, like vegetables, herbs, and fruits[17] for an international market, conflict with current Egyptian water security goals and raise concerns that ultimately this system is not sustainable.

This research is particularly timely because Egypt is a landscape that is rapidly changing in the face of climate change pressures. Egypt is vulnerable because the Nile River is the major water source for the state and its large agricultural industry."[18] In Egypt, climate change may lead to the loss of agricultural land due to rising sea levels, and lower yields because of the stress placed on the different crops.[19] Due to these pressures put on the state by climate change, it is important to address the issues of food security and water security in Egypt. Additionally, it is important to understand how the state's policy choices regarding food and water security, including horizontal expansion and choice of irrigation, are effective or insufficient in addressing these issues.

Statement of Problem or Question

The Government of Egypt and the international development community are proposing agricultural policies using scarce Nile River water that have the potential to contribute to conflicts between the goals of food and water security, on the one hand, and the long-term

[16] Arab Republic of Egypt Ministry of Water Resources and Irrigation, *supra* note 4.
[17] International Fund for Agricultural Development, *supra* note 15.
[18]International Commission on Irrigation and Drainage Egyptian national Committee on Irrigation and Drainage, Background Report on Application of Country Policy Support Program (CPSP) for Egypt (2004).
[19] Occidental Oriental Consult, Water Mondiaal Egypt Study: Quick scan and market analysis of the Egyptian water sector challenges and opportunities for the Dutch private sector 41 (2011).

protection of water resources such as the Nile River, on the other hand. Given the large population in Egypt and the lack of water, this thesis uses the lens of political ecology to explore how historical and contemporary water policies have influenced water management and access to water, and, to evaluate whether contemporary agricultural policies will aggravate or improve water management in Egypt in relation to water quantity and accessibility. An area which needs to be explored is understanding the current governmental policies designed to enhance water and food security in the Nile Basin, and how these practices interact with water and agricultural management laws at local, regional, national and international levels to achieve water and food security objectives. The ultimate question is what effects current agricultural and water policies have on actual agricultural water use in Egypt.

There are many other questions that arise with the current policies and how they affect people and their interactions with their environment. To deal with many of these pressures, Egypt has focused on reclaiming land in the desert for agricultural development. One major question that arises with these policies is whether needs of farmers in the Old Lands are being overlooked in the push out into the desert. Are there decisions being made that affect people's rights to water in an already constrained resource environment? What are the underlying policies used to support this expansion and is there a role for rule of law? This topic, and its investigation, is important because there is inadequate understanding of how historical water policies and agriculture policies have interfaced regarding use of the Nile River. This research project sheds light on the interactions between the government's agriculture and water policies, and hypothesizes that the current agricultural practices, including inefficient irrigation practices and horizontal expansion into the desert, which is

driven by the policy of raising high-value crops for the international market, may undermine Egypt's long-term food and water security and is not a sustainable system. The results of this research will contribute to an understanding of the direct and indirect effects of agricultural development projects on the ecology of an environmentally sensitive region.

To address this question, this paper will begin with a thorough historical investigation of agriculture and water development and policies in Egypt, focusing heavily on the period after the construction of the Aswan Dam. The paper will also look at how these policies and laws interact with food and water security for the growing population in Egypt. Additionally, the major role of Egyptian smallholder farmers, those who usually cultivate less than one hectare of land mainly for subsistence,[20] will be explored including how their current agricultural techniques play into the issues regarding water scarcity.

Methodology

To fully understand the complexity of this issue the author mainly had two separate phases to collect information. The first part focused mainly on obtaining background information regarding Egypt and it water use and agriculture policies and laws. This was using primary information gathered from various sources and using primary information regarding the law. The second step in the gathering information was to visit Egypt to help try and fill in the areas where there were gaps in the literature and try and develop a picture of what was happening on the ground today in Egypt.

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[20] Agricultural, Forestry, and Fisheries, Republic of South Africa. *Framework for the Development of Smallholder Farmers through Cooperatives Development.* Available at http://www.nda.agric.za/doaDev/sideMenu/cooperativeandenterprisedevelopment/docs/FRAMEWORK-%20OF%20SMALL%20FARMERS%20(2).pdf

In the site visit the author was mainly confined to the Luxor area in Upper Egypt except for spending time in Cairo at the beginning and end of the visit. Information was gathered through many impromptu interactions with local community members. All participants were willing volunteers and no attempts were made to coerce or otherwise promote participation on the part of any person who was unwilling to enter into conversation. In addition to these interactions, the author completed ten (N = 10) extended interviews which occurred mainly in the later part of the visit arranged through a contact in Cairo. Five of the people interviewed were foreign national workers, one was a foreign business owner involved in farming, and four were Egyptian nationals, including two business owners, a student, and a local community member.

Interviews were initiated by the author. To contact the individuals, the author would either send out emails explaining the purpose of the research trip or ask the individuals in person if they would be willing to participate. Once a response was received, the author would set up a time to meet and conduct the interview. The author submitted a list of questions to the IRB board[21] which she would use to direct the open ended interview. Upon arriving in Cairo, the author was limited in who she was actually able to conduct interviews with. Responses to the emails were very few and when in the field, the author was limited to the Luxor region due to the current political situation. Once the author made a few original contacts, she was able to obtain other contacts who were working in Egypt with development and water use issues. From these interviews, the author hoped to get a picture of what was actually happening in Egypt through local perspectives. Although the process of making contacts and gaining access to the local population was difficult, the contacts that were made proved to be very

[21] *See* Appendix A for list of sample question.

helpful in painting varied perspectives on the current situation regarding water use and the River Nile in Egypt. From these discussions several themes emerged to shed light on how water, agriculture, and development are viewed on a variety of social levels.

Outline for Thesis

The structure of this thesis is as follows: The Introduction Section presents both the concept of Political Ecology (PE), including a brief overview of how the author used this framework to conduct research regarding Egyptian water, agriculture and land use laws and policies, and a description of and the context surrounding the River Nile. The context and description of the Nile River includes an overview of the entire water resource, including the historical treaties, albeit contested treaties, allocating most of the water to lower basin states. This highlights a broader view of the Nile River as the essential water resource of Egypt and further emphasizes the importance of this research. This is followed by a description the main issues Egypt faces regarding management of its water resources.

Chapter 2 includes a literature review of PE providing an in-depth exploration of the framework and historical development of this concept. Four common concepts of PE are described including prior case studies as examples of application of the PE framework to issues of environmental degradation. Chapter Two also includes a brief overview of previous research regarding water management and agriculture in Egypt, and ends by familiarizing the reader with the complex geographical issues in Egypt that impact natural resource uses.

Chapter Three presents a historical inquiry into the development, description and promulgation of laws and policies regarding water, agriculture, and land use in Egypt. It

indicates where the policies and laws have influenced the development of water management in Egypt. Overall, this chapter sets forth historical and current legal precedent and provides the legal framework for the issues presented in this thesis. Once this historical context is set, it is important to understand how laws are applied on the ground to discover if there are any differences in how they are applied.

Chapter Four presents several salient themes discovered during the author's site visit to Egypt in early 2014 from discussions with and interviews of local residents. This site visit sheds light on how the laws and policies, that were described in the previous chapter, circumscribe how people interact with their environment in their application. Additionally this chapter highlights an important theme that emerged from the site visit, namely that of corruption and its influences on the effectiveness of laws, which is thoroughly explored in the context of Egypt and water.

Chapter Five presents a final discussion of how water and agricultural laws and policies are applied and how this can lead to environmental degradation of the River Nile within the context of the shared concepts of PE outlined in Chapter Two. The discussion includes an analysis of laws and policies established in Chapter Three and how they interact with current land and water use in Egypt, and how this fits within the framework of PE with regard water availability of the Nile River. This includes recommendations made by the author to address the relevant issues regarding water availability in the Nile River and questions to be answered by future research.

The rest of this introduction briefly outlines PE as a framework including an overview of the Nile River as a water resource for the region. This allows for intensive focus on Egypt and

ends with pressures and specific overall issues Egypt is facing in regard to management of its water from the River Nile. Overall this sets the stage for the inquiry presented throughout the rest of the thesis.

Introduction to Political Ecology

To address issues of water and agricultural policy and how they are implemented, Political Ecology was selected as a framework and process of inquiry to investigate and illustrate the interactions and connections between human societies and their surrounding environment.[22] This approach was developed as a way to include humans and human societies as a variable in research on environmental degradation. PE provided a framework that allowed the author to explore this very complex issue and explore the extent to which policies, cultural issues, or various power issues within Egyptian society have led to environmental degradation of the Nile River in Egypt.

Three shared concepts, as noted by Political Ecologist Susan Paulson, have been developed through various applications of the PE framework that relate to specific issues of environmental degradation. These shared concepts include marginalization, pressure to develop resources,[23] and abundance and scarcity of resources and all have the potential to impact issues of environmental degradation. Furthermore, it is important to understand how policies and laws affect people's interactions with their environment, which can further increase instances of environmental degradation. Throughout the analysis presented in this thesis, it will be imperative to keep these three concepts in mind as all three concepts will

[22] Susan Paulson, Lisa L. Gezon, & Michael Watts, *Locating the Political in Political Ecology: an introduction*, 62 Human Organization 3, 205 (2003).
[23] *Id*.

provide a way to analyze how laws and policies are implemented on the local level. PE will be explored more beyond this introduction, including a description of the shared concepts and examples of specific applications in Chapter Two, as well as application to the specific case study of Egypt throughout this thesis.

The Nile River Basin

As this thesis addresses water resource issues regarding the Nile River, it is imperative to understand the system as a whole. This sets the stage for a bird's eye view of what specific resources are available and how these resources are allocated within the Nile River Basin. The thesis also sets forth the specific issues Egypt is facing in the management of its allocated amount of the resource. The Nile River is the longest river in the world.[24] It travels across eastern Africa for 4,000 miles crossing Sudan, South Sudan, Burundi, Eritrea, Rwanda, Democratic Republic of Congo, Tanzania, Kenya, Ethiopia, Uganda and Egypt, a total of eleven states.[25] The Nile River consists of two tributaries, the Blue Nile originating in Ethiopia and the White Nile originating in the Central African states of Kenya, Uganda, and Tanzania,[26] and both finally merge in Khartoum, the capital city of Sudan to form the River Nile proper. The Blue Nile contributes 85 percent of the water in the Nile, leaving the White Nile to contribute the remaining fifteen percent of water.[27] Since this river extends across vast and varying landscapes, evaporation is a major issue affecting water availability basin wide. It is estimated that fifty percent of the water in the White Nile is lost because of

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[24] Alex Grzybowski, Stephen McCaffery, & Richard K. Paisley, *Beyond International Water Law: successfully negotiating mutual gains agreement for international water courses*, 22 Pac McGeorge Global Bus. & Dev. L.J. 139, 151 (2010).
[25] *Id*.
[26] *Id.*
[27] Jaroslav Myšiak,et al., The Adaptive Water Resource Management Handbook 158 (2010).

evaporation in the South Sudan, while drought and evaporation plague the Blue Nile through areas in Ethiopia.[28] After merging in Khartoum, the River Nile flows north through Sudan and Egypt and empties into the Mediterranean.[29] The average annual flow has historically been very volatile due to flooding and droughts that plague the region, although the total annual renewable flow has been estimated at around 84 billion cubic meters per year.[30] It is important to note, "[a]ll Nile countries have ambitious proposals to expand irrigated agriculture to meet growing food demands and boost economic development" doubling the amount of irrigated land to more than "10 million ha in the Nile Basin."[31] These ambitious plans will have a direct effect on the amount of water needed to support these projects. This puts another basin wide pressure on this resource that will have direct effect on the amount of water available to Egypt.

Even though the River Nile is estimated to be the longest river in the world, the actual volume of water in the Nile is very small by comparison. Historical international treaties have made this a unique situation as the majority of water has been allocated to lower riparian states, Sudan and Egypt. Egypt relies on those various historical agreements and treaties to support its claims to the "natural and historic rights" in the amount of water it needs and is allotted. Other upper riparian states contest the allotted amount. It is important to establish how these agreements were made in order to understand the basis of the amount of water Egypt asserts it has the right to regarding the River Nile.

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[28] *Id*.
[29] Grzybowski, McCaffery, & Paisley, *supra* note 22.
[30] This amount is fairly small compared to the Congo River which is estimated to have 1,300 cubic kilometers per year; *see* The Nile Basin Initiative, Summary: The State of the River Nile Basin 2012, http://nileis.nilebasin.org/system/files/Nile%20SoB%20Report%20Chapter%209%20-%20Summary.pdf
[31] Seleshi Bekele Awulachew et al., The Nile River Basin: Water, Agriculture, Governance and Livelihoods, 75 (2012).

Two major historical agreements embody the basis for Egypt's claims to historic and natural rights. The first treaty was the 1929 Nile agreement. This agreement was signed by the United Kingdom (the colonizer) and Egypt. This agreement simply recognized Sudan's right, which at the time was a colonized state by Great Britain, to increase their utilization of water from the Nile, even though Sudan was not a party to the agreement.[32] The most important aspect of this agreement was the recognition of the 'natural and historical' rights of Egypt.[33] This treaty set the basis for subsequent arguments among the riparian states as this treaty allocated most of the amount to Egypt, a downstream riparian state. Under this agreement 48 billion cubic meters of water was allocated annually to Egypt and Sudan received 4 billion.[34]

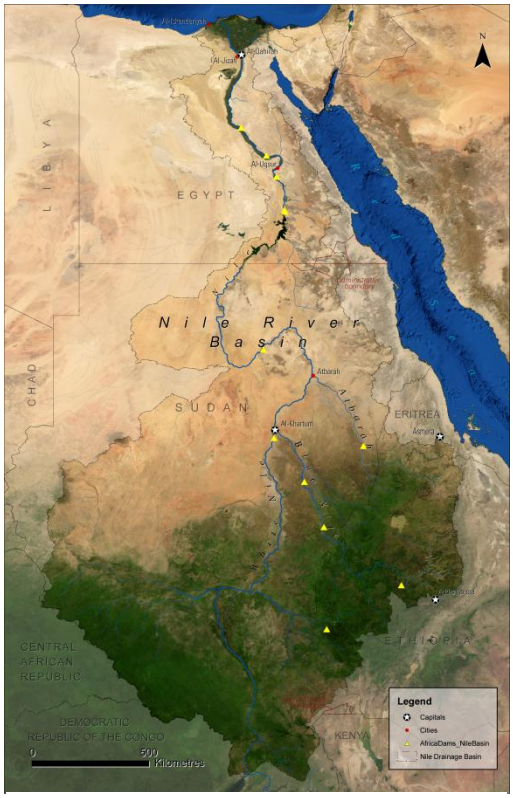

Figure 1 The Nile River Basin, Africa Water Atlas, www.na.unep.net/atlas.

This amount was even increased with the reaffirming of this past agreement with a second treaty with Sudan, which had been recently decolonized, in 1959.[35] This agreement increased

[32] Alice Shih & Trevor Stutz, *Sink or Swim: Abrogating the Nile Treaties While Upholding the Rule of Law*. 43 ELR 10790 (2013).
[33] *Id*. at 10793.
[34] *Id*.
[35] Lisa M. Jacobs, *Sharing the Gifts of the Nile: establishment of a legal regime for Nile waters management*, 7 Temp. Int'l & Comp. L.J. 95, 109 (1993).

the amount to 55.5 billion cubic meters annually which is allocated at the High Aswan Dam.[36] This is in comparison to the 84 billion cubic meters that is available in the Nile River Basin.[37] This agreement reaffirmed the past agreement and increased the water amount allocated to Egypt. With these historical agreements Egypt is facing issues with management of this water source within its borders.

Major Issues for Egypt Surrounding Water Use

Based on the description and geography of Egypt as presented, it is important to understand the main issues that are directly linked to water use in Egypt. Three major challenges to Egypt's "historic and natural" allocated water amount have emerged in recent decades.[38] All of these issues will increase the pressure on the limited resources of the Nile River and are crucial in understanding uses within Egypt itself. These issues will make it more critical for policy makers in Egypt to address issue of water supply within agricultural policies.

The first is the diversion of Nile waters to cities on the Sinai Peninsula. This plan extends back to 1996, when former President Hosni Mubarak announced a plan to divert Nile waters to an area in the North Sinai desert.[39] This project came to a standstill in 2006, due to low investment and over-extension of governmental resources with the development of

[36] Mohamed A. El-Nahrawy, Food and Agriculture Organization of the United Nations, Country Pasture/Forage Resource Profile: Egypt, http://www.fao.org/ag/AGP/AGPC/doc/Counprof/Egypt/Egypt.html.
[37] Shih & Stutz, *supra* note 32, at 10790.
[38] *Id*. at 10793.
[39] Fawzi Karajeh, Theib Oweis, & Atef Swelam, International Center for Agricultural Research in the Dry Areas, Water and Agriculture in Egypt: Technical paper based on the Egypt-Australia-ICARDA Workshop on On-farm Water-use Efficiency, 70 (2013).

megaprojects elsewhere in the state.[40] In recent years there has been a revival to complete this project to address issues of overpopulation within the Nile valley by relocating around three million people to the newly reclaimed areas.[41] Upon completion of the project, there will be major diversion of water to the Sinai Peninsula.[42] This canal is designed to pass through an underground diversion beneath the Suez Canal.[43] The pressure to complete this project has the potential to stress an already constrained system through this major diversion of water from the Nile River. Additionally, many proponents for the building of a canal to divert water have asserted that this region has sufficient water resources, through underground sources and rainfall to support the population within this region.[44] As a result, there exists much speculation about mismanagement within the Egyptian State and places pressure to support this expansion into the desert using an already constrained and stressed resource.

The next major issue regards the conversion of prime agricultural land into mainly municipal and domestic uses. The most extreme example of this is an area around Cairo called the desert road. In this area "alarming quantities of the country's precious agricultural…land have been vanishing to make way for cheaply-built homes of low-income citizens."[45] It is estimated that there has been around 500,000 units built since 2011 and about 1 billion dollars invested in this area.[46] There are many reasons this prime agricultural land has been allowed to be developed for residential purposes. The first is that most of this development has been

[40] Zeinab Abulgheit, The revival of Al Salam Canal, supposed to develop Sinai, Egypt Independent, May 5, 2012, http://www.egyptindependent.com/news/revival-al-salam-canal-supposed-develop-sinai-0.
[41] *Id*.
[42] Interview 2, Please refer to Appendix A for information regarding interviews.
[43] Occidental Oriental Consult, Water Mondiaal Egypt Study: Quick scan and market analysis of the Egyptian water sector challenges and opportunities for the Dutch private sector 39 (2011).
[44] *Id*.
[45] Maria Golia, Middle East Institute, The Lost Land of Egypt, http://www.mei.edu/content/lost-land-egypt.
[46] Interview 2, *see* Appendix A.

since the 2011 revolution, when most policing stopped in order to address issues of the dissolution of the government.[47] This lax enforcement also extended long before the revolution resulting in the "chronic absence of viable housing policies."[48] Additionally, another reason for this illegal building has been identified as the culture of "baksheesh" or bribes rampant throughout the Egyptian society. As will be seen, corruption ultimately becomes a major focus of this thesis because it affects every level of society in Egypt. Tips, bribery, or graft--also known as "baksheesh"-- influence policies at every level, including the agricultural sector in Egypt, as is apparent with the disappearance of precious agricultural land. The phenomenon of corruption may shed light on the motivation behind some of the decisions currently being made regarding agricultural practices and provide some direction as to how these issues may be addressed. The ultimate result of these illegal developments is that land already designated for agriculture, and is the easiest to irrigate, is now in high-density residential use and is forcing the Egyptian government to look for other regions for agriculture development.

The third and final issue surrounding water use in Egypt is that of climate change. The main issue regarding climate change is how it may affect the amount of water available in the river, from upper riparian states and within Egypt itself. Estimates of water potential vary widely from increasing the amount of available water "by as much as 30 %," whereas other estimates decrease the amount available "by up to 78%."[49] These issues and questions will become more pertinent when the effects of global climate change become more apparent over time and the need to address the issues in a basin wide manner becomes vital. Ultimately, there

[47] Golia, *supra* note 45.
[48] *Id*.
[49] Shih & Stutz, *supra* note 32, at 10788.

will be a change in the overall amount within the river and this has the potential to be very influential on the amount available to Egypt. It becomes even more important and pressing for policy makers to address these issues in a timely and planned manner.

Summary

This chapter provided the framework, focus and basis to understand the current agricultural and water situation within Egypt. This chapter highlighted the larger themes that are present in the Egyptian policies regarding food and water security. A brief introduction to the themes presented throughout the thesis was established in this chapter. Political Ecology was introduced as the lens through which the complex issue of water management in Egypt will be explored. As indicated in this chapter, the most pressing issues in Egypt are population growth, limited water supply, and limited agricultural and land resources. As Egypt's population grows, it will be faced with many issues regarding how to manage these various resources. These issues result from a variety of international, national, and local policies and practices. Policies developed to address issues concerning water and food security sometimes can have different effects on the ground than the policymakers intended when drafting the laws and policies. In the following chapters, these effects will be teased out by examining how the legal structure developed in Egypt in light of both the current Egyptian situation and the findings of the author throughout this research project. This examination leads to policy and legal recommendations to address these issues so as to ensure that Egypt will reach food and water security for future generations.

Chapter Two-Political Ecology Framework and Water Degradation Inquiry

Introduction

In the previous chapter, the author introduced the framework for Political Ecology (PE), provided an overall illustration of the Nile River Basin as well as introducing the River Nile as a water resource. The next important steps are in refining PE and in providing examples of how other researchers have used the framework for their own inquiries. The concepts and ideas set forth in PE are woven throughout this entire thesis to understand how policies and laws affect how people interact with the Nile River as a water resource. This chapter highlights that PE is a place-based analysis and each study is unique to the culture and geographical space of that specific inquiry. Finally, the geographical attributes of Egypt will be presented, as it is important to understand the constraints and unique circumstances this state presents.

Political Ecology Framework

This study applies a political ecology approach in order to analyze how the development of Egyptian agriculture and water policies and laws impact the availability of Nile River water. Political ecology is a theoretical framework for researchers interested in understanding the inter-connection between human populations and their environment.[50] The theory of political ecology developed in response to the lack of focus on the relationship between human decision making and the environment. Researchers have used this framework to broaden the focus of environmental degradation to include humans as a variable in the ecological system.

[50] Susan Paulson, Lisa L. Gezon, & Michael Watts, *Locating the Political in Political Ecology: and introduction*, 62 Human Organization, 205 (2003).

Harold Brookfield and Piers Blaikie[51] define "political ecology" as a framework for understanding the crossroads between politics and ecological sciences.[52] Brookfield and Blaikie continue to define "political ecology" as an approach that investigates the circular interaction between social units, including "person, household, village, region, state, [and] world" and their reactions and relationships with different "environmental changes" over time.[53] Originally, political ecology developed from cultural ecology[54] but now has evolved to combine other social and biophysical sciences including "anthropology, biology, geography and political science."[55] This approach departs from the traditional framework of understanding environmental issues as purely scientific problems that need "scientific" solutions and, instead, explores socio-ecological solutions to environmental issues and changes. For example, Brookfield and Blaikie's research focused on looking at the widespread soil degradation in Indonesia and its impact on community social structures.[56] They concluded that land degradation must be regarded not just as a physical phenomenon but also as a social construct.[57] However, Brookfield and Blaikie's definition has been criticized as being vague and not providing adequate guidance for how researchers may use this theory as a lens for looking at environmental issues.

Political ecologists have generally developed three prominent principles which are described by Paul Robbins in his book *Political Ecology: a critical introduction*.[58] The first assertion is

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[51] Neuman, Roderick. Making Political Ecology, (2005).
[52] Harold Brookfield & Piers Blaikie, Land Degradation and Society, 17 (1987).
[53] *Id*.
[54] Peter A. Walker, *Political Ecology: where is the ecology?*, 29 Progress in Human Geography, 74 (2005).
[55] Paulson, Gezon & Watts, *supra* note 50, at 205.
[56] Brookfield & Blaikie, *supra* note 52, at 17.
[57] *Id*. at 26.
[58] Paul Robbins, Political Ecology: A Critical Introduction, 59 (2nd ed. 2012).

that "social and cultural relationships are rooted in economic interactions among people and between people and non-human objects and systems."[59] This focuses on the idea that people are an integral part of any system and that many decisions are based on economic factors. The second prominent assertion is that "exogenous imposition of unsustainable extractive regimes of accumulation result in environmental and social stress."[60] When resources are extracted, many negative consequences are experienced at the local level where the population that sacrifices the most often does not gain economic benefits from extractive practices. Finally, the third assertion is that "production for a global market leads to contradictions and dependencies."[61] This third principle of political ecology is applicable in the case of Egypt because the imposition of new agricultural policies by the Government of Egypt is influenced by many international organizations. Once resources are extracted or developed for a global market, the social structure within the population will change. Moreover, producing for a global market can also lead to conditions that contradict other policies and goals within the region.

Along with the principles that have developed in regard to Political Ecology, three shared concepts have also have also developed as central to the theory of political ecology.[62] The first of the shared concepts is marginalization. Marginalization of a group happens when the group is kept or put in a powerless position within a society. This concept links environmental issues with social constructs and views them as not mutually exclusive. Environmental concerns cause marginalization within a population but are also a result of

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[59] *Id*.
[60] *Id*.
[61] *Id*.
[62] Paulson, Gezon, & Watts, *supra* note 50.

marginalization. Environmental issues and marginalization are "mutually reinforcing."[63] A main focus of many political ecology studies is to understand the interaction between different social and political groups in a population and how these interactions influence the use of natural resources. These interactions tie directly into the marginalization of certain groups. For example, groups who subsist off the land, mainly smallholder farmers in Egypt, are often left out of the political process and are unable to participate in decisions that affect necessary resources [64] for their livelihood.

The next shared concept is pressure of production on resources.[65] In many cases of environmental degradation, it is the needs of the local human population that drive the necessity to develop natural resources, but which in turn can place pressure on the natural resource. This concept is important because as populations grow, more pressure will be put on the natural resources of the region to support the growing population.

The last shared concept is that of scarcity or abundance of natural resources.[66] Environmental degradation and conflicts over resources are more likely to occur in areas where a supply of natural resources is either scarce or abundant. If a natural resource is viewed as abundant in supply, it is more likely to be developed and exploited to the economic benefit of a few. An example of an abundant resource is that of global fish supply. Many countries and companies have exploited this resource to the point of decimation because many of the global fish populations are viewed as abundant in supply. These resources have been exploited to

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[63] *Id*.
[64] Sina Marx. *The Political Ecology of Irrigation Management in the Blue Nile Basin: Impacts of Global Environmental Policies on Local Adaptation in the Koga Irrigation Project, Ethiopia*. (Aug. 29, 2011) (unpublished M.A. Thesis, University Cologne).
[65] Michael Watts, Silent Violence: Food, Famine, and Peasantry in Northern Nigeria, (1983).
[66] Phillipe Le Billion, *Political Ecology of War: natural resources and armed conflicts*, 20 Political Geography 563 (2001).

economically benefit a few companies involved.[67] This has led to conflicts in areas where the resource extraction has decimated the surrounding environment to the detriment of the local population. [68] Conversely, if a resource is scarce this also can lead to conflicts. When a needed resource is scarce, tension is more likely to develop over the allocation of that resource. This is evident in water supplies for arid regions. Many regions do not have enough water to support the population. This will cause tension over how this scare resource is allocated. States where the natural supply of water is not sufficient must look to other suppliers of the resource, which can be other states. This can increase the probability of conflicts over the supply of water.

Since researchers were not confined to merely scientific solutions to these problems, new and innovative recommendations were made to deal with environmental issues. One important contribution of this framework is to incorporate local communities in the process of dealing with environmental issues. Focusing more on understanding the social structure and cultural identities of the local population will better ensure that the local community will take on the solution or process as their own. This will lead to less resistance of the process or solutions by the local community and make the goals and the entire process around various environmental issues more sustainable. Political ecology has expanded what has been seen as the traditional causes of environmental degradation, which mainly looked at scientific causes, in addition to what has been viewed as the traditional fixes for these issues, which mainly looked to scientific solutions.[69] These solutions could include looking at the social structure

[67] The End of the Line; imagine world without fish (docurama films, 2009).
[68] Le Billion, *supra* note 66, at 563.
[69] Marx, *supra* note 64.

within the community to understand if there are power imbalances, favoritism, or marginalization that contributes to the degradation of the environment.

The political ecology framework has been applied in various contexts. In her study of the Bolivian Andes, Susan Paulson describes the connections between environmental degradation, as witnessed by massive erosion, and how "power and politics" as well as "national and international policies" have influenced the access of local populations to natural resources and traditional "productive processes and markets."[70] The main focus of her study was to link "environmental degradation and social inequality," which she notes is often not interconnected in many studies regarding either topic. Paulson's methods included direct observation of locals, participation in the field, mapping the movement of the local populations, and interviews with the local population. Her research found that distinct gender roles influenced the local traditional knowledge regarding agriculture and livestock. Next, Paulson moved on to a larger context to understand how outside influences affected the gender roles and identities, and traditional knowledge within this population. Starting in the 1950's the Bolivian government initiated a program to influence farm production to increase Bolivian produce on the international markets.[71] These programs included privatization and changes in traditional crops to increase yield and were specifically targeted at the male population, which was counter to the traditional farming techniques within this population.[72] Additionally, these agricultural programs changed the dynamics between different social groups and concentrated land ownership in wealthier individuals instead of the poor that have traditionally farmed these areas. Ultimately, these changes influenced the way in which

[70] Susan Paulson, Gendered Practices and Landscapes in the Andes: The Shape of Asymmetrical Exchanges, 62 Human Organization, 242 (2003).
[71] *Id*. at 248.
[72] *Id*.

farming is done and led to massive erosion and ecological degradation on lands that were once relied upon by traditional Bolivian farmers.

Philippe Le Billon applies political ecology to understand the relationship between wars and natural resources.[73] Le Billion focuses on the role that natural resources have played in conflicts, concluding two ways in which these relate in that "armed conflicts motivated by the control of resources, and resources integrated into the financing of armed conflicts."[74] This study is important to this thesis because there is a very high potential for conflict and mistrust among the various stakeholders within Egypt, mainly between the national government, international actors, and the local communities. Moreover, it is important to note that Egypt has publicly stated that it is willing to take military actions against any country that diminishes the "natural and historic" water amount allotted to Egypt in various international agreements.

Another application of political ecology was made by Lisa Gezon in her study of conflicts over land use in Northern Madagascar. In her article *Political Ecology and Conflict in Ankarana, Madagascar*[75] Gezon studied the relationship among members of the local community over concerns of resource utilization of local forests. This study highlighted the tension between a local population, dependent on wood from the Anakarana region, and those who wished to conserve the resource. Political ecology allowed Gezon to evaluate the complex social structures within the culture, including power dynamics, and link these structures to efforts to conserve the natural resource. For example, Gezon notes that although local participation was a cornerstone to the projects, meaningful collaboration between the

[73] Le Billon, *supra* note 66, at 562.
[74] *Id*. at 580.
[75] Lisa L. Gezon, *Political Ecology and Conflict in Ankarana, Madagascar*, 36 Ethnology, 85 (1997).

international organization and the local community was lacking during the process.[76] Additionally, the local leader, referred to as the Ampanjaka, felt a lack of recognition by the international organization as an important "decision maker in issues of natural resources."[77] Due to this lack of focus or understanding of the local community, these varying power dynamics between the local community and the international conservation group led to tension over the conservation and resource utilization of wood from the local forests.

Bill Derman and Anne Ferguson focused on water reform in Zimbabwe – an inquiry related to this author's research in Egypt. In their article, *Value of Water: Political Ecology and Water Reform in Southern Africa*,[78] Derman and Ferguson focused on how stakeholders valued water at the local, national, and international levels. Focusing on the Zimbabwean water reform allowed them to study the complex relationships between the different stakeholders and how various stakeholders valued the scarce resource of water. They studied how these different stakeholder values of water conflicted on at the international, national, and local levels.[79] The various processes used for stakeholder participation and policy development lacked understanding or consideration of local identities and traditional beliefs. Derman and Ferguson point to the issues concerning the local beliefs regarding rainfall and the new policies of user pays. The traditional belief is that rainfall is dependent upon their ancestral spirits but acknowledgment of this was completely lacking in the new water policies developed.[80] The new reforms relied heavily on international norms, like the Dublin

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[76] *Id.* at 88.
[77] *Id. at* 96.
[78] Bill Derman & Anne Ferguson, *Value of Water: Political Ecology and Water Reform in Southern Africa*, 62 Human Organization, 277-288 (2003).
[79] *Id*. at 277.
[80] *Id.* at 280.

Principles, that focus more on "demand management and cost recovery."[81] This lack of understanding and the inflexibility of this process put the entire reform in jeopardy and made the policy goals contradict many beliefs of the local community.[82] This case study illustrates the classic instance of how well-meaning policies fail or have a very different result than intended.

These case studies provide models to investigate how historical and current policies in Egypt regarding food and water security interact on the local, national, and international levels. They also provide a framework for exploring whether there is tension between the goals of water and food security policies in Egypt and the current trend to export high value crops. Additionally, these studies offer a guide to understand the nuances between changes in policies in water and agriculture and how these have affected water quantity and availability in the Nile River.

To address issues of food shortages in water scarce states, a concept of "virtual water" proposes these states purchase and import water intensive food crops on the international market to alleviate the supply of water needed to produce the crop domestically.[83] An example of this would be importing 1 million tons of wheat to free up the 1000 m^3 of water that it would take to produce that amount domestically.[84] This concept follows from the idea that in order to address the global water supply, water should be treated as an economic

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[81] *Id*.
[82] *Id*. This was due to the political situation at the time and because of this the reform has "taken back stage to national politics."
[83] Dennis Wichelns, *The role of 'virtual water' in efforts to achieve food security and other national goals, with an example from Egypt*, 49 Agricultural Water Management, 132 (2001).
[84] *Id*.

commodity.[85] In theory, commodification of water resources will enhance the discussion of food and water security[86], create a better tracking system of global water movement, and ultimately constitute a "powerful economic tool to ameliorate water scarcity problems of national economies."[87]

Virtual water identifies states that are "water scarce" and others that are "water abundant."[88] Labeling states then enables them to participate in a virtual trade of water by importing water intensive crops while exporting crops that are less water intensive and are of high economic value. Since a large portion of crops raised in water-scarce Egypt are grown for the international markets, virtual water should influence the choices regarding crop selection and distribution. One noted benefit is that this can be used instead of moving water across boundaries which has been identified as too costly.[89] Conversely, virtual water does allow for some quantifying of limited amounts of water used because productivity of the various water resources is "variable in time and space."[90] Virtual water plays an important role in horizontal expansion and crop choices that will be factors in the pressure to develop the scarce resource of the River Nile. The overall PE theoretical framework of virtual water, marginalization, and scarcity or abundance sets the stage for exploring the complexities of Egypt today, complexities which include the geography, population, water resources, agriculture, and climate that make the place, Egypt, come alive.

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[85] A.Y Hoekstra & P.Q. Hung, *Globalisation of Water Resources: International Virtual Water Flows in Relation to Crop Trade*, 15 Global Environmental Change, 46 (2005).
[86] Dennis Wichlens, *The policy relevance of virtual water can be enhanced by considering comparative advantages*, 66 Agricultural Water Management, 50 (2004).
[87] M. Dinesh Kumar & O.P. Singh, *Virtual Water in Global Food and Water Policy Making: Is there need for Rethinking?*, 19 Water Resources Management, 760 (2005).
[88] A.Y Hoekstra & P.Q. Hung, *supra* note 85, at 46.
[89] Daniel Zimmer & Daniel Renault, Food and Agriculture Organization, Virtual Water in Food Production and Global Trade Review of Methodological Issues and Preliminary Results, http://www.fao.org/nr/water/docs/virtualwater_article_dzdr.pdf.
[90] *Id*.

Egypt- the Place

Egypt is a location where the climate plays a distinctly major role in how famers use their land and water resources. To emphasize, multiple pressures, both environmentally and humanly imposed, currently pull at an already scarce resource, namely water.

Egypt has a total of 1,001, 450 km.[91] Out of this total area, a little over 3 percent is arable.[92] Climatically, it is mainly desert and there are four predominant regions. These include the Nile River Valley and Delta, the Eastern Desert, the Western Desert, and the Sinai Desert. Egypt is known for ancient agricultural practices, including developing a canal system to move water to their crops along with creating shadufs, water lifting devices created by the ancient Egyptians which allowed them to lift water from its original source to their crops.[93] Although Egypt is known for its historical agricultural practices, there is no appreciable rainfall over most of the country. The only region that gets any rainfall is the delta region along the north coast of the country, [94] which is referred to by people in Upper Egypt as "the place where rain falls."[95] Annually, this region receives less than 200mm per year of rainfall and this amount mainly falls on the northern region of the country near the coast.[96] Due to the patterns of rainfall and the fact that there is no appreciable amount, the Nile River is the main

[91] Mohamed A. El-Nahrawy, Food and Agriculture Organization of the United Nations, Country Pasture/Forage Resource Profile: Egypt, http://www.fao.org/ag/AGP/AGPC/doc/Counprof/Egypt/Egypt.html.
[92] *Id*.
[93] El-Nahrawy *supra* note 91.
[94] *Id*.
[95] Interview 7 *see* Appendix A.
[96] Central Intelligence Agency, *The World Factbook: Egypt*, available at https://www.cia.gov/library/publications/the-world-factbook/geos/eg.html.

source of freshwater for all uses including agriculture, industry, and domestic uses, constituting about 97 percent of annual renewable water resources.[97]

Egypt is the sixteenth most populated country in the world and it fits most all of its population into this small land area. Estimates on population, like the amount of water, is uncertain[98] and ranges from about 82 million currently extending to around 87 million. People who work in Egypt have scoffed at these estimates stating that nobody really knows the population of Egypt and that it probably has "already reached and exceeded" that amount.[99] For a country with increasing population, fresh water will continue to be a major issue for generations to come. For a nation that receives on average 18mm of annual rainfall, most of which is concentrated in the downstream region, sustaining and supplying water for its population is a significant challenge.

The uncertainty surrounding estimates of total water use within Egypt remains very high. In planning terms, the difference between estimates of actual water usage is highly significant. Given that Egypt's nominal total allocation (for all uses including irrigation) under the Nile Agreement is 55.5 km^3, the lower estimate indicates that Egypt has room for substantial proposed increases from current levels of irrigation, within the supply limit guaranteed by the agreement. In contrast, the higher estimates suggest that Egypt is already overusing its allocation by 10 km^3 (20%) and is dependent on 'excess' flows to Aswan which may not be

[97] Arab Republic of Egypt Ministry of Water Resources and Irrigation, Integrated Water Resources Management Plan (2005).
[98] Interview 2 *see* Appendix A.
[99] *Id.*

guaranteed in the longer term, and is thus potentially vulnerable to any increase in upstream withdrawals.[100]

In an effort to supply the growing population with fresh water the Egyptian government is looking for other resources to support the demand for this resource. This includes exploration of groundwater resources. The goals and plans developed by the groundwater sector in the Ministry of Water Resources and Irrigation are to develop the national groundwater supply. There are four separate aquifers, the Nubian Sandstone, the Moghra, the Nile, and the Costal identified for development that are the available groundwater.[101] Development of these aquifers is being explored but issues with extraction and viability of these as sources for long term sustainable development is already apparent.[102]

There appear to be many issues associated with the development of these aquifers as resources for the growing population. To deal with the seasonal fluctuation in water demand, Egyptian farmers use conjunctive management, whereby they manage their water using both surface and underground resources.[103] Governmental policies also play an important part in managing water. Historically, power has been very centralized in Egypt, with decision making powers concentrated in the central government.[104] Because of this, the national government

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[100] Seleshi Bekele Awulachew et al., The Nile River Basin: Water, Agriculture, Governance and Livelihoods, 75 (2012).
[101] Arab Republic of Egypt Ministry of Water Resources and Irrigation, Integrated Water Resources Management Plan (2005).
[102] *Id*. The Nubian Sandstone aquifer which is shared by Egypt, Sudan, Chad, and Libya. This contains over 150,000 Billion Cubic Meters (BCM) of fossil water but as it is shared by four states, there will be issues with the over extraction of this aquifer. The Moghra which is already experiencing issues regarding water quantity and quality due to massive water extraction. The Nile which is renewable and already has highly productive extraction wells. The Coastal aquifer is already experiencing problems due to salinity because of its proximity to the Mediterranean Sea.
[103] *Id.* at (10).
[104] Nicholas Hopkins & Reem Saad. Upper Egypt Identity and Change. (2004).

traditionally has played a major role in governance of the country.[105] One major push in recent years is to decentralize power and delegate more responsibilities, especially water management to a more local level. This next governing level is broken into 26 different governorates. These governorates are headed by a governor who is appointed by the president. The main responsibility of these governorates is to implement policies and laws that are established on the national level. There are many questions as to the effectiveness of these national policies on the local level. These questions include whether there is any conflict between the policies and the needs of the local populations, and whether or not the laws and policies are consistently applied throughout the state.

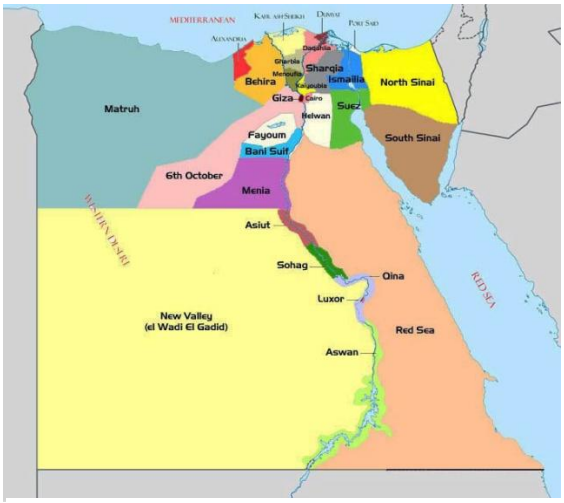

Figure 2Food and Agriculture Organization, Map of Egypt's Administrative Divisions/Governorates, available at: http://www.fao.org/ag/AGP/AGPC/doc/Counprof/Egypt/figures/fig1.jpg

As outlined by the Government of Egypt the biggest challenge in addressing water resources is meeting the increased demand. Population increase is the biggest influence in increased demand. Freshwater per capita is expected to decline from 711 m^3 to 550 m^3 in 2030.[106] This estimate includes the amount of water needed for all uses and does indicate changes with climate change.[107] Not only will there be pressure on the water resources in regard to agriculture but there will be land pressure. The Egyptian government wants to increase inhabited land from about 5.5 percent to about 25 percent. This will put pressure on balancing the need for domestic use of land

[105] *Id.*
[106] El-Nahrawy, *supra* note 90.
[107] *Id.*

versus agriculture uses. To ensure food and water security, the government of Egypt will need to balance the needs of feeding and supplying water to the population versus water use associated with agriculture and irrigation.[108]

Egypt is mainly a rural population with 58 percent of the population living in rural areas.[109] Agriculture still plays a major role in the economy of the state and is ever increasing. Agriculture provides 30 percent of the jobs of the whole Egyptian population which extends to providing livelihoods for about 55 percent of the population.[110] On purely economic terms, agriculture provides for 20 percent of the foreign exchange earnings and provides for about 17 percent of the Gross Domestic Product (GDP).[111] This indicates that agriculture will be a very important part of not only food and water security but also the economic development and security of the state. It will be an important factor in these policies furthered by the Government of Egypt.

In order to best manage its water resources, the government must understand the makeup of the water demand to meet the various needs. To quickly note, just as population and water availability is hard to calculate, "demand within Egypt is similarly poorly quantified."[112] The volume of irrigation withdrawals and return flows in the Nile Valley and Delta are complex and difficult to account."[113] Even thought the actual water demand is hard to calculate it is apparent that agriculture diverts the most water. It is academically agreed that agriculture is the biggest user of water resources in the country using about 86 percent of the water

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[108] *Id*.
[109] *Id*.
[110] *Id*.
[111] *Id*.
[112] Awulachew et al., *supra* note 100, at 75.
[113] *Id*.

resources.[114] In regard to land resources, agriculture consists of 3.5 percent of the land covering 3.5 million hectares.[115] The majority of this land is concentrated within the Nile Basin and Delta.

Due to the lack rainfall, the total amount of irrigated agricultural land constitutes 99.8 percent, leaving only 0.2 percent of the total agricultural land not requiring irrigation.[116] This 0.2 percent of the total agricultural land amounts to only 210,000 hectares that are rain fed.[117] Most of these lands consist of "old lands" or those that have traditionally been farmed consisting of around 2.2 million hectares.

Figure 3 Youth helping in field near Luxor with desert in background

Because Egypt has historically been an agricultural society, various methods for irrigation are used throughout the country. Irrigation is prevalent throughout the country although "there is great variability."[118] The range of "productivity between different irrigation districts" is vast "with some functioning very poorly, but some…ranking among the best in the world."[119] Irrigation is defined as "the controlled application of water for agricultural purposes, particularly crops, pasture trees and

[114] B.M Mati, Nile Basin Initiative, Irrigation Best Practices for Smallholder Agriculture: Training Manual No.7 (2011).
[115] El-Nahrawy, *supra* note 91.
[116] Mati, *supra* note 112.
[117] *Id.*
[118] Awulachew et al. *supra* note 100 at 74.
[119] *Id.*

other plants, to supply water requirement not satisfied by rainfall." [120] The total amount of land that is irrigated totals 3,422,178 hectares.[121] There are three types of irrigation which are commonly used: surface irrigation, sprinkler irrigation and localized irrigation.[122] Surface irrigation, often referred to as flood irrigation, is used on over 3 million hectares, whereas sprinkler irrigation is used on only 171,910 hectares.[123] The final application of water is localized, i.e., commonly known as drip or trickle irrigation, and is used on 221,415 hectares.[124] As it stands, the type of irrigation that is used the most on agricultural land, i.e., flood irrigation, is often viewed as the most inefficient. To supply this need, the Nile supplies 83 percent of the water needed for irrigation. The other 17 percent is supplied by groundwater or other mixed sources.[125] The biggest issue for the Government of Egypt is managing these demands and those of other uses including domestic and industrial uses.

To feed its population, Egypt has "turn[ed] dry desert land into fertile soil"[126] or reclaimed massive amounts of land, commonly referred to as "new lands," totaling a little over one million hectares.[127] New lands are lands that are reclaimed from the vast deserts surrounding the Nile River valley and delta. These new lands include what have been termed "mega projects" both in the Sinai Peninsula and the Sahara Desert. Many of these projects are diverting water from the Nile River and transporting the resource across vast distances, in the

[120] Mati, *supra* note 114.
[121] Arab Republic of Egypt Ministry of Water Resources and Irrigation, *supra* note 101.
[122] *Id.*
[123] El-Nahrawy, *supra* note 91.
[124] *Id*.
[125] *Id*.
[126] Oxford Business Group, The Report: Egypt 2010, 198 (2010).
[127] Arab Republic of Egypt Ministry of Water Resources and Irrigation, *supra* note 101.

case of the "New Valley" or "Toshka."[128] In regard to this project, the Sheikh Zayed transports water from Lake Nasser to Toshka, traveling a distance of over 200 kilometers through a desert.[129]

Some ideas that have been developed to conserve water and thus increase the amount of available water include "more effective on-farm water management practices, changes in cropping patterns towards less water consuming crops, introduction of improved irrigation systems, and re-use of drainage water and treated water."[130] The effects of implementing the improved management techniques could have an effect on the availability of water for Egypt in the Nile River but the effects are still unknown for any improvement in management techniques.

Summary

When Political Ecology is used as a lens to evaluate the interplay of historic and current goals and policies to manage water and food resources, it is understandable that competition for those resources can lead to tension or conflict over management of a natural resource like the Nile River in Egypt. One major source of tension, and a ready source for potential conflict, is the extent to which international and national policies, in conjunction with national laws, are implemented on the local scale. Chapter Three provides an overview of the historical development of the law concerning water, agriculture, and land tenure in Egypt and also presents the development of Egyptian food and water security policies.

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[128] Arab Republic of Egypt, Agriculture in the New Valley, http://www.newvalley.gov.eg/html/toshkae.htm.
[129] *Id*.
[130] Arab Republic of Egypt Ministry of Water Resources and Irrigation, *supra* note 101.

Chapter Three-Historical Overview and Analysis of Egyptian Agriculture, Water Policies, and Water Use

Introduction

This chapter focuses on the legal structures that control water use in Egypt, including historic and current water use laws and the concept of land tenure. Further analysis involves the impact these laws have for Egypt's development of comprehensive water use and management plans.

Water Use Laws and Policies

To understand where Egyptian water and land tenure laws, as well as agricultural policies, stand today it is important to understand the historical development of these laws. Egypt's irrigation and food production system has been in place since Pharaonic times.[131] Although many agricultural techniques have changed since this time, the underlying systems of irrigation, mainly through use of canals, still remain much the same today. Historically, Egypt's main source of irrigation was the annual flooding of the Nile River.[132] Ancient Egyptians used the flooded land for food production.[133] This practice was aided by the development of shadufs, an ancient water lifting device that utilizes a bag or bucket to lift

[131] Annette Schomberg, Ancient Water Technology: Between Hellenistic Innovation and Arabic Tradition: Syria, 120 (2008).
[132] Wes Jackson, *Natural systems agriculture: a truly radical alternative,* 88 Agriculture, Ecosystems and Environment 113 (2002).
[133] *Id*.

water to higher levels, and water wheels that allowed the Ancient Egyptian to move water to their crops.[134]

The first manmade irrigation structures were established under the foresight of Ruler Mohammed Ali in 1805.[135] Since Mohammed Ali placed focus on high value crops, like cotton, sugarcane, fruits, and vegetables, a change needed to occur to protect these crops from the natural cycle of the Nile River.[136] This facilitated the need to develop dams along the Nile River for more control of its floods and also to construct many of the canal systems still used today.[137] Additionally, issues of salinization were minimal due to the natural system of drainage and natural flooding.[138]

A major change in irrigation and flood control was the construction of the original Aswan Dam in 1902. This increased storage capabilities and extension of irrigation throughout the country.[139] This trend for expansion increased even more with the completion of the High Aswan Dam in 1968. This massive structure increased the storage capacity to a total of 162 billion cubic meters and has halted virtually all of the annual Nile floods.[140] The High Aswan Dam altered water use in Egypt and since the construction of the dam, Egyptian policymakers have pushed for more intensive utilization of water, especially regarding agriculture.

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[134] Schomberg, *supra* note 131, at 120.
[135] Sarwat Fahmy, et. al., Ministry of Water Resources, Analysis and Review of Modification in Law 12 of 1984 on Irrigation and Drainage: Report No. 37, (2000).
[136] *Id*.
[137] The modern day "water delivery system" started with the first barrage or dam construction; *see* International Commission on Irrigation and Drainage Egyptian National Committee on Irrigation and Drainage, *Background Report on Application of Country Policy Support Program (CPSP) for Egypt*, 6 (2004).
[138] Fahmy, et. al., *supra* note 135.
[139] *Id*.
[140] *Id*.

Water rights and water use for agriculture has always been linked to the land.[141] Due to Islamic tradition, water cannot be commodified, only the delivery of the water.[142] Water delivery was amongst the farmers was centrally managed by the government.[143] Power was very centralized and there were many complaints of water shortages and mismanagement that are still prevalent today.[144]

Due to the long history of agriculture and irrigation within the Nile ecosystem, establishing rules and laws that can effectively manage a system that has its beginnings in an ancient society has proved to be very challenging and difficult. The history of development is replete with many changes in power, policy focus, and technology that make current management of the system challenging. It has proven difficult to address the entrenched issues while at the same time making it flexible to address any new developments. Several water use laws that apply to managing traditional agriculture systems and water use in Egypt, including irrigation laws, environmental laws, and land tenure laws, were developed to meet these challenges.

Law 12 for the Year 1984

The main law that concerns use of Nile waters for irrigation purposes is Law 12 of the year 1984. This law cancels out two previous laws regarding irrigation and drainage.[145] The main issue was establishing law 12/84 as the one law to control and guide the management of irrigation and drainage. Law 12 of the year 1984 states: Maintaining the drainage and

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[141] USAID, USAID Country Profile; Property Rights and Resource Governance: Egypt, http://usaidlandtenure.net/sites/default/files/country-profiles/full-reports/USAID_Land_Tenure_Egypt_Profile.pdf
[142] *Id*.
[143] *Id*.
[144] *Id*.
[145] Law No. 12 of 1984 (Concerning the issue of Law on Irrigation and Drainage) *Al-Jarida Al-Rasmiyya*, 22 Feb. 1984, Art 1.

irrigation and land used in the "public interest…becomes the responsibility of the state."[146] The law is broken down into various sections regarding specific topics. These include *Section II: Concerning the Private Ducts and Drains, Section IV: Concerning Water Distribution, Section VI: Concerning Protection of Irrigation, Navigation and Riverside, and Section VII: Concerning Penalties.*

The first substantive section of the law concerns private ducts or canals commonly referred to as mesqas.[147] Mesqas constitutes the last or "tertiary" section of the canal that is privately owned and distributes the irrigation water to the farmer's fields.[148] Section II Article 18 outlines the amount of water one landowner can apply to his land which is "in proportion to the area of land owned."[149] As discussed later in this section, land tenure laws have effectively reduced the amount of land available for ownership by a single person or by a family, thereby reducing the amount of water available to the individual farmer.[150] Article 19 places the responsibility of maintaining the private ducts and private drains and specifically tasks the landowner to dredge the canals and "preserve their embankments in good condition."[151] This section outlines that control over the amount of water allotted to the landowner is delegated to the Regional Irrigation Inspector and also the General Director within the Ministry of Irrigation (currently referred to as the Ministry of Water Resources and Irrigation).[152] This section also allows for the Regional Irrigation Inspector to develop and

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[146] *Id*. at Art 1(d).
[147] *Id*.
[148] Arab Republic of Egypt Ministry of Water Resources and Irrigation. Water for the Future: National Water Resource Plan 2017 (2005).
[149] Law No. 12 of 1984 *supra* note 145, at Art. 18.
[150] A.O El Bilassi & G.M. Seyam, *Land tenure structure in Egyptian agriculture: Changes and impacts,* 9 CIHEAM Options Mediterraneennes, 52 (2005).
[151] Law No. 12 of 1984 *supra* note 145, at Art. 19.
[152] *Id.* at Art. 18.

implement an irrigation schedule for lands within a specific irrigation system.[153] Moreover, the General Director is delegated the "responsibility for settling any conflict."[154] This raises questions as to the uniformity of the decisions made by the Regional Inspector and also the General Director. Since the power is consolidated in one specific person, there could be room for corruption or favoritism by these agency actors. Additionally, omissions of responsibilities and lack of enforcement of the penalties outlined in the laws can also lead to issues regarding the application of these laws on the local level.

The next pertinent section of this law concerns the power to effect water distribution throughout these irrigation systems. Power is delegated to the Ministry of Irrigation to "modify the irrigation and drainage system according to the nature of the agricultural land."[155] Ambiguity is what constitutes "nature of the agricultural land" or how it has been otherwise used or applied in regard to modification of irrigation.[156] Since there is no guidance as to how this has been applied or how this has been interpreted, one would assume that it is based on the type of soils and variety of crops being used on the land.

Moreover, the General Director has the power to "prohibit everyone from taking water from one or more of the public canals in order to ensure the justly [sic] distribution of water, to stop giving the lands more water than their needs or to any other emergency affecting the public interest."[157] These public canals consist of any canal that is not considered a mesqa,

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[153] *Id*.
[154] *Id*.
[155] *Id.* at Art. 36.
[156] No information regarding how this is applied on the ground or how this is interpreted was available to the author.
[157] Law No. 12 of 1984 *supra* note 135, at Art. 37.

which includes "main canals, public feeders and public drains."[158] This is a vast delegation of power to the Ministry of Irrigation for the public interest. As indicated in these two sections, power for the distribution of water is held within the Ministry of Irrigation. For example, the law prohibits "[w]asting the irrigation water, by draining it into a private or public drain or into uncultivated or unlicensed land," which is land illegally utilized without express permission by the Ministry, and delegates to the Ministry the power to enforce the penalties associated with the wasting of irrigation water.[159] Overall, this has led to very uneven distribution and application of water for irrigation throughout the country and has led to issues of mismanagement within the irrigation system.[160]

The next substantive section within this law addresses the issue of irrigating new lands within Egypt. The definition of new land is "any land, not licensed before for irrigation is considered new."[161] The license including any specified conditions is granted by the Ministry for a period "not exceeding ten years."[162] This can include land within the "(Basin) bed of the Nile or any other place inside [Arab Republic of Egypt] and is provided with water supply through the plan of the state."[163] This concept of "new land" is important. In order to provide food for export, the Egyptian Government is looking to expand into the desert to provide lands for this produce utilizing a scarce water source. As dictated in Article 63, the state "is not allowed to allocate any lands for the new horizontal agricultural expansion, without getting the approval of the Ministry of Irrigation to ensure that the land is provided with a

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[158] *Id.* at Art. 1(B).
[159] *Id.* at Art. 82.
[160] "Small farmers have often argued that the government treats them unfairly in distributing irrigation water, shortchanging those who live at the end of canals." USAID, *supra* note 141, at 12.
[161] Law No. 12 of 1984 *supra* note 145, at Art. 62.
[162] *Id.* at Art. 9.
[163] *Id.* at Art. 62.

water supply."[164] This topic of horizontal expansion, which has become a priority for the Government of Egypt, becomes important when considering issues of scarcity and abundance and the implications these issues have for any future planning and goal setting both nationally and at the local level.

The final section pertinent to irrigation of agricultural lands regards penalties for violations of this law. The penalties range mainly from the 50 to 300 Egyptian Pounds (L.E.) depending on the specific violations and can amount to 10,000 L.E. mainly for violations regarding protection of the coastal areas.[165] The current exchange rate stands around 7 L.E. to 1 U.S. dollar, making the penalties range from around 7 dollars to around 1,400 U.S. dollars.

Law 12 of the year 1984 was amended by Law 213 of the year 1994. These amendments were made to try to involve farmers on the local level in issues of water management and to address issues of top down management as outlined in Law 4 of the year 1984. The next section outlines the amendments made and focuses on the specific changes the amendments were designed to implement.

Law 213 of the year 1994

To try and decentralize power of water allocation in Egypt, by establishing and empowering Water User's Associations, the Egyptian Government amended Law 4 of the year 1984 by promulgating Law 213 of the year 1994. As outlined in Section 5.1 of this law, the goals of these amendments are to lay down "for the first time in Egypt a legal basis for participation of

[164] *Id.* at Art. 63.
[165] *Id.* at Arts. 89-100.

farmers in a number of aspects of water management, albeit primarily at the mesqa level."[166] This was a direct acknowledgment that power delegated from the top down was not necessarily the best way to address issues of water management since many of the issues affecting the local communities were not being addressed to their satisfaction.[167] The first modification was to change the name of the Ministry of Irrigation to the "Ministry of Public Works and Water Resources."[168]

Article 64 authorizes "the competent Irrigation Department"[169] to designate new land for irrigation dictating that individuals "are obliged to adopt one of the ways of irrigation indicated in the authorization."[170] Efficient water use is highlighted as a focus of the "irrigation method[s] as may be described in the license."[171] The main contribution of the amendments is to establish Water Users Associations to include farmers at the local level. The goal of these groups is to "participate in planning and control" at the mesqa level."[172] The minister issued a decree that also specifies "the administrative organization and use of the improved irrigation system, including the formation of water resources users with a legal personality at the mesqa level."[173] This decree was to aid farmers in addressing issues in water management through Water Users Associations, whose development is a main contribution of this amendment.

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[166] *Id.* at Amend. 5.1
[167] Fahmy et. al. Ministry of Water Resources, *supra* note 135.
[168] *Id.* at Art. 1.
[169] *Id.* at Art. 64.
[170] *Id.* at Art. 64.
[171] *Id.* at Art. 71.
[172] Institutional and Social Innovations in Irrigation Mediterranean Management, Egypt Water Management Legal and Institutional Context, http://www.isiimm.agropolis.org/OSIRIS/doc/egWaterLegalnstitutional.pdf.
[173] Fahmy et. al. Ministry of Water Resources, *supra* note 135, at Art. 71.

To help facilitate these associations, additions were made to the original law, mainly to Article 36 for fiscal and funding purposes. The main focus of the revised Article 36 is to help farmers, in the old lands, which constitutes any land that was previously granted a license by the Ministry, to implement "improved field irrigation systems" and aid in the management of these systems.[174] Additionally, Article 36 bis (1) establishes the financing needed for these improvements in the old lands. This addition established "financing of projects related to the development and maintenance of improved mesqas…and for the promotion of awareness with respect to the use of the water." [175] Although there is improved involvement of the farmers in water management in Egypt, use of the improved irrigation systems and management of water is still delegated by the Minister of Public Works and Water Resources.[176] The Ministry "shall regulate by decision the method of managing and using improved irrigation systems in the olds lands."[177] Once the "improved irrigation system" is chosen, it then becomes the responsibility of "water users and water boards acting independently" to apply the new methods.[178] The main issue with the amendments made in Law 213 of the year 1994 was that the changes were "constrained by ambiguous political support, the lack of a legal framework associated to a controversial water system in its hydraulic and institutional aspects."[179] Additionally, with focus put on "changes in vision and policies, the increasing scarcity of water, the anticipated diversion of Nile water to new lands, and the increased importance of

[174] *Id*. at Art. 36bis.
[175] *Id*. at Art. 36bis(1).
[176] *Id*.
[177] *Id*. at Art. 56.
[178] *Id*. at Art. 56.
[179] Nicola Lamaaddalena & Roula Khadra, Regional Assessment- Water Users' Association in the SWIM-SM Project Countries, (2012) http://www.swim-sm.eu/files/ASSESSMENT_WUAs_FINAL.pdf.

stakeholder participation," many of the goals and purposes of these laws needed to be revisited.[180]

With the development of irrigation and new lands, problems were beginning to emerge regarding the ability of this legislation to address issues regarding agricultural water use in Egypt. To address these issues, in 1998 a task committee was created to study and make suggestions as to how to modify this law to address the changes and limitations of this law. During this process a stakeholder workshop was held to propose a new modified law. Stakeholders included representatives from "water-related management responsibilities," universities, NGOs and water users.[181] Through meetings and sessions, the stakeholders provided a list of improvements to Law 4 (1984) and Law 213 (1994).

MWRI Recommendations

These improvements were outlined in a draft law created by the Ministry of Water Resources and Irrigation (MWRI).[182] The main concept in this document was to provide for a more flexible and all-encompassing law to address the complex issues Egypt faces regarding its water resources. The improvements are geared to make water management more holistic and allow for incorporation of the Integrated Water Management Plan, detailed later in this chapter.

The first recommendation by the MWRI was to focus on "integrated water management for different sources, types, and uses considering the social and economic aspects."[183] Egypt is

[180] Fahmy et. al., Ministry of Water Resources and Irrigation, *supra* note 135.
[181] *Id.*
[182] *Id.*
[183] *Id.*

now focusing not only on the economic aspects of water management, but trying to incorporate social aspects which were omitted or deemphasized in earlier versions of the law. Along with looking at the social implication of management, the recommendations included defining "the responsibilities and authorities of governmental and non-governmental bodies at all central, regional, and local levels."[184] In improving water management at all levels it is important to establish the various roles each stakeholder has in the management process. One major aspect of this social planning is the promotion and involvement of water users as one of the most important stakeholder groups. For the benefit of private users and the various stakeholders, and to better fund these irrigation projects, alternative sources of funding are sought, through various international organizations.[185] The focus is put on private companies to invest in water management although the MWRI should still retain the supervisory role. The improvements should be taken on by private companies which in turn are encouraged to pass the "associated costs and expenses on to the end users."[186]

Another major aspect the MWRI promotes is the development of other sources of water throughout the country. This includes the use of groundwater for "drinking and irrigation purposes."[187] Drainage water, which is water that is delivered back to the main canal after being applied to the fields, is another alternative source of water recommended by this document, but more research is needed to ensure the viability of this approach.[188] However, many questions remain about the suitability of this practice in certain areas in its "existing

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[184] *Id.*
[185] Lamaaddalena & Khadra, *supra* note 179, at 15.
[186] Fahmy et. al., Ministry of Water Resources and Irrigation, *supra* note 135.
[187] *Id.*
[188] *Id.*

condition or after mixing [the drainage water] with freshwater."[189] The State is exploring rain harvesting and floodwater as other viable sources of water for agricultural and irrigation purposes.[190] This would be more promising in areas in Lower Egypt where there is an appreciable amount of rainwater each year. This does not appear to be the best option in the old lands in Upper Egypt.

One of the most promising recommendations made in regard to the old lands in Upper Egypt is to incorporate modernized irrigation systems. These improved methods which were originally outlined in Law 4 of the year 1984 including sprinklers, drip irrigation systems, and "other improved methods."[191] There are many feddans, which is an "Egyptian unit of area equal to 1.038 acres" already in use in agriculture that use very inefficient methods of irrigation, including flood irrigation.[192] With improvement in these areas, the many benefits of improved water management might become more pronounced and thus salient to the water user stakeholders. Along with these improvements, the recommendations include re-focus on renovating the existing structures to make the entire water system more efficient. These recommendations are to improve canals and drains, "adjust water balances, and replace or renovate irrigation and drainage pumps at the end of their life span."[193]

As indicated earlier, the enforcement mechanism for the previous law was lax and the penalties were minimal and rarely enforced for violations of the laws.[194] MWRI recommends

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[189] *Id.*
[190] H.I. Abdel-Shafy, et al., *Rainwater in Egypt: quantity, distribution and harvesting*, Mediterranean Marine Science, 245-257 (2010).
[191] Fahmy et. al., Ministry of Water Resources and Irrigation, *supra* note 135.
[192] Occidental Oriental Consult, Water Mondiaal Egypt Study: Quick scan and market analysis of the Egyptian water sector challenges and opportunities for the Dutch private sector, 28 (2011).
[193] Fahmy et. al., *supra* note 135.
[194] Interview 2. *See* Appendix A.

that the penalties be "toughened for the violations of the law concerning water resources and irrigation."[195] MWRI also recommends imposing tougher penalties, by the Ministry "regardless of the courts' right to impose other penalties legislated by the penal code or other criminal laws."[196] By increasing the authority of the courts to impose tougher penalties, the hope is to deter violation of these laws. This is to help correct the lax and sporadic enforcement of these laws, through delegation to various enforcement agencies and agency actors at the local level.[197] This will most likely be a major challenge for water managers in Egypt as they try to implement these recommendations. It appears that some of these recommendations have been implemented but no changes to the substantive laws have been made.

The myriad challenges facing the water and irrigation systems in Egypt are also predicated on a thorough understanding of the land tenure system in Egypt. As indicated earlier, the amount of water that is allocated to each individual farmer is dependent upon the amount of land owned or allotted to the shareholder farmer. These land tenure laws provide the legal basis for agricultural land ownership in Egypt.

Land Tenure

Historically and recently, Egypt has undergone had many land reforms, many of which resulted from special legislation passed by former President Mubarak, reforms that were targeted at redistributing land and limiting the amount an individual or family could own.[198]

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[195] Fahmy et. al., *supra* note 135.
[196] *Id*.
[197] *Id*.
[198] Lama Abu-Odeh, Lama, *On Law and the Transition to Market: The Case of Egypt*, 23 Emory International Law Review, 351-381 (2009).

The effects of legislating land reform under the existing land tenure laws had direct and major impacts on individual holdings in regard to agricultural lands.[199]

An agricultural land holding is any size of land, which is used in any part for the production of plants or animals.[200] Land that is used to produce "plants, [or] animal" is known as "agricultural land tenure."[201] The type of "land holding plays a significant economic and social role in determining the form of land use and the holder's decision-making in the field of production."[202] Whether a person owns land, rents land, or a mixture of both, they are considered an agricultural landholder when they use farming land and are "administratively, financially and technically responsible for the farm."[203]

Many changes have occurred since the early 1950s to address issues of unequal distribution of land. Before the first major Agrarian Reform Laws in 1952, land was unequally distributed with smallholders who constituted 94 percent of the number of land holders but only owned 35 percent of the land.[204] The 65 percent of land that was left was owned by 6 percent of the population. The first reform laws were used specifically to target these inequalities through "redistribution of holdings in order to increase the income of smallholders and improve their economic and social standards."[205]

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[199] USAID, USAID Country Profile; Property Rights and Resource Governance: Egypt, http://usaidlandtenure.net/sites/default/files/country-profiles/full-reports/USAID_Land_Tenure_Egypt_Profile.pdf.
[200] A.O El Bilassi & G.M. Seyam, *Land tenure structure in Egyptian agriculture: Changes and impacts*. 9 CIHEAM Options Mediterraneennes, 52 (2005).
[201] *Id.*
[202] *Id.*
[203] *Id.*
[204] O El Bilassi & G.M. Seyam, *supra* note 200.
[205] *Id.*

The first land tenure law promulgated was Law 127 in 1952 which limited the maximum amount of land that an individual could own to 200 feddans, or a little over 207 acres, of agricultural lands.[206] This amount decreased to 100 feddans for an individual by Law 127 of the year 1961.[207] The amount for both individuals and families were further decreased by Law 50 of the year 1969 where 50 feddans was the maximum for individuals and family ownership was limited to 100 feddans.[208] The effects of these land reforms were to redistribute land ownership, totaling over "300,000 hectares…comprising between 12 [percent] to 14 [percent of the land under cultivation],"[209] expropriating land from owners who held more than the maximum level established in the law, and to enable more smallholder farmers to own a larger share of the agricultural lands in Egypt.[210] The effects of these land reforms included changing how land is passed down through generations resulting in the inheritances of smaller and smaller individual plots.

Additionally, Law 96 passed in 1992, which effectively cancelled Law 127 of the year 1953, cancelled controlled rent for smallholder farmers.[211] The direct effects of this law, which was implemented in 1997, was that many smallholder "farmers were left without land, subsistence or employment" as the rent for land was increased by landlords far beyond what the tenants were able to pay.[212] Effectively the law "stripped about 1 million registered tenant families of

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[206] Law No. 127 of 1952
[207] Law No. 127 of 1961.
[208] Law No. 50 of 1969.
[209] USAID, *supra* note 199.
[210] *Id.*
[211] Mohamed Elmeshad, *Rural Egyptians Suffer Most from Increasing Poverty*, Egypt Independent, Sept. 28, 2011, http://www.egyptindependent.com/news/rural-egyptians-suffer-most-increasing-poverty
[212] *Id.*

permanent and heritable land rights."[213] Land tenure laws have had direct negative effect on the ability of smallholder farmers to thrive as is evidenced by the reduction of land available to smallholder farmers.[214] Egypt has gone through many reforms and changes in laws that have ultimately placed a lot of stress on smallholder farmers. In an area where land in closely tied to identities, these laws have essentially stripped many smallholder farmers of their land, their identity, and their access to water.

An additional major factor that affects smallholder farmers concerns the type of crops that Egypt has supported through its national policies. Over the past two decades, the Egyptian government has shifted its policy from certain food staples to supporting crops that have higher economic value.[215] The biggest question with regard to these changes concerns the economic benefits obtained from higher value crops versus possible negative effects on water accessibility. Of particular concern is whether traditional communities will have access to the waters of the Nile to grow subsistence crops or whether these communities will have to compete with export agriculture.

In order to address the issues regarding shifts in crop support and water usage several plans were developed by the Government of Egypt to provide direction and coordinated efforts towards more effective water and crop management. These plans include the Integrated Water Management Plan and Also the National Water Resources Plan.

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[213] USAID, *supra* note 199.
[214] *Id*.
[215] Fahmy et. al., Ministry of Water Resources and Irrigation, *supra* note 135, at 231.

Integrated Water Management Plan

As stated in Chapter One, Egypt developed an Integrated Water Management Resources Plan (IWMRP) to address issues concerning water management. It was in response to the multi-stakeholder group discussion previously discussed, and has become the guide for the Ministry of Water Resources and Irrigation in their drive to implement Integrate Water Management. This plan "describes how Egypt will safeguard its water resources in the future both with respect to quantity and quality, and how it will use these resources in the best way from a socio-economic and environmental point of view."[216] This plan outlines the steps Egypt will take to reach Integrated Water Management in regard to its water resources. The goal of this plan is to "manage and develop" land and water resources "within a coordinated framework in order to maximize economic and social welfare and ensure equity and sustainability of environmental systems."[217] As explained in the management plan, the main challenges facing Egypt will be **"**meeting the water demands of a growing society, rising living standards, food policy to feed a growing population, and water quality degradation and environmental problems and health issues."[218] This plan outlines the need to develop these resources in a coordinated fashion taking into consideration future challenges.

As indicated in the report, industrial water and municipal water use is currently being met. Additionally, agriculture production is at very high levels, with a cropping intensity of about 200%.[219] Cropping intensity is defined as 'the fraction of the cultivated area that is

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[216] Arab Republic of Egypt Ministry of Water Resources and Irrigation, Integrated Water Resources Management Plan, 5 (2005).
[217] *Id.* at 6.
[218] *Id.*
[219] *Id.*

harvested."[220] The main issue in regard to building a sustainable agriculture system is the cost associated with the increase in water use. It is estimated that "the costs for water services for the next 15 years will be more than triple the current expenditures."[221] This will present new challenges to ensure that the government will be able to address the increase in expenditures needed to cover the projected increase in demand.

Although water management is seen as a national priority, the Egyptian government indicates a delegation of many powers to local water user boards, which are being created to address the various water issues at a more local level.[222] The ministry would allow the water user associations to try and manage water on the local or mesqa levels. These water user associations were first introduced in the changes to Law 4 of 1984 but have not yet been realized as full-fledged institutions. When these boards emerge, the main concerns that they will face include meeting the supply versus demand imbalances for the future, the health of the ecosystem including its effects on the local population, and issues regarding "weak service delivery, reliability, and transparency."[223] Additionally, these boards and the Water Ministry will be facing issues regarding "financial stability and cost recovery issues"[224] along with issues regarding measuring water quality and quantity along the Nile River.

Two main departments will be responsible for implementing this management plan and for the daily operations of Egyptian water resources. The two main departments include the Ministry of Water Resources and Irrigation (MWRI) and the Ministry of Agriculture and

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[220] Food and Agriculture Organization, *AQUASTAT*. Available at: http://www.fao.org/nr/water/aquastat/data/glossary/search.html?termId=7587&submitBtn=s&cls=yes
[221] Arab Republic of Egypt Ministry of Water Resources and Irrigation, *supra* note 216, at 6.
[222] *Id.* at 35.
[223] *Id.* at 6.
[224] *Id.*

Land Reclamation (MALR). MWRI's main responsibility is distribution and management of water resources throughout the state and includes addressing issues of agricultural drainage water and water quality. The Second department, MALR, is responsible for practices on agricultural lands. This includes implementing improvement plans for more efficient water use, especially focusing on the individual farm level. They also are the Ministry who is delegated the responsibility of implementing plans for horizontal expansion.[225]

The main focus of the Integrated Water Management Plan is to emphasize the importance of management the waters of the Nile in an integrated way. This document also highlights the development and adoption of the National Water Resources Plan (NWRP) which outlines Egypt's national strategy for protecting its water resources until the year 2017. As will become apparent, this is the document that pushes the horizontal expansion plans for reclaiming land for agricultural purposes.

National Water Resources Plan

In addition to the Integrated Water Management Plan, Egypt has a developed a National Water Resource Plan (NWRP) which is entitled, *Water for the Future*. This document was created by the Government of Egypt with the aid of the Government of the Netherlands. This is the document that describes how Egypt will implement the policy goals outlined in the Integrated Water Management Plan. It has the same focus as the IWRMP and describes "how Egypt will safeguard its water resources in the future (till 2017), both with respect to *quantity* and *quality*, and how it will use these resources in the best way from a *socio—economic* and

[225] Fahmy et. al., Ministry of Water Resources and Irrigation, *supra* note 135.

environmental point of viewpoint view"[226] This plan specifically defines Integrated Water Resource Management as a "process which promotes the coordinated development and management of water, land, and related resources, in order to maximize the resulting economic and social welfare in an equitable manner without compromising the sustainability of a vital ecosystem."[227]

The basic principles that drive the development of this plan are twofold. The first is that "[f]resh water is a **finite and vulnerable resource**, essential to sustain life, development and environment; it should be considered in a holistic way, simultaneously taking into account quantity and quality, surface water and groundwater."[228] The second principle is that "[w]ater development and management should be based on a **participatory approach**, involving users, planner and policy makers at all levels.[229]

The main focus of this plan is to outline how to best manage land and water resources. In regard to land reclamation, projects like Toshka and Sinai are used as examples of projects that can be implemented to increase land for agricultural uses. In regard to water supply, the plan points to issues of actual increase in supply from upper basin states. They highlight the fact that "a limited increase is not unrealistic, either as a result of water conservation projects in Sudan, changes in reservoir operation of Lake Nasser or (in the very long run) as a result of climate change."[230]

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[226] Arab Republic of Egypt Ministry of Water Resources and Irrigation, Water for the Future, National Water Resource Plan 2017 I-6 (2005).
[227] *Id.*
[228] *Id*.
[229] *Id*.
[230] *Id*.

This plan also contains action with regard to institutional reform with the main focus involving the private sector in managing water resources. The goal is focused on improving "performance of the irrigation and drainage system by transferring public responsibilities to the private sector."[231] This focus on transferring responsibilities includes adopting an Integrated Water Resource Management which they define in this document as "demand-oriented, multi-sectoral [*sic*]."[232] A legal structure goal presented in this plan is ultimately to "determine the need for laws and regulations for the sustainable use of the water resources."[233]

Population is identified as a major factor in the need to manage its water resources for the future.[234] One major challenge is "securing water for food production" to feed the growing population. Since a large portion of farming done in Egypt is "sustenance" it is important to recognize and to address water and agricultural production as being connected.[235] The plan breaks the lands into two major areas, the "Old lands in the Nile Valley" and "New Lands" which are those that have been reclaimed. Along with the mega projects mentioned previously, population increases, and "horizontal expansion plans of the government will increase the demand for irrigation water."[236]

As outlined in the plan, "[i]n terms of **water use**, an important issue is whether the expansion of the New Lands comes at the expense of less water being available to the Old Lands"

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[231] *Id*. at I-4.
[232] *Id*. at I-5.
[233] *Id*.
[234] *Id.* at I-6
[235] *Id*.
[236] *Id*.

(*emphasis added).*[237] This is important because many farmers would be denied access to water which is vital for their livelihoods. Additionally, the plan asserts "productivity is much lower in the New Lands than in the Old Lands," while providing statistics establishing that productivity ranges from 50-85 percent less on the New Lands emphasizing that production has the potential to improve with time.[238] The government justifies this choice by concluding that "to the extent that the high productivity of the Old Lands has not yet been met in the New Lands, this represents a chance for expansion of output, even without massive additional investment."[239] Ultimately, the plan admits that water use will change in Egypt as a result of the horizontal expansion projects, but justify it as a "chance for expansion of output."[240]

The key to understanding this policy development is in understanding how the Government of Egypt is defining the goals for food production. Food-sufficiency is the first issue they address in the plan. It defines "[f]ood self-sufficiency is that ratio between the production and consumption."[241] It continues by stating "[m]aximising food self-sufficiency in 2017 through measures would result in the production of large quantities of basic staple grains, which are relatively low-value in the international markets."[242]

Even though it is indicated that they could produce "large quantities of basic staple grains" the basis for the agricultural policy "is not based on self-sufficiency but on food security, using

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[237] Arab Republic of Egypt Ministry of Water Resources and Irrigation. *Water for the Future, National Water Resource Plan 2017*. 2-31 (2005).
[238] *Id*.
[239] *Id*.
[240] *Id*.
[241] *Id*.
[242] *Id*.

Egypt's competitive advantages."[243] Food security was defined by the World Food Summit "when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life."[244] Egypt's plan for achieving food security is "[m]aximising national income" by producing "higher value food crops…and trade[ing] them to purchase staples and have additional revenue and employment as well.[245] Thus, in addition to allowing the government to buy food staples on the international market from the revenue of these high value crops, the government will be able to "tackle" the trade imbalance.[246]

To find water for this expansion and choice of food security, "considerable increase in efficiency" is needed "to make this additionally needed water available."[247] Much of this increase in efficiency is targeted in the Old Lands. The much needed water will also come from a "shift from crops with a high water demand to less sensitive crops."[248] Through these improvements the Government of Egypt hopes to free up enough water to support the expansion into the desert and growth in population.

Summary

This chapter presented the substantive law regarding water and land use. The development of laws regarding water illustrate that Egypt has tried to reassess how the state approaches water management in the country. Recent re-evaluation of historical approaches to water management and land use has served to highlight the areas in which the previous approaches

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[243] *Id*.
[244] World Health Organization, Food Security, http://www.who.int/trade/glossary/story028/en/.
[245] Arab Republic of Egypt Ministry of Water Resources and Irrigation. *Water for the Future, National Water Resource Plan 2017*. 2-32 (2005).
[246] *Id*. at 2-31.
[247] *Id.* at I-6.
[248] *Id*.

were inadequate in addressing current issues. Land reform laws have also had a negative impact on smallholder farmers in so far as that much of the land, even though it had been redistributed, is dimensionally so small that it severely limits productivity of the land. The most recent approaches identify water as a holistic resource that

Chapter Four- Egyptian Site Visit

Introduction

Environmental degradation is tied to a certain place or event. Political Ecology lays a framework for understanding the interconnected relationship between people and their environment in cases of environmental degradation. The main focus of this thesis is to understand how policies and laws regarding agriculture and water use influence Egyptians use of the water of the River Nile and have resulted in major environmental degradation and marginalization, particularly at a local level. The hypothesis is that the Government of Egypt's policies and laws, as applied, markedly affect people's access to water. This, in turn, has the potential to marginalize groups, such as smallholder farmers primarily in the Old Lands in Egypt, as the state tries to manage its scarce water resource.

As described in Chapter Three, historical changes have occurred in laws and policies regarding the River Nile that have lead to additional marginalization. Although there have been attempts to decentralize decision making and planning powers, many of these attempts have been inadequate and have not reached the goals as planned. Motives for decentralize power were to enable "the real stakeholders" to "strength[en] their ownership feelings towards public property."[249] To ensure decentralization, "cost-sharing and cost-recovery" through local water board and increased privatization will be implemented while the "planning process" at the national level will be continued "as an ongoing exercise."[250] Ultimately, the motivations include allowing the stakeholders a feeling of more control in use

[249] Arab Republic of Egypt Ministry of Water Resources and Irrigation. *Water for the Future, National Water Resource Plan 2017*. xx (2005).
[250] *Id.*

of the water resources but ultimately the power will remain with the national government for the planning process, leaving mainly operation and maintenance to the local water boards.[251]

Furthermore, government decisions have altered land tenure including eliminating rent control which has resulted in the eviction of many smallholder farmers who rely on the leased land for their livelihoods. Many subsistence farmers now lack access to land and the water associated with that land; this has had dire effects on their livelihoods to date. Additionally, the National Water Plan until 2017 established a connection between the government's plans for horizontal expansion into the desert and water access. While the government concedes that there will be initially lower productivity in the New Lands, agricultural productivity should increase over time and represent an investment opportunity.

However, the advocates of the National Water Plan until 2017 have not addressed the particularly problematic issue of, how this plan and policy affects water users in the Old Lands. Ultimately, many questionable choices have been made through laws and policies that have had less than adequate results, intended or otherwise, in regard to water management in Egypt. Policies and planning on paper often diverge drastically from how practices are applied at the local level.

To understand how these policies are being applied it was important for the author to visit the sites and communities that these policies affect. This site visit allowed the author to better understand what the current situation is "on the ground" in Egypt because the local level is where those policies, good or bad, are implemented. Understanding the perspectives of local community members allows for a better illustration of what the average Egyptian faces on a

[251] *Id.*

day to day basis. The main objectives in the site visit was to explore the local community's knowledge of the national laws regarding water and understand if any legal benefits were received at the local level. This chapter presents findings regarding the current situation in Egypt including results from the author's field visit to Egypt during January, 2014. It was this author's experience that there exists vast differences between what is on paper and the local effect of the laws when implemented.

Themes from Site Visit

From these various interviews, the author obtained some impressions of what was happening in Egypt regarding water use and identified some unifying themes from these interviews. These unifying themes include the **Importance of Water, Legitimacy in Government and the Legal System, and Corruption**. The interviews themes are important in regard to these issues because they provide the perspectives of the individuals on the ground and how the various policies regarding agricultural development and water use affect those individuals. Through the lens of Political Ecology, these policy choices influence how people interact with their environment and in turn can lead to marginalization of certain groups, thereby setting up the circular relationship. That is, policies choices are a major catalyst to how communities interact with their environment which leads to marginalization, and then this marginalization further plays into those original interactions with the environment that set up the marginalization in the first place, thus establishing the circular relationship. This will highlight the ways in which corruption and policies choices regarding horizontal expansion, crop choice, irrigation practices, and climate change contribute to marginalization of groups within the Egyptian society and also to environmental degradation. This next section will

explore the various themes present in the interviews that will be woven through the various policy choices regarding water use and agriculture.

Importance of Water

All of the interviewees talked about how Egyptian identities are tied to the River Nile and that there is a very important, close connection to this river.[252] All 10 people who were interviewed indicated that water use and misuse was the primary issue in Egypt. Egypt receives the majority of its water from the River Nile. Most of the population lives around the Nile. A large part of the population sees the Nile daily or their livelihoods are closely tied to the river. Due to this, protecting its water and ensuring the Egyptian's livelihoods were important topics to everyone who talked with the author. The respondents expressed concern that water and agriculture are going to become bigger issues in the near future. They varied in their responses and discussion regarding issues of water. Some were concerned with general issues of use, some were focused on quality, and others were concerned with management of the resource.[253]

Figure 4 Nile River Basin on hike from Valley of the Kings to Hatshepsut Temple

When asked what the main issues regarding what will affect quantity of water accessible for Egyptian use and access in Egypt, the responses varied regarding the main issues. The

[252] Interviews 1-10.
[253] Interviewees 1-10

developing Grand Ethiopia Renaissance Dam[254] in Ethiopia was mentioned by all Egyptians interviewed, in Lower and Upper Egypt alike and was identified as the biggest challenge for maintaining the existing quantity of water available in Egypt. When discussing this with foreign agency workers and foreign business owners the Grand Ethiopian Renaissance Dam was mentioned in passing and with much less emphasis.[255] Overall, issues regarding inefficiency in water use, technology, population growth, and corruption were identified as salient topics by those who were foreign whereas these factors were often not mentioned at all by the Egyptians with whom the author had contact. All Egyptians that were interviewed did not hesitate to refer to military actions and the necessity of war if the water supply is threatened in anyway by an outside power, and most cited the need for use of force or military action to ensure continuance of the supply of Nile water.[256]

Legitimacy of Government and the Legal System

For a system to work properly it is important to establish trust among all stakeholders who are involved in the process. When there is no trust in the system or belief in the necessity of making and following laws there is a tendency for participants in those systems to disregard those laws and rules of conduct, or otherwise decrease meaningful participation in the system. As a result, lawless and chaotic societies, much like Egypt today develop, which in turn decreases further trust of stakeholders in the system. This level of distrust in the current system appears also to extend to water management. Laws are unevenly applied in Egypt including those that pertaining to water use in that, laws are liberally interpreted to favor those in powerful positions, the laws are not enforced, or enforced in favor of those citizens who

[254] Chapter One *supra*, The Nile River Basin.
[255] Interviews 2,3,4, and 8
[256] Interviews 7, 9, and 10

have the connections while enforced against those who do not.[257] Mistrust of officials and the system can lead to not adhering to the decisions made by those officials in regard to water and land disputes.

One main factor cited by foreign workers as pertaining to legitimacy of government was that much business is transacted in secrecy and out of the public's view.[258] Several respondents pointed out that very few transactions are ever written down or otherwise recorded, so accountability is poor or non-existent. This secrecy influences how citizens are affected by the laws and how they participate in general society and the system. Questions, including "Were there any challenges or risks encountered" during your work in Egypt highlighted many issues as to the traditional power structure in Egypt that made it difficult to change policies. Some specific responses included that "leaders are so corrupt"[259] and that the management structure is "absolutely a mess"[260] which basically establishes an environment where policies are almost impossible to change. One interviewee hinted that the necessary basis for change to occur is "some economic" reason for altering the current system, otherwise policies will remain the same.[261] From the interview data collected, the necessity of thoroughly understanding and developing sensitivity regarding these themes became rapidly apparent to the author at the outset.

With regard to laws and policies, a common thread amongst foreign workers was that laws and policies were inconsistently enforced.[262] Either the laws were never enforced or they

[257] Interview 2.
[258] Interviews 1,2,3,and 5
[259] Interview 8.
[260] Interview 2.
[261] Interview 3.
[262] Interviews 1, 2, and 5

were enforced in favor of whoever was going to benefit the most.[263] This points to the assumption and general feelings by foreign workers that the laws are ineffective and can be used as a way to provide benefits to a few in a community. This response was vastly different than the majority of responses from Egyptians and Egyptian workers. With the latter group, there was practically no mention of the legal system as a way to address issues regarding water.[264] Once, when the author was asked what her profession will be, and she replied a lawyer, one response was "why?"[265] While the majority of the Egyptian workers interviewed did not see legal solutions as being viable for change, as many do not see the legal system as benefiting them or they completely devalue the legal system,[266] most Egyptians interviewed did want to see good management plans established regarding water as they identified this as a major issue.

In addition, from responses gathered from interview data, many Egyptians, especially in Upper Egypt, have a high level of mistrust of others, as indicated in daily casual interactions with many citizens by the author in Upper Egypt. Gaining the trust of locals was difficult for the author. Many were apprehensive to talk with a foreign woman about water use and agriculture in Upper Egypt. This level of mistrust also plays into the management of land and water. If decisions are being made without the oversight of the public, trust is broken. It becomes a system where people are going to do what they need to for themselves without consideration of the effects on others. This is what happened with the illegal conversion of agricultural land developed for residential purposes. In an article about the illegal building one resident in the area pointed to the fact that there is mistrust of the government and also the

[263] Interviews 2, 3, and 4
[264] Interviews 7, 9, and 10
[265] Interview 9
[266] Interviews 7, 9, and 10.

corruption within the governmental system. The resident stated "Why shouldn't we steal? The government has been stealing from us for ages."[267] This quote supports the contentions of many of the interview respondents that there is widespread mistrust of the Egyptian people in regard to their officials and a lack of disclosure that extends to all levels of Egyptian society.

This level of mistrust on both the agency level and the local level, distrust of each other and of foreigners or foreign influence has many implications regarding water management and issues in Egypt. The distrust will prove a major hindrance to those trying to gather information or establish development projects in Egypt. This mistrust has been exacerbated by the current situation. Egypt has seen many political changes since the Arab Spring in 2011 when the government of Hosni Mubarak, who had been in power for three decades, was deposed.[268] After this time Egypt has not had an effective government and the result has had a significant and polarizing effect on the country, at least as indicated by the majority of the respondents.

After the ouster of Mubarak, elections were held where a candidate from the Muslim Brotherhood, Mohammed Morsi, was voted president.[269] Once in power he granted himself "far-reaching powers" and drafted a conservative "Islamist-leaning" constitution.[270] Due to massive demonstrations, Morsi was deposed by the military in June 2013.[271] During the time of the research trip, Egypt voted on a new constitution and set plans to hold elections for president and a new parliament later in 2014. As is stands today, the Muslim Brotherhood, of

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[267] Maria Golia, *The Lost Land of Egypt*, Middle East Institute, available at http://www.mei.edu/content/lost-land-egypt.
[268] BBC News, *Arab Spring-Country by Country- Egypt,* Available at http://www.bbc.com/news/world-12482291
[269] *Id*.
[270] *Id*.
[271] *Id*.

whom Morsi was a primary candidate, has been labeled a terrorist organization and has been associated with many bombings around the country.[272] On the other side of the political spectrum are Egyptians who are in favor of the military takeover and ouster of Morsi.

Due to the political instability, there is a high degree of chaos in the country and the rule of law has been largely ignored or disregarded as indicated by the 526 mass death sentences for members of the Muslim Brotherhood handed down by a Minya court, a governorate located in Upper Egypt.[273] This disregard for laws creates an environment of great uncertainty, leading to more distrust of the government, even generating fear of the system. When an institution exercises its power, ignoring the law, and targeting specific groups, the system and trust in the system is broken, perpetuating this culture of distrust. This lack of trust or knowledge of the legal system likely will continue to be a hindrance to establishing ways in which people are able to redress grievances and protect their rights to use of the resource. This is even more prevalent with the current political instability which is the focus of a second theme that emerged.

Egypt and Corruption

A particular focus that emerged from the interviews involved the major theme of corruption in Egyptian culture and its implication for water availability in Egypt. This theme rapidly became a dominant and consistent topic of almost all participants, regardless of societal level or involvement in policy or government work. Across all interviews and conditions of interview format—extended qualitative and daily informal contacts, the theme of baksheesh,

[272] *Id*.
[273] Tody Cademan, *Egypt has come full circle*, Aljazeera, available at http://www.aljazeera.com/indepth/opinion/2014/03/egypt-comes-full-circle-end-ar-2014329161913398399.html

tips or bribes, became the salient theme and one that influences all the other common themes established in the site visit. It is important to address this unifying theme to fully understand its impacts on water and agriculture throughout Egypt.

One of the major issues in addressing corruption is understanding what it is and how it is defined. As one interviewee stated, corruption, "it is everywhere."[274] The issue then becomes understanding what exactly constitutes corruption in a society. In traditional societies corruption was defined by the "moral vitality of whole societies"[275] and acts that went beyond these norms were considered corrupt. As societies became more sophisticated this definition changed to define corruption by "classifying specific actions" that would be considered corrupt.[276] One definition that many scholars use defines corruption as "the abuse of public roles or resources for private benefit."[277] This is the definition the author will use to describe the overall systemic corruption that is rampant in Egypt.

Using this definition there are three forms of corruption. The first is incidental, or corruption that happens on the individual basis.[278] In Egypt there is the culture of baksheesh or the reality of having to pay for every service received even if funded by the government. The next form is institutional and concerns corruption within part of the society like the police.[279]

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[274] Interview 2.
[275] Johnson, Michael. *The definitions debate; old conflicts new guises.* Routledge 11 (2001).
[276] *Id*.
[277] Mark Robinson, *Corruption and Development*, Frank Cass Publication 4 (1998).
[278] *Id*.
[279] *Id*.

The final form concerns systemic corruption that is on the societal scale.[280] Corruption is so rampant in Egypt, in that it affects all levels of society.[281]

Through the interviews it became quite apparent that corruption was a known problem for development projects and the entire Egyptian culture. This section presents findings of a report on corruption in Egypt done by various international organizations who have become involved in studying corruption in Egypt, including "MENA-OECD Task Force on Anti-Bribery, OECD Good Governance for Development in Arab Countries Initiative, the Arab Anti-Corruption and Integrity Network (ACINET), and the UNDP-POGAR project to support the Ministry of Investment in the fight against corruption."[282] Included will be a discussion focused on linking corruption and water in Egypt follows.

The first important issue to understand is the societal effects of corruption. The major issue with corruption is that it can "weaken political institutions" within a country.[283] These institutions are unable to function in the manner intended and corruption weakens the "effectiveness and accountability of governments."[284] Not only does it undermine political institutions within a country, corruption also "undermines economic growth."[285] This is important in Egypt because there is a lot of money flowing in from outside resources

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[280] *Id*.
[281] Transparency International, Transparency International asks Egyptian presidential candidates to make a public commitment to anti-corruption, available at http://www.transparency.org/news/pressrelease/transparency_international_asks_egyptian_presidential_candidates.
[282] MENA-OECD, *Business Climate Development Strategy, Phase 1 Policy Assessment Egypt*. 13 (2009).
[283] Robinson, *supra* note 277 at 3.
[284] *Id*.
[285] *Id*.

Although there is a widespread notion that corruption is a problem in Egypt, it is very hard to determine the effects of this practice due to its "secretive nature."[286] The secretiveness makes it "almost impossible to determine its exact magnitude in a given environment."[287] This is apparent in Egypt where everyone pointed to the issue of corruption but actually finding data linking a certain event, law, or policy with an act of corruption was impossible. There are examples, which will be explained later in this chapter that highlight some examples of events that could be linked to corrupt acts. The literature regarding Egypt and corruption is based on "non-government perception surveys report."[288] This report supports the theme developed through all of the interviews that "corruption is widespread and that it is part of daily life."[289] This can range from "petty corruption," the normal baksheesh that people are expected to pay for various services around Egypt, to "grand" corruption, major acts of systemic corruption.[290] Both of these types of corruption "affect[s] all parts of society."[291]

Another factor that is identified as influencing and perpetuating the culture of corruption in Egypt is "the non-enforcement or improper application of the law."[292] This practice parallels the application of water laws in Upper Egypt. The lax enforcement of these laws has made the potential for local officials to "enrich themselves" through bribes or "abuse their discretionary power."[293] Additionally, non-enforcement means that prosecutions or punishments are very rare within Egypt. This allows corruption to continue and actually reinforces this behavior by allowing people to get away with abuses of the law.

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[286] Interview 5.
[287] MENA-OECD, *supra* note 282.
[288] *Id*.
[289] *Id*.
[290] Robinson, *supra* note 277 at 3.
[291] MENA-OECD, *supra* note 282 at 13.
[292] *Id*. at 27.
[293] *Id*. at 64.

To deal with corruption, countries are urged to make "the fight against corruption a national priority" and develop a clear strategy and message regarding corruption and the government's anti-corruption policy.[294] Egypt has to date not developed a national strategy dealing with corruption although there is a push by the government to get involved in "international initiatives and projects to strengthen integrity and fight corruption."[295]

Implication of Corruption on Water Availability in Egypt

Corruption in the water sector is becoming the focus of many international watchdog groups in Egypt. Transparency International developed a report in 2008 outlining corruption and its effects on the water sector. The main issue with corruption and the water sector is that it "can turn the control of water into a force that aggravates social tensions, political frictions and regional disputes."[296] Since water is already a very scarce resource in Egypt, and corruption is rampant this increases the chance that tensions will turn into disputes as this resource becomes even scarcer.

In regard to water resources, there have already been documented cases by Transparency International where corruption has been linked to, or at least blamed for water shortages in the country. [297] Transparency International points to the events in the summer of 2007 where "[d]ire water shortages in Egypt triggered widespread public protest and roadblocks."[298] The more this resource is spread out to irrigate a larger area of land, the more likely these protests will become more frequent because of corruption within the system.

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[294] *Id*. at 14.
[295] *Id.*
[296] Transparency International. *Global Corruption Report 2008; Corruption in the Water Sector.* Cambridge Press, 11 (2008).
[297] *Id*.
[298] *Id*.

One issue talked about during several of many interviews with foreign development workers was the illegal construction of housing units on agricultural land. This contributes to loss of prime agricultural land. During the 2011 uprising, about 500,000 acres of prime agricultural land was developed into about 700,000 housing units.[299] According to interviewees, the developments were allowed due to the lax enforcement of housing policies and also the culture of corruption.[300] Interviewees indicated that during the chaos, land was stolen by local developers and citizens because the government was not willing to enforce the laws. This has a direct effect on water and agriculture because water usage is tied to land. The loss of this prime agricultural land places pressure on the government to look elsewhere to secure additional agricultural land. This, 'land grab' indicates the ineffectiveness of government during political instability and points to the issue of rampant corruption.

The next incident involves a large project in the western desert called the Toshka or the New Valley Project. Saudi Prince al-Walid bin Talal received a contract, from the Government of Egypt to purchase 100,000 acres and "2 percent of Egypt's share to water from the Nile."[301] The Saudi Prince paid less than ten US dollars per acre.[302] Moreover, the contract for the portion of the water states that the water cannot be cut "without expressed[*sic*] written approval from Talal provided one month in advance."[303] The water diversion extends directly from the High Aswan Dam and Lake Nasser.[304] The contract expressly exempts Talal from basic legal requirements placed on every other farmer and food producer in Egypt. These

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[299] Golia *supra* note 267.
[300] *Id.*
[301] Egypt Independent, *Dispute Over Toshka Project Land Over, Saudi Prince says*, available at http://www.egyptindependent.com/news/dispute-over-toshka-project-land-over-saudi-prince-says
[302] *Id*.
[303] Tamim Elyan, *Lawsuit Aims to annul Saudi prince's Toshka land deal*, The Daily News Egypt, Oct. 20, 2010.
[304] Egypt Independent *supra* note 301.

exemptions include the need to contact the government about seeds, types of crops grown and deadlines for cultivating the land.[305] The contract also allows Talal to export any or all of the crops grown on the land.[306]

This contract was challenged within Egypt by lawyer Shehata Mohammed, who was joined by various agencies.[307] The trial was delayed numerous times and finally the lawyer who brought the challenge to the contract dropped the case.[308] An investigation into the contract stated that "the contract contained unknown provisions that violated the law and gave the company unjustified benefits."[309] Ultimately the outcome of this contract was that the prince agreed to give back 75,000 acres as part of a new contract, but he was able to keep 25,000 acres for cultivation.[310] This example is indicative of the fact that the Egyptian government is willing to sell the people's interest in natural resources to further these large projects throughout Egypt. This is evidence that a culture of corruption exists in Egypt in regards to natural resource management.

Interview Themes Reflected in Egyptian Policy and Planning: Implications for Continued Marginalization and Environmental Degradation

Policies and planning regarding horizontal expansion, irrigation inefficiencies, high-value crop choices, and the effects of climate change, are reflected in the interview themes. These

[305] *Id*.
[306] *Id*.
[307] Tamim Elyan, *Lawsuit Aims to annul Saudi prince's Toshka land deal*, The Daily News Egypt, Oct. 20, 2010.
[308] Egypt Independent, *Saudi Prince hand over desert project land to the Egyptian government.* http://www.egyptindependent.com/news/saudi-prince-hands-over-desert-project-land-egypt-government.
[309] *Id.*
[310] Tamim Elyan, *Lawsuit Aims to annul Saudi prince's Toshka land deal*, The Daily News Egypt, Oct. 20, 2010.

themes include: centrality/importance of water, legitimacy of government, and corruption. These themes highlight the gaps in the policies, as indicated by many of the interviewee who have worked or resided in Egypt, that through the lens of PE, inferences can be made that marginalization and environmental degradation will increase. It is important to establish the themes that extended from the interviews because Political Ecology emphasizes understanding how these policies affect individuals on the national, regional, and local levels. This in itself can lead to various dependencies and contradictions in the application of those laws and policies. Ultimately, when policies and planning regarding water and agriculture are viewed through the lens of PE, inferences can be made that environmental degradation and marginalization will become worse. Overall, the analysis is that these four policies or conditions horizontal expansion, irrigation techniques, crop choices, and climate change, through the lens of Political Ecology will jointly increase marginalization and environmental degradation.

Robbin's Three Main Assertions of Political Ecology
1) humans are part of the system and interaction is rooted in economic interactions
2) exogenous imposition of unsustainable extractive regimes of accumulation result in environmental and social stress
3) production for a global market leads to contradictions and dependencies

Horizontal Expansion

Horizontal expansion was established in the National Water Plan 2017 to expand into the desert to raise high-value crops for international markets. As dictated in Article 63, the state "is not allowed to allocate any lands for the new horizontal agricultural expansion, without getting the approval of the Ministry of Irrigation to ensure that the land is provided with a water supply."[311] Horizontal expansion basically "turn[s] dry desert land into fertile soil"

[311] Law 12Section IV, Chapter 5 Article 63.

which "is an energy and water intensive activity that the state has left to the private sector."[312] Much horizontal expansion is driven by loss of agricultural land due to development to support the growing population and is also driven by foreign investments interested in developing agricultural land. Interview 2 focused on the effects of horizontal expansion and how much energy it takes to move water up and out of the valley, further away from its source, the River Nile and that this signifies **extraction** of water from the valley and transport it out toward the desert to then raise crops that are high value mainly for export to a foreign market. This in turn can lead to **dependencies** on these outside influences that can look to profits for the companies over the livelihoods of the local farmers and communities.

Much of this horizontal expansion is driven by the potential for investments and there are many f**oreign influences** on these policy choices. For example, the Saudi Prince Talal and his contract for land in Toshka of which he received 2 percent of the very scarce Nile water, exempted him from the Egyptian legal requirement of notifying the authorities or otherwise submitting to restrictions regarding crop choice.[313] The Saudi Prince is not the only foreign investor that is interested in developing land in these horizontal expansion projects. For example, Al Dahra, a company based in the United Arab Emirates has bought 100.000 feddans in Toshka in 2013.[314] This company has a five year plan to develop land in Toshka, where the main goal of the development of canals and irrigation systems is "supplying water to the entire farm"[315] to "provide high quality fodder for UAE."[316] These high quality

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[312] Oxford Business Group, *The Report: Egypt 2010*, Oxford Business Group (2010).
[313] *See* Corruption and Egypt Section Above
[314] Amwal Al Ghad English. *UAE'S Al Dahra Buys 100K Feddans in Egypt's Toshka*. Available at http://www.amwalalghad.com/en/investment-news/industry-trade/23622-uaes-al-dahra-buys-100k-feddans-in-egypts-toshka.html.
[315] Al Dahra, *Al Dahra Worldwide-Egypt*, available at http://www.aldahra.com/aldahra-egypt.html.
[316] *Id*.

agricultural products, include peanuts, fruits, and wheat, and animal feed production. Toshka, in regard to the financial investments by the Saudi Prince and the Al Dahra company, make horizontal expansion very attractive to the Government of Egypt. It is still imperative that the effects of these expansion projects on smallholder farmers' water use in the Old Lands are addressed.

Through the lens of Political Ecology we can make significant inferences of how horizontal expansion will increase marginalization and increase environmental degradation.

Marginalization will likely increase due to horizontal expansion. Horizontal Expansion as indicated in the Water Plan 2017, will increase water use though these expansion plans.[317] Although there is not specific quantification of the increases, the amount of reclaimed land, for agricultural purposes potentially could increase by 35 percent.[318] Many farmers' water use will potentially be affected by the horizontal expansion projects and the push towards export agriculture, but their needs or how this will affect their water rights are never addressed.[319] For example the document does indicate that "[i]n terms of **water use**, an important issue is whether the expansion of the New Lands comes at the expense of less water being available to the Old Lands" (*emphasis added).*[320] In explaining water use in the New Land the plan states that "productivity is much lower [50-85 percent less] in the New Lands than in the Old Lands" indicating that productivity has the potential to improve with time.[321] A "chance for expansion of output, even without massive additional investment"[322] provides the justification for focusing on expansion into the desert. Ignoring how these policies affect

[317] Please refer to Chapter 3: National Water Plan 2017
[318] Arab Republic of Egypt Ministry of Water Resources and Irrigation, *supra* note 249.
[319] I*d*. at 2-31.
[320] *Id*.
[321] *Id*.
[322] *Id*.

Old Land farmers puts pressure on the farmers and represents marginalization of this group. It appears that there is little or no apparent concern for understanding the exact impact these policies may have on farmers in Upper Egypt. These policies also ignore the fact that water is **very important** to the livelihoods of these farmers. In effect, smallholder farmers in Upper Egypt will be directly impacted by these policies but the exact impacts on their water use is disregarded in governmental policies, thus keeping them in a **powerless position** within society.

International or external factors influence the development of major resources such as land and water. This will increase the need for water which will most likely be taken from those who do not have the financial resources, like smallholder farmers. Those who have stronger connections to the government than an impoverished smallholder farmer, will reap the rewards. Corruption can also play heavily into who controls the access to and development of the natural resource. For example, impoverished smallholder farmers will remain in a powerless position against influences of major international players (Saudi Prince and Al Dahra). Even though the companies may provide some employment opportunities, the power structure is such that the local community becomes reliant upon these outside influences. As what happened with the Saudi Prince, attraction of foreign investors can increase the likelihood that deals will be made with investors that exempt them from requirements placed on other Egyptians, or infringe on the rights of water users in the Old Lands. As in the case of political ecology in Madagascar, the aspirations of outside influences and misunderstanding the uses of the local community has caused a lot of tension between the competing uses. Specifically in the case of Madagascar, there were international conservation groups, including the World Wide Fund for Nature working to protect the forested land the many

local communities used to wood for construction and maintenance purposes for their dwellings.[323] The "complex and fluid" issue of conservation in Madagascar made the various groups goal contradictory and changed the focus and outcomes of the various projects.[324] The international groups, did not always understand the importance of this resource to the local community and also the importance of the local and religious leaders in the management of the resource. [325] This set up an environment that led to contractions, where goals changed often and often shifted alliances of the local communities.[326] This Madagascar case is similar to Egypt, in that international investments and the horizontal expansion do not really address the needs of the water users in the Old Lands in Upper Egypt and potentially overlooking their needs and not allow them the same influence that other groups with financial resources have. This can lead to marginalization of the smallholder farmers in the old lands.

Environmental Degradation will likely increase due to horizontal expansion. Diversion to these horizontal expansion areas is water intensive and will increase the need for water.[327] This will increase the use of this scarce resource and can potentially lead to water being diverted to certain projects or areas at the expense of water users in the Old Lands. Overall, there will be less water in the entire Nile system with more people trying to utilize it. In a using a scarce resource like the Nile River, this indicates that there could potentially be over utilization of the resource. Because of the complexity of the system, it is unclear and hard to

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[323] Lisa L. Gezon, *Political Ecology and Conflict in Ankarana, Madagascar*, Ethnology, 89 (1997).
[324] *Id.* at 98.
[325] *Id.* at 87.
[326] *Id.* at 89.
[327] Fawzi Karajeh, Theib Oweis, and Atef Swelam. *Water and Agriculture in Egypt Technical paper based on the Egypt-Australia-ICARDA Workshop on On-farm Water-use Efficiency*. International Center for Agricultural Research in the Dry Areas. (2013).

calculate just how much water is being used for irrigation.[328] There is not much emphasis on precautionary principles in the use of the resource. This expansion will put pressure on the scarce resource and will increase marginalization among the neediest amongst the Egyptian population and increase environmental degradation.

Moreover, outside pressures and influences may not fully understand the connection of identity that the Egyptians have toward this resource,[329] and thus promote policies that are counter to this connection. Additionally, as indicated by Le'Billion, once a resource becomes scarce, the likelihood that conflicts will arise pertaining to its allocation will also increase. This is a very likely scenario in Egypt where this expansion is placing pressure on an already scarce resource, increasing the likelihood of conflicts over the resource. Alternatively, as indicated by the Water Plan 2017, there is a notion in the Egyptian Government that this resource may not be as scarce as many believe. This is indicated by the assertion that water availability could possibly increase in the Nile River. This allows the government to establish these policies and allow for extraction of the resource by a few wealthy outside sources. This also follows the alternative assertion by Le'Billion in that when resources are abundant they will be exploited to the economic benefit of a few. Due to the extraction of resource and expansion as to the area this resource is supposed to support, environmental degradation will continue to increase at the expense of the resource, economically benefitting a few companies or persons.

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[328] Seleshi Bekele Awulachew et al., The Nile River Basin: Water, Agriculture, Governance and Livelihoods, 75 (2012).
[329] Chapter 4 s*upra* Importance of Water at 63.

Irrigation Techniques and Water Use

One goal of the Water Plan 2017 was to improve irrigation systems on the Old Lands.[330] Improved irrigation techniques, like drip irrigation, use considerably less water than flood irrigation, the most prevalent irrigation technique in Upper Egypt.[331] One way to improve water use is to "improve on-farm water management…by improving and developing irrigation and drainage system networks."[332] The majority of land is still irrigated using flood irrigation. As mentioned previously, the level of knowledge and education plays a part as to how these irrigation techniques are implemented. In Upper Egypt there appears to be a lack of knowledge of technological advances needed to implement more efficient irrigation techniques.

Figure 5 Mesqa near Luxor

Moreover, choosing advanced irrigation techniques are made by the central government. Improvement in irrigation techniques and implementing these systems are decided upon by the Ministry and then it is left to the local unions and WUA to implement those changes at the local level.[333] This leaves the majority of the financial burden on those farmers who may not have the means to install the irrigation systems. Moreover, the water schedules are still developed by the ministry but issues still exist with fulfilling the need for the local farmers. For example ones at the end of the irrigation system often do not get enough water to irrigate

[330] Arab Republic of Egypt Ministry of Water Resources and Irrigation, *supra* note 249.
[331] Personal observations
[332] Karajeh, *supra* note 327.
[333] Arab Republic of Egypt Ministry of Water Resources and Irrigation, *supra* note 1 at 2-31.

their fields.[334] As a result, these irrigation techniques and technology influence how farmers are able to irrigate their fields and affect water use in Upper Egypt.

Through the lens of Political Ecology we can make significant inferences of how the policy choice of irrigation will increase marginalization and increase environmental degradation. **Marginalization will likely increase because irrigation techniques affect water use**. The majority of improvements in efficient irrigation occur with the population who has the resources to implement the expensive equipment for improved irrigation technique.[335] As indicated through the personal observation made by the author, inefficient irrigation techniques are still used in Upper Egypt. In order to have this new technology, the farmers need to have major capital to invest in these techniques which many do not have in Upper Egypt. Another reason for using these inefficient irrigation techniques is that it is traditionally how the Egyptians have watered their crops. The farmers may not know about the better irrigation techniques or do not understand the benefits of these irrigation techniques in regard to water use.

Figure 6 Irrigation near Luxor Egypt

[334] International Commission on Irrigation and Drainage and Egyptian National Committee on Irrigation and Drainage, *Background Report on Application of Country Policy Support Program (CSPS) for Egypt*, 2 (2004).
[335] Law 12 of the Year 1984, Art. 36 bis(1).

Moreover, much of the improvements regarding irrigation are within those areas of horizontal expansion. This is influenced by many investor and international interests, particularly developing land in the mega projects like Toshka. Even though the Government of Egypt does provide subsidies to the smallholder farmers and there is a special fund created using the national budget and "fees paid by the beneficiaries,"[336] it takes a lot of capital for these improvements and many impoverished smallholder farmers do not have the resources to be able to develop this land for agriculture. Whether or not they are actually able to fund the improved irrigation techniques or have assistance in installing them will potentially keep these impoverished farmers in a state of powerlessness over decisions on how to manage their own land. The diversions to the New Lands through horizontal expansion divert water needed in these lands to a larger surface area. This along with climate change, including an estimated drop in available water ranging up to 70 percent,[337] and due to both of these factors, smallholder farmers will receive less water to use for irrigating their crops.

As indicated, there was variability among respondents in the understanding of the technical issues regarding water. Many of the improvements to irrigation are very technical and require a thorough understanding of how to install, and use the equipment along with education on how to maintain the system. Much of the education that Upper Egyptians receive is through intergenerational interactions whereby elders or members of the community teach the younger generation in the fields. In order to improve the use of efficient irrigation techniques, there needs to be an appreciation and an understanding that this intergenerational education is often how information is passed down.

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[336] *Id*.
[337] Alice Shih & Trevor Stutz, *Sink or Swim: Abrogating the Nile Treaties While Upholding the Rule of Law*. 43 ELR 10790 (2013).

Environmental Degradation will likely increase. Irrigation in the New Lands will mainly drive the degradation of the Nile system as a whole. Irrigation increases the amount of water applied to the fields and thus influences the amount of water that will be available in the entire ecosystem. High use and high need in specified areas, for example in high value crops areas, has the potential to decrease the amount of water available within the entire ecosystem. When more water is applied to larger areas of land, which increases the need for water for irrigation purposes on those lands, the potential to negatively influence the ecology of the system just by reduced amount of water available can be significant.

Robbin's Three Main Assertions of Political Ecology
1) humans are part of the system and interaction is rooted in economic interactions
2) exogenous imposition of unsustainable extractive regimes of accumulation result in environmental and social stress
3) production for a global market leads to contradictions and dependencies

In addition, the influence of upper basin states with plans to divert and to increase water use through agricultural expansion of their own, will affect the amount of water available. For example, more water will be diverted above the High Aswan Dam and placed out over more land. The Government of Egypt is behind this expansion out into the desert and this diversion will mainly be for irrigation and some domestic uses. Investments made by international organizations and businesses also make this expansion possible by providing a lot of development money for these areas of agriculture development. The type of irrigation that is used in these areas of expansion include center pivot irrigation, sprinklers, and some drip irrigation.[338] This carries many of the same issues as horizontal expansion does within Egypt such as increased salinization. Moreover, the effects of the Grand Renaissance Dam, has the potential to reduce the amount of water available in the Nile River, thus making this scarce resource even scarcer.

[338] Arab Republic of Egypt Ministry of Water Resources and Irrigation, *supra* note 249 at 2-31.

Lastly, irrigation also increases evaporation which increases higher salt concentrations. Many farmers also use water high in salt to irrigate their crops which also decreases the productivity of their crops."[339] This in turn also increases the salt concentration within the system. This is if great concern in the Old Lands whereby "25 [percent] of the Upper Egypt regions are all salt-affected."[340] This has the potential to decrease the productivity of the system and decrease crop yields.[341] This will ultimately affect access to water and the entire system as a whole.

High-value Crop Choice

High value crops have been pushed as a way of addressing poverty in Egypt based on the idea that farmers will receive higher incomes for these crop choices. Some assumptions behind choosing high value crops, as supported by international development agencies, are that these crops are higher yielding and less water intensive[342] and will without doubt increase the incomes of the smallholder farmers. Ultimately, there are questions as to how much water is actually needed to raise and transport these crops to international markets. Crops like melons, tomatoes, cucumbers, and strawberries are economically attractive, and can efficiently irrigated when modern technology is available. Many smallholder farmers lack access to this technology and applying this water to crops that are automatically going to be exported raises questions as to whether this is the best choice for the local community. In a location like Egypt where there is a lot of uncertainty in the amount of water that is being used for crop

[339] Karajeh, *supra* note 327.
[340] *Id.*
[341] International Commission on Irrigation and Drainage and Egyptian National Committee on Irrigation and Drainage, *supra* note 334.
[342] International Fund for Agriculture, *Rural Poverty Portal, Farming for profit in the Egyptian Desert*, available at http://www.ruralpovertyportal.org/country/voice/tags/egypt/egypt_farming.

irrigation,[343] is this the best use of the scarce resource? So much focus is placed on the issue that participating in the industrialized agricultural trade seemingly allows farmers to receive a higher income, there are often other effects that are often overlooked by those making the decisions.

There is also uncertainty in the calculations regarding how much water is actually used in the production of various crops. For example tomatoes are described as being "water intensive crops"[344] but in other estimates they use less water and are a "less water intensive" crop.[345] Likewise, wheat ranges "from about 500-4000 liters to irrigate 1 kg of crop."[346] Ultimately there is uncertainty regarding these choices for crops. Moreover, trade based on virtual water is based on transporting produce over vast distances. This takes a vast transportation system especially a "[g]ood transport and infrastructure in rural areas."[347] Currently, transportation and traveling around Upper Egypt is hard and very time consuming.

Crop choices are also driven by many **international influences** including many European governments,[348] and also international organizations like USAID and IFAD. **T**hese identified international influences are coterminous with other **foreign or exogenous influences** such as a prevalent Russian influence in agricultural development. For example, Minister of Foreign Trade, Industry and Investment Mounir Fakhry Abdel Nour stated that "You (Russia) have

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[343] Awulachew et al., *supra* 328 at 75.
[344] European Commission. *Science for Environmental Policy*. Available at http://ec.europa.eu/environment/integration/research/newsalert/pdf/122na1.pdf.
[345] International Fund for Agriculture, *supra* note 342.
[346] Ami Sedghi, *How much water is needed to produce food and how much do we waste?*, available at http://www.theguardian.com/news/datablog/2013/jan/10/how-much-water-food-production-waste.
[347] Lena Horlemann and Susanne Neubert, *Virtual Water Trade: A realistic concept for resolving the water crisis?*, available at http://edoc.vifapol.de/opus/volltexte/2013/4368/pdf/Studies_25.pdf.
[348] The Government of the Netherlands was active in developing the Water Plan 2017 *see* Arab Republic of Egypt Ministry of Water Resources and Irrigation, *supra* note 249 at 2-31.

expressed your wish to expand exports, primarily of wheat... and we want to develop exports of vegetables and fruit. It would help widen our cooperation."[349] Russia has stated its interest in receiving vegetables in exchange for the wheat.[350] Additionally, markets such as the European markets and Middle Eastern markets are also interested in vegetables that are produced specifically in Egypt.[351] This indicates that there is vast interest from numerous markets to agriculturally trade with Egypt. From this interest in expanding trade, smallholder farmers may become reliant upon the international market for their incomes and that is driven by the international push to incorporate virtual water into international trade. Unfortunately, there remain a lot of uncertainties in the international market. There are absolutely no guarantees that incomes will be increased in that "[h]igh returns in water do not necessarily represent high return to capital, labor, or other factors of production."[352]

Some argue that virtual water trade could possibly "**increase the dependence** of the importing countries on the exporting countries."[353] The plan to raise high-value crops is purely based on **economical reasons**. The Egyptian government furthers the idea of raising high-value crops because they would then be able to increase the national income and buy food staples on the international market. These decisions are influenced by many international companies and will lead to dependencies on the larger market for income.

Through the Lens of Political Ecology we can make significant inferences of how the policy choice of raising high value crops will increase marginalization and increase environmental

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[349] Reuters, *UPDATE 1: Egypt mulls free trade zone with Russia's trade union,* available at http://www.reuters.com/article/2014/03/26/egypt-russia-trade-idUSL5N0MN1ZY20140326.
[350] *Id*.
[351] International Fund for Agriculture, *supra* note 342.
[352] Brian Chatterton. *The Politics of Water Scarcity in Egypt*, Middle East Institute Viewpoint: The Environment and the Middle East, 37 (2011).
[353] *Id*.

degradation. **High value crops is likely to increase marginalization.** Even though there may be high-value in the crop choice it doesn't mean the benefit will actually get to those farmers who are raising the crops. Focusing on increasing the production of high-value crops can actually have the opposite effect in that the "prices for high-value crops can actually decrease with the flood of produce into the markets."[354] Relying on the international market has so many uncertainties with regard to actually benefiting those impoverished farmers it is intended to help. That is, prices may actually decrease due to the flood of produce into the market and in turn place the risk on those impoverished farmers who are raising the crops. This places a heavy burden on individual farmers to use the scarce resource of the Nile to raise crops that ultimately may not benefit them to the degree it is intended and keeps them in a powerless position.

Additionally it is important to note that this pressure to produce for the international market is due to many international influences. Huge investments are made by the international community to develop the virtual water trade. Many farmers see a deluge of international development money coming in to their areas to raise high value crops. It is hard to resist these influences in areas were poverty is so rampant. This in itself can be a form of marginalization in that the farmers do not really have a choice, and need to participate in this system to receive the economic benefit of international investment. Moreover, to raise these crops it takes vast knowledge about production which could possibly be lacking in these various targeted regions. Moreover, once the focus for high value crops is implemented on the ground, this can keep the farmers and the entire Egyptian state in a powerless position as it "would actually **increase the dependence** of the importing countries on the exporting

[354] Chatterton, *supra* note 352 at 37.

countries,"[355] thus, keeping the local communities in a powerless position regarding utilization of their land and water resources.

Environmental Degradation will likely increase. High value crops have the potential to negatively affect the availability of water within the entire ecosystem. These high value crops have been implemented in areas of horizontal expansion,[356] with the implications mentioned above regarding moving water over vast distances and promoting the need for increased irrigation. To support the increases in high value crops, the Egyptian government is expanding out into the desert, using Nile water, and then transporting that water and trading it on the international market. This puts strain on an already scarce resource and can potentially lead to more water being used over vast distances thus leading to less availability of water for others within the system.

Figure 7 Agricultural fields around Luxor

Additionally, it is important to understand the implication of the virtual water trade on "ecosystems of the food-exporting countries."[357] Implications are that "increased farming may lead to greater land use and to the pollution of soil and water by agro-chemicals."[358] More

[355] Horlemann *supra* note 347.
[356] International Fund for Agriculture, *supra* note 342.
[357] Horlemann *supra* note 347.
[358] Karajeh *supra* note 327.

pollution in the system can affect water use and ultimately can lead to environmental degradation of the entire system. This goes beyond the scope of this thesis but it is important to note in that this could have a direct effect on the availability of water for other uses, and also affect the ecosystem.

Climate Change

Climate change has the potential to affect the water supply to Egypt in the Nile River. The question is how does climate change affect Egypt? It is apparent that the effects of climate change are unknown. Predictions of reductions of water run upward of 78 percent, but the Egyptian Government has indicated that in the long run climate change could actually increase water availability in the Nile River.[359] Much research supports the idea that the climate will become hotter, thus increasing the need for water resources. Additionally, many state that climate change will lessen productivity of crops in Egypt. [360] There seems to be lack of understanding regarding the effects of climate change through the policies furthered by the Egyptian Government. This is indicated by the fact they state that a "small increase" in water due to climate change is not beyond the realm of possibility.[361] These assertions by the government seem to defy all knowledge and estimates made regarding effects of climate change on the Nile River. Overall, it is widely supported that climate change will have an effect on water supply in Egypt and, like all the policies and plans implemented by the Egyptian Government to date, likely will affect water use by implementing strategies and plans that will increase the need for water, thus utilizing a water resource that is already scarce.

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[359] Arab Republic of Egypt Ministry of Water Resources and Irrigation *supra* note 249.
[360] Karajeh *supra* note 327.
[361] Arab Republic of Egypt Ministry of Water Resources and Irrigation *supra* note 249.

Through the lens of Political Ecology we can make significant inferences of how effects of climate change will increase marginalization and increase environmental degradation. **Marginalization will increase** because of climate change. Egypt's ability to deal with the effects of climate change will lead to people not having access to water needed to water their crops.[362]

Ultimately, this does not allow them to fully utilize their own water and land resources. This in a sense is marginalization of the entire Egyptian state. Egyptian farmers will not be able to produce crops to support their population nor will they be as productive for the international market. This will keep them in a powerless position as the scarce resources of the Nile River will be utilized by a wide variety of stakeholders and the amount of water available will be negatively affected by climate change.

Environmental Degradation will likely increase due to the effects of climate change. There still remains a lot of uncertainty regarding the effects of climate change. Most agree that it will have a negative effect on the ecosystem and availability of water in the River Nile. This means that ultimately, there will be less water in an already scarce system. Moreover, Egypt's population will also have an effect on water use. As the population continues to grow, more demands will be placed on an already overburdened system of water use and availability. As the climate becomes hotter, it is likely that increased need for water by an increasingly dense population will interact in negative ways that will accelerate degradation of the environment.[363] One major negative impact with population density is the creation of

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[362] Karajeh *supra* note 327.
[363] Karim Elgendy, *Sustainable Development and the Built Environment in the Middle East: Challenges and Opportunities*, Middle East Institute Viewpoint: The Environment and the Middle East, 10 (2011).

waste. This coupled with higher consumption[364] trends leads to using more of the resource that is already limited, and increasing the waste associated with this consumption. These factors play into environmental degradation and can even accelerate it in certain areas.

Along with the increase in need for water by an increasing population, more water is being applied to larger areas of land. This increases the need for water for irrigation purposes on those lands, which influences the ecology of the system just by reduced amount of water available. In addition, the influence of upper basin states and their own plans to increase water use through agricultural expansion of their own, will further affect the amount of water available as climate change occurs. As mentioned, all upper basin states currently have major agricultural plans of their own to divert water for agricultural purposes, which will put pressure on the entire ecosystem and will affect the amount of water available. Moreover, there is potential for development of the Grand Renaissance Dam to reduce the amount of water available in the Nile River. Add in the further effects of climate change and, once again, potential for further degradation of the environment.

Lastly, through the lens of Political Ecology we can also make significant inferences of how the additional themes derived from the interviews, including education, illegitimacy of government, and corruption will increase marginalization and increase environmental degradation. **Illegitimacy of government is likely to increase marginalization.** The system is dysfunctional and there is a lack of transparency in governmental decisions.[365] Citizens don't trust the government.[366] Citizens do not participate in the system or the system has not been beneficial to them; this lack of meaningful participation is an example of marginalization

[364] *Id*.
[365] Interview 1,2,3,5.
[366] Chapter 4 *supra* Legitimacy of Government.

itself. Moreover, impoverished smallholder farmers don't have the influence to change the polices that are directly affecting them. There is centralized decision making power, which is purely a top down structure.[367] For people to effect change through personal power, they have to be given the chance to empower themselves.

Illegitimacy of the legal system will lead to marginalization. Citizens do not have access to knowledge regarding the legal system which stops them from meaningful participation in the system. Moreover, laws are not being applied evenly.[368] Illegitimacy of the legal system also hinders them seeking to resolve issues regarding water management. If they are able to seek help resolving an issue, the fact that decisions are left to the General Director for resolution, consolidates power in one individual. Also this central control leaves discretion to the Individual Irrigation Inspectors regarding issues over management of the water system and schedule, which can leave people out of the process. There have been cases where farmers are unable to cultivate their fields due to water shortages.[369] The legal system is not viewed as a means to deal with issues regarding water management or mismanagement. Additionally, as mentioned before, corruption still can potentially influence the system of water allocation in Egypt, in that farmers and citizens aren't able to meaningfully participate in the system. Additionally, the system, due to corruption may be ineffective in that the laws and policies are unevenly applied. [370]

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[367] Chapter 3 *supra* Law 12 of the Year 1984.
[368] Chapter 4 *supra,* Site Visit Section.
[369] Transparency International, *Global Corruption Report 2008: Corruption in Water Sector*, available at http://issuu.com/transparencyinternational/docs/global_corruption_report_2008?e=2496456/2011923.
[370] Chapter 4 *supra* Legitimacy of Government.

Environmental Degradation will increase. Illegitimacy of the government and the legal system can cause environmental degradation. When laws are not followed this can lead to the mismanagement of the irrigation systems. Additionally, decisions made by the Ministry may not be adhered to, thus further compromising the entire system. This can potentially lead to poor or no maintenance of those systems, thus potentially affecting how water is applied to their fields. Additionally, overall, it appeared that there was a lack of understanding on many interviewees' part as to how individuals could potentially affect the larger system or impact the ideas and values and others around them. For example, there were many times the author witness citizens in Egypt watering cement, or washing their car, or using water in ways that could potentially be using the scarce resource in an unbeneficial and wasteful manner. Also, during conversations, there seemed to be a lack of social responsibility towards the environment, where people would litter everywhere. Lastly, environmental degradation associated with, or perhaps caused by, corruption and corrupt practices can lead to further mismanagement of the water system. That is, unevenly applied laws, lack of transparency, and mistrust of the system can potentially lead to people not obeying laws or judgments made by the Ministry regarding water use.

Summary

Based upon the author's site visit to Egypt, several unifying themes were established through various interviews and interactions with Egyptian locals, government workers, Foreign Aid workers and foreign business owners. Policies and planning regarding horizontal expansion, irrigation inefficiencies, high-value crop choices, and the effects of climate change, are reflected in the interview themes of centrality/importance of water, legitimacy of government,

educational disparities, and corruption. When policies and planning regarding water and agriculture are viewed through the lens of PE, inferences can be made that substantiate both environmental degradation and marginalization of citizens. The next and final chapter provides suggestions to address these issues in addition to outlining important questions and future areas of study.

Chapter Five- Conclusions

Introduction

As indicated in the previous discussion, Political Ecology is a highly suitable lens for addressing and evaluating issues of environmental degradation. Addressing the issues of water availability and water quantity in Egypt through use of PE facilitated an evaluation of this very complex issue and allowed the author to make connections regarding policies, law, irrigation, agriculture, culture, and corruption. Further, this inquiry provided an illustration of how all of these issues interconnect to make a situation whereby the rights and access to a necessary resource by a vulnerable population, smallholder farmers, are seriously abridged.

Figure 8 Sunrise over sugar cane fields

In turn, this puts them at risk as these interconnections play out, especially as policies that are directly in conflict with their culture and practices are planned and instituted. However, and in keeping with the use of PE to evaluate the process, there are many changes that can be made to the current policies and laws regarding water and agriculture to better ensure that this population is protected and, secondly, to enable them to protect their culture and the resources they depend on for their livelihood and wellbeing. These include, increasing transparency of government along with increasing disclosure of policies and decisions. Moreover, suggestions include reducing corruption and increasing education. Based upon the analysis

contained within this thesis, clearly the system in Egypt has a lot of room for improvement. This next section walks through some recommendation made by the author in regard to water management in Egypt.

Water Management and Policy

Water use is Egypt is a major issue due to the constrained resource, many pressures placed on this constrained resource and the many wrong policies furthered by the Government of Egypt. It is important to understand where management can be improved domestically. As indicated throughout the interviews and the author's time in Egypt, it was apparent that rational management of water and agriculture is very important to Egyptians interviewed across every social class and there is a desire for effective water management.[371] There are many ways which the Government of Egypt can address issues of water availability domestically. The main issue is changing how corruption influences these decisions, either directly or indirectly. It is a systemic issue that will need to be changed. Issues concerning water management extend through all aspects of society, including law, policy, education, and agriculture. It is imperative that the changes occur to ensure the safety of the Nile Waters. Changes will not come quickly but there is more danger in not addressing these issues that will have dire consequences for the farming communities and Egypt as a whole, than on meeting them head on.

Moreover, serious conflicts exist with regard to promotion of water and agricultural policies that have the potential to affect the actual water use of impoverished smallholder farmers on the Old Lands in Upper Egypt. This section provides recommendations to address issues of

[371] Chapter 4 *supra* Legitimacy of Government.

agricultural water use in Egypt in order to promote effective water management. While there are also a wide variety of solutions proffered to address issues of water security and food security in Egypt, the majority of policies developed to date involve pushing out into the desert.[372] Since arable land is extremely scarce in Egypt, land reclamation is seen as necessary to provide land for development. This push is the major policy promoted by the Ministry of Land Reclamation and Irrigation.[373] However, there remain questions as to the sustainability of these developments as salinization of the soil, decrease in crop productivity, and the cost and energy needed to transport water to these locations all would likely have major impacts on the success of such solutions. Due to these limitations a variety of other ideas have been offered as alternatives, as to how to address water and food security including promoting better irrigation practices, i.e. drip irrigation, in the old lands.[374]

In the Water Plan for 2017, and as indicated in the interviews, international influences are a major factor sited as to whether they actually will improve the supply of water or limit it. That is, current policies look to an increase water supply in the Nile as a direct result of "conservation effort in Sudan," and climate change (although this is disputed by many).[375] These all represent influences outside the government of Egypt. Likewise, many believe that the water levels will be affected by the construction of the Ethiopia Grand Renaissance Dam. Since these are beyond the direct control of the Government of Egypt, it becomes vitally important to look to domestic uses to find inefficiencies in water use. In her site visit the author was informed and observed that, the majority of current irrigation practices consist of

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[372] Arab Republic of Egypt Ministry of Water Resources and Irrigation. *Water for the Future, National Water Resource Plan 2017*. 2-31 (2005).
[373] *Id*.
[374] Interview 8.
[375] Arab Republic of Egypt Ministry of Water Resources and Irrigation, *supra* note 372.

flood irrigation, which is considered to be very inefficient. Promoting change in irrigation techniques to more efficient means, mainly drip irrigation, can address issues of waste in already established agricultural areas. This has the potential to change a wasteful use of water to one that is more efficient and can promote higher yields on already established agricultural lands. Another suggestion is promote growing more food staples for domestic consumption in addition to high value crops. This would result in a change of policy from defining crop choices on a purely economic basis to one that incorporates food self-sufficiency, which has the potential to positively affect water availability as many food staples are less water intensive and can be grown through dry land farming. This was outlined as possible in the National Water Plan but rejected based on economic terms.[376] It is important to look to this as an option to ensure food and water security for the future.

Moreover, officials and agricultural and water scientists should conduct further research to establish if the horizontal expansion, for agriculture and also domestic uses, has a direct effect on agricultural water use in the Old Lands. The Water Plan for 2017 does address the question of whether these expansions affect agricultural water use; however, no answers are provided anywhere in the text for potential solutions. In effect, the Plan as written only provides a comparison between productivity of the Old Lands versus the New Lands, stating that the New Lands productivity is less now and will increase in the future. The report concludes that "to the extent that the high productivity of the Old Lands has not yet been met in the New Lands, this represents a chance for expansion of output, even without massive

[376] Fawzi Karajeh, Theib Oweis, and Atef Swelam. *Water and Agriculture in Egypt Technical paper based on the Egypt-Australia-ICARDA Workshop on On-farm Water-use Efficiency*. International Center for Agricultural Research in the Dry Areas. (2013).

additional investment."[377] This completely dodges the issue of whether or not water use is affected by horizontal expansion thereby making it imperative that the government understands the implication of the current policies on actual water use. The government justifies the horizontal expansion as an "investment opportunity,"[378] leaving the issue of effects on actual water use not addressed.

Another major issue regarding the promotion of more equitable water and agricultural policies is to address the issue of food security in Egypt. As indicated earlier, the definition of food security is in producing high-value crops, thus enabling trade on the international market which will in turn allow Egypt to purchase food staples to feed their population. Food security is currently defined as maximizing the national income to stabilize the discrepancy in trade by 'promoting exports rather than by curbing (food and fodder) imports."[379] At issue here is that huge uncertainties in the international market exist and neither price nor products are guaranteed to be supplied by the international market. "The present study therefore advocates that both the political decision-makers and international development cooperation focus not so much on Virtual Water Trade but much more on measures to improve water management."[380] The Government of Egypt should redefine food security in the Water Plan 2017 to promote producing more food staples within the country for national consumption instead of completely relying upon the international market for food security. One way to ensure that these policies are being followed is increasing transparency throughout the Egyptian system.

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[377] Arab Republic of Egypt Ministry of Water Resources and Irrigation, *supra* note 372.
[378] *Id*.
[379] *Id*.
[380] Lena Horlemann and Susanne Neubert. *Virtual Water Trade: A realistic concept for resolving the water crisis?*, available at http://edoc.vifapol.de/opus/volltexte/2013/4368/pdf/Studies_25.pdf.

Increase Transparency

Transparency is a very important aspect for the citizen to understand how to protect their interests. In looking at the legal structure as it is set, many decisions are made in a top down fashion.[381] Many policy decisions are being made without the input of the general public and are enforced lots of times to benefit certain groups that have connections.[382] Many Egyptians do not understand their rights, and even if they did have access to the judicial system it can prove very costly and hard.[383] Land disputes are common in Egypt but many people do not understand their rights or do not the resources to access legal help.[384] Furthermore, even understanding the rights they have can prove difficult as the laws are very complex and a large portion of the population is illiterate. This too plays into meaningful disclosure because even if they were able to access the laws and information, many would be unable to understand or read the documents. This is a huge hurtle to ensure that laws regarding agriculture, land, and water are followed.

In order for a legal system to be functional, citizens need to understand their rights as defined within the laws and also understand the procedures, not only in redressing grievances, but also of the development and implementation of policy and decision making processes. This allows for informed input of all stakeholders and allows them a chance to ensure their needs are addressed. Allowing this process also ensures that policy makers are accountable for their decisions and also promotes transparency in the process.

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[381] Interviews 2, 5, and 10.
[382] Interview 2.
[383] Land Center for Human Rights, available at http://www.lchr-eg.org/en/.
[384] *Id*.

With regard to the various laws regarding water use, it is important to apply the laws in an equitable manner. Importantly, this is perhaps the one area that can have immediate implication on water use in Egypt, for example, in making fines and penalties stronger, monetarily and also time for sentences, for violating established laws. Enforcing zoning laws to protect precious agricultural lands is imperative to ensure that the state is able to have land to produce products, for either international or domestic markets. Promulgating laws that are flexible to address issues on the local level will help local communities address issues regarding water allocation to meet their own specific needs. This can be done by granting power to regional Water Users Associations and promoting decentralized power structure for water issues.[385] Some powers are to settle disputes among water users on the local level or irrigation system with power to refer to the regional level when dispute are unable to be resolved on the local level. Meaningful participation by representative on the local and national level regarding water use is also a power that should be delegated to the WUA's. Along with transparency there should be meaningful disclosure to allow people meaningful participation in the system.

Disclosure

For a system to work properly it is important to establish trust among all stakeholders who are involved in the process. The existing law does not provide meaningful disclosure. When there is no expressed trust of the system or belief in the necessity of making and following laws there is a tendency for participants in those systems to disregard those laws and rules of conduct, or otherwise decrease meaningful participation in the system. As a result, lawless

[385] It is important to note that there are development programs that are helping to establish these Water User Associations.

and chaotic societies, much like Egypt today develop, which in turn decreases further trust of stakeholders in the system. This level of distrust in the current system appears also to extend to water management. As indicated earlier, laws, particularly water laws, are unevenly applied in Egypt. Mistrust of officials and the system can lead to not adhering to the decisions made by those officials in regard to water and land disputes.

Disclosure is important to combat corruption because it helps to create relationships of trust. Unless there is meaningful disclosure within the Egyptian system, corruption will continue to destroy trust of the system. For a system to function properly there needs to be trust, first of the system itself, and then trust that is extended to the other participants within the system. This is clearly lacking in the Egyptian culture at present and has had a direct and deleterious effect on land and water management. Until this issue is addressed, the system will not fulfill its goals and continue to perpetuate the culture of mistrust.

Reducing corruption also plays into governmental disclosure and transparency. Corruption clearly is a major issue in Egypt. As indicated by the interviews conducted by the author during her site visit as well and throughout the interviews through general and casual conversation, corruption clearly permeates all levels of society. It affects the accountability of government as policy decisions and laws are developed, enacted and established in practice. Corruption must be addressed to ensure that there is transparency in government and allow for dialogue to happen to ensure that corruption on every level is addressed. In the context of law this means pressing for meaningful disclosure of policies and their effects on the general population. This also means there are accountability issues in regard to officials and their decisions. Because corruption is so rampant, decisions made in regard to development

projects and water management can be influenced by those who have power in the society. This in turn means people do not participate in the society which leads them to be marginalized within society and kept in a powerless position. Pressing for accountability and transparency in the process will also allow for policy development that addresses the needs of various stakeholders in regard to corruption and the functioning of the government and is necessary to allow for those stakeholders, especially smallholder farmers, to advocate for themselves and their lifestyle.

Current Conditions of political instability impact rule of law for water and agriculture because corruption is rampant during times of political instability. Corruption influences how laws work and the meaningful participation of the citizens in the system. A major and perhaps disabling level of mistrust has developed because people in Egypt do not participate in the system nor is there meaningful disclosure of their rights or of the political process. Citizens may not be aware of their rights, nor are they able to access the legal system to redress issues that arise regarding land use and water.[386] Lack of access, lack of understanding, lack of disclosure, and the influence of corruption within the system lends itself to be a dysfunctional system as a whole. Thus, corruption plays a major role in the distrust of the system and lack of meaningful participation by its citizens in the political process. What follows are suggestions as to how Egypt can address corruption in the system and the implications such remediation could have in regard to water management.

A sizeable body of literature exists on the topic of reducing corruption to protect natural resources. As outlined in the 2008 report by Transparency International, one major factor for reducing corruption in the water sector is increasing transparency and accountability

[386] *Id.*

throughout the water management sector in Egypt.[387] Emphasizing transparency and accountability will ultimately help the citizens of Egypt redress their grievances in regard to the water sector by allowing them to meaningfully participate and hold officials accountable. One way to ensure transparency is to establish policies that are in line with international norms and practices. This is in regard to anticorruption conventions but also conventions regarding the use of transboundary watercourses.

To promote these international norms it is quintessential to establish a national plan to address issues of governmental corruption at all levels. This would mean rewriting domestic policy statements that specifically address issues of transparency and accountability. Corruption needs to become a priority for domestic policy makers and become a national priority. Unless this becomes a priority, issues of corruption and baksheesh will continue to be a problem and influence all levels of society which directly relates to, and impacts the next suggestion, which is to "re-establish a culture of integrity."[388] In re-establishing a culture of integrity, the task would include incorporating the private sector to "join forces" with the Government of Egypt to promote more transparency and integrity throughout society.[389] In the context of water usage and management, all transactions regarding same would need to be documented and kept in an accessible place for the public scrutiny and education. This includes a refocusing on the effects of corruption and raising public awareness about these issues.[390]

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[387] Transparency International, *Global Corruption Report 2008: Corruption in Water Sector*, available at http://issuu.com/transparencyinternational/docs/global_corruption_report_2008?e=2496456/2011923.
[388] MENA-OECD, *Business Climate Development Strategy, Phase 1 Policy Assessment Egypt*. 14 (2009).
[389] *Id*.
[390] *Id.*

Governmental structural adjustments should be made with the reestablishment of anti-corruption agencies in Egypt to ensure that the international principles against corruption are adhered to and promoted.[391] A complete list of anti-corruption agencies is provided by the United Nations, but many of them are weak and unable to fully go after corruption within the Egyptian system.[392] The agency that is most applicable to water issues is the Administrative Control Authority (ACA) which "is responsible for detecting as well as fighting corruption in the government, the public business sector and the private sector that accomplishes public work."[393] Watchdog groups, like Land Center for Human Rights, exist that also can play a role in combating corruption on the national and local scale.[394] With the reestablishment of these agencies, the hope is to have raised levels of transparency and accountability for decisions that are being made on the governmental level. In regard to the water sector, they can help farmers who may have disputes over water rights and usage, for example, and can also monitor development of future policies to help ensure transparency. This also relates to the last suggestion, which includes involvement of a variety of stakeholders, whom include members in "business, civil society, and media stakeholders."[395] This will ensure that awareness is raised about the issue of corruption throughout society.

It is important to mention that one major reason why corruption is allowed in all levels of government and society is that there is lack of access to information in Egyptian society,

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[391] *Id*.
[392] UN Complete list of Anti-corruption agencies, Egypt.
[393] International Association of Anti-Corruption Authorities. *Administrative Control Agency (ACA).* Available at http://www.iaaca.org/AntiCorruptionAuthorities/ByCountriesandRegions/E/Egyptjigou/201202/t20120209_801454.shtml.
[394] Land Center for Human Rights.
[395] MENA-OECD, *Business Climate Development Strategy, Phase 1 Policy Assessment Egypt*. 14 (2009).

largely through repression and intimidation. For example, Egypt is ranked as one of the most dangerous countries for journalists[396] and ranks 166/179 countries on the press freedom index.[397] The free flow of information is drastically affected by this control of journalists in the county. This hinders dialogue and education of the general population of Egypt. To ensure that government accountability occurs, there needs to be free press throughout the country. This is one way to address issues of corruption and increase government transparency and accountability.

Education

Education is a major hurdle to overcome regarding issues of water resources. One policy that should be implemented is to focus on education of farmers and agricultural workers. There are vast differences in the information regarding agricultural techniques and what is being done throughout Egypt, especially Upper Egypt. For example, in conversation with a local business person, the author learned that local farming communities generally lack information on ways to improve their irrigation techniques and agricultural practices. Promoting educational programs as a national policy, rather than relying solely on personal exchange of information, can have major impacts on how water is used, not only in Upper Egypt but also on the horizontal expansion projects. Additionally, one area where there can be a lot of gain concerning water use is educating the general population on water use in Egypt as it can raise general awareness of the issues surrounding the need for more effective ways to conserve water, and agricultural land, and in turn put pressure on the government to establish policies

[396] Omar, Ali. *Syria, Iraq, and Egypt most dangerous countries for Egypt*. http://www.dailynewsegypt.com/2013/12/30/syria-iraq-and-egypt-most-dangerous-countries-for-journalists/.
[397] Transparency International. *Corruption by country/territory: Egypt*. Available at http://www.transparency.org/country#EGY.

that actually address the needs of the population. Furthermore, promoting education can affect all aspects of society and should be part of any policy to manage a natural resource. As mentioned, education can be a powerful tool against corruption in a similar manner.

In summary, these are recommendations regarding water use in Egypt via concerted focus on what can be done to change policies and laws for improvement: pushing more efficient use in the Old Lands instead of focusing on pushing out into the desert, promoting more equitable agriculture and water use policies including increasing transparency and disclosure. Another recommendation includes tackling the issue of systemic and cultural corruption and finally increasing education within Egypt. Through these recommendations, water management in Egypt can be improved to work towards sustainability of water use in Egypt and also protect the impoverished smallholder farmers and their interests in the resource. Changes and improvements will come over time but it is vital to start today to ensure the health and vitality of the River Nile for future Egyptians.

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Appendix One

Internal Review Board Approval Letter

IRB Proposal For Amy Swoboda

Interview References

Sample Question for Interviews

Consent for Participation in Research

نموذج موافقة على الاشتراك في البحث

University of Idaho

December 11, 2013

Office of Research Assurances
Institutional Review Board
875 Perimeter Drive, MS 3010
Moscow ID 83844-3010

Phone: 208-885-6162
Fax: 208-885-5752
irb@uidaho.edu

To: Anastasia Telesetsky
Cc: Amy Swoboda

From: Traci Craig, PhD
Chair, University of Idaho Institutional Review Board
University Research Office
Moscow, ID 83844-3010

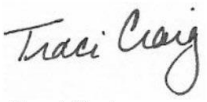
Title: 'The fruits of development in a desert ecology: investigating Egypt's export-based agricultural economy and its implications on ecology and water availability in an arid region'

Project: 13-265

Approved: 12/11/13
Expires: 12/10/14

On behalf of the Institutional Review Board at the University of Idaho, I am pleased to inform you that the protocol for the above-named research project is approved as offering no significant risk to human subjects.

This approval is valid for one year from the date of this memo. Should there be significant changes in the protocol for this project, it will be necessary for you to resubmit the protocol for review by the Committee.



Traci Craig

IRB PROPOSAL FOR AMY SWOBODA

1. Study Abstract.

This study is designed to develop an understanding of how programs created to enhance water and food security in the Nile Basin interact with water and agricultural management laws at a local, regional, national and international level. The current Egyptian government and the international development community are pursuing export-agriculture policies using scarce Nile River water that have the potential to create conflicts between the goals of food and water security, on the one hand, and the long-term protection of water resources such as the Nile River, on the other hand. Given the large population in Egypt and the lack of water, this thesis will explore how historical and contemporary water policies have influenced surface water quantity and accessibility levels and evaluate whether contemporary poverty alleviation programs will aggravate or improve water management in Egypt .

Potential benefits to the subjects include:

- Developing an understanding of how the evolution of water and agricultural management laws interact and influence water and food security objectives.
- Document the effects of water and agricultural management laws on various stakeholder groups

Individual interviews will be conducted, either in-person or over the phone or internet. Participation will be completely voluntary. All measures will be taken to ensure that any information or response will be kept from inappropriate disclosure.

2. Statement of Purpose and Background.

The purpose of this study is to understand the perspective and goals of participants regarding water usage in the context of specific agricultural development projects in Egypt. Additionally, the study provides is an inquiry into how various water laws and agricultural policies are affecting different stakeholder on the international, national, and local levels. The study described in this proposal will be used as part of a thesis/project.

3. Subjects.

a. Subject Characteristics: The participants in this study will include employees of agencies involved in development projects in Egypt and MENA. These target agencies include the International Fund for Agricultural Development (IFAD), United States Agency for International Development (USAID), the World Bank (WB), and other relevant government agencies that may be identified during the interview

process. These agencies have been chosen because of their engagement in specific Egyptian agricultural development projects. Policymakers within the Ministry of Agriculture and Land Reclamation and the Ministry of Water Resources and Irrigation will also be contacted for this project. Within Egypt, government officials for the target governorates, Qena and Sohag will be contacted and interviewed in this process. Farmer associations within Qena and Sohag will be contacted by the interviewer. Initial contacts with smallholder farmers will be developed through introductions by international and national agencies and through academic institutions in Egypt including the South Valley University located in Qena, Sohag University in Sohag, and Cairo University and the American University both located in Cairo.

b. Selection Criteria: The subjects of this study were purposefully chosen because of their involvement in specific development projects in Egypt. The purpose of contacting members of the various agencies is to also obtain further contacts with farmers. All steps in the process will be transparent. Farmers will only be contacted in their official capacity as a farmer and all records pertaining to their specific interview will be submitted to the subject upon express request by the specific subject.

c. Special Populations: Although it is unlikely to have contact with any special populations, the interviewer will ensure necessary precaution are taken to address this group. Some of the farmers in Qena and Sohag may be under the age of 18. Express, either written or verbal, by the parent will be obtained before interviewing any member of this population.

d. Recruitment Source: The subjects for the study will be recruited from various development agencies involved in specific development projects in the Qena and Sohag regions of Egypt. Through these contacts, the interviewer will hopefully establish contacts with farmer associations engaged in the Qena and Sohag agricultural projects. The members and leaders of the farmer associations may provide introductions to other smallholder farmers within the associations. The development agency professionals, national policymakers, farmer association leaders and smallholder farmers will only be interviewed in their official capacities and the goals and objectives of this study will be thoroughly discussed with any subject prior to the start of any interview.

e. Recruitment Methods: The interviewer will contact the various agencies and their members to establish relationships with the various stakeholders. The subjects will be made fully aware of the goals and objectives of the study from the onset of contact through an informed consent process. The subject will be identified and recruited by the interviewer.

f. Informed Consent Process: A letter of consent that will be translated into Arabic will be available and used at the start of any interview process. If the subject is illiterate, then a verbal confirmation of the voluntary process of the interview will be obtained before the start of any questioning. This confirmation will indicate that any information or participation in the interviews will be completely voluntary and

confidential and that all results will be kept in a locked environment in line with any policies established by the Institutional Review Board or by the University of Idaho.

g. Study Location: The subject will be interviewed either over the phone or in person at various locations. These locations will be decided by the interviewee. These locations can include in various offices, in the field, or within participant's homes. Additionally, if the chance occurs to have a meeting with a larger group of participants, a special meeting will be set up and the researcher will ensure that anyone who decides to participate will be informed that their participation is voluntary.

h. Potential Problems: Problems involving subject identification, recruitment or data collection are unlikely and unforeseen at this time. If any problems occur, the interviewer will take all necessary steps to ensure that the information gathered and data collected remains confidential.

4. Research Design and Method.

a. Research Design: This study is designed to obtain the perspectives of various stakeholders who are involved with agricultural development projects in Egypt. The interviewer will be fully informed of the purposes of the study and will only conduct interviews with the express consent of participation by an interview subject. The interviewer will have specific questions to use during the interviews and the interviewee at anytime will be able to stop the interview process. A recording device may be used during the interview, only with express written or verbal consent by the participant. Additionally, meeting with various members of farmer associations could occur outside of a formal meeting. If this happens, the interviewer will work with agency members listed above to ensure that all potential study participants understand the voluntariness of their participation and that at anytime the interviewee can terminate the interview.

b. Questionnaires and Interview Guides: Two questionnaires will be created. One will be used specifically for people involved in agency work or who are agency or institutional professionals. The interviewer will provide the interviewee a sample of the questions going to be asked in the interview. This specific questionnaire will also be used when interviewing leaders of the farmer associations in their official capacity. The second questionnaire will be developed specifically for smallholder farmer participants. With the use of an Arabic translator, the interviewer will conduct the interview using this questionnaire. Since the goal is to understand the individual farmer's perspectives, the interviewer will use these questions as a guide to help facilitate a discussion. The interviewee will be the leader of the conversation with only minimal input by the interviewer. Anytime the interviewee want to terminate the interview, the questioning will stop immediately.

c. Deception or Complete Disclosure: All goals and objectives will be disclosed at the beginning of the interview. This will be accomplished by their informed verbal consent or informed written consent. The tape of the interview or a written transcript

of the interview will be available to the interviewees within 72 hours after the interviews occur to allow the participant to clarify or redact any information they provided to the interviewer. The subject can stop the interview at any point during the process with the understanding that the information collected during the interview will not be used as part of the study.

5. Potential Benefits.

This study has the potential to benefit agencies that are involved in agricultural development projects. Insight into the connection and benefit of these specific targeted development projects will be explored. Information can include the perspectives of the individual farmer and various stakeholders. This study will hopefully shed light on how these projects are affecting people on the individual level and inform various stakeholders of any discrepancy between policy objectives and policy implementation.

6. Risks.

a. Identification of Risk: There are only minimal risks associated with participation in this research. The research is designed to help the researcher to understand the relationship among subjective perspectives on the use of water in agricultural development projects, objective measures of water use, and existing laws and policies. The subject will be interviewed in their official capacity and all measures will be taken to ensure that any information gathered will remain confidential. This being stated, if any risk to any participant is discovered during the process, the interviewer will work with the various agencies, professionals and individual to ensure that the risk is address and minimized.

b. Management of Risk: Management of risk will be a continuing process throughout this study. Risk management will occur from the beginning and will be assessed throughout the process. To minimize risk, at any time an interviewee may stop the interview process. Only subjects who have consented will participate in the interview. All communication will be confidential. Additionally, the interviewer will make transcripts of the interview immediately after the interview is conducted. This will allow the interviewees to review their own statements and clarify or redact any information. This will ensure that the interviewees are in control of the information they are providing and that the process and information gathered is completely transparent. Additionally, at the request of any participant, the interviewer will give them any information gathered regarding their own interview including transcripts of the interview or copies of tapes of the interview.

c. Confidentiality: The records of this study will be kept confidential. Research records will be kept in a locked computer and the data will be coded to ensure confidentiality. The farmers will be coded as “Farmer 1” and “Farmer 2” etc. At no point in this study will the names of the farmers and their codes be given to anyone else. Any notes taken by the interviewer or participant will be kept in a locked cabinet with only the interviewer having access to the information.

d. Assessment of Risk: Only minimal risk to subjects is anticipated. If at any time a risk is discovered, the interviewer will take all necessary steps to ensure that the risk is minimized and work with the agency members and the interviewee to address any issues that may arise.

7. Costs.

The subjects of this study will not incur any costs as a result of their participation. All participation is voluntary and the interviewees will be informed of the voluntariness of their participation at the beginning of contact.

8. Compensation and Incentives.

There will be no compensation or incentives offered for anyone involved in this research project. Although there may be instances where food is bought by the interviewer during the interview process, it will be expressly indicated that the food is not compensation for their participation in the interview. Their participation will be completely voluntary and any food or goods purchased by the interviewer during the process will not be compensation or an incentive for their participation in the study.

9. Investigator Experience.

Amy Swoboda is a graduate and law student at the University of Idaho. She is specializing in international and transboundary water law and water management and policy. She is familiar with the ethical practices of field research and is currently enrolled in a course specifically dealing with the complexity of field studies and the ethical issues regarding working in a developing country. This study is supervised by Professor Anastasia Telesetsky at the University of Idaho College of Law. All materials and interview questions will be used only after her review. Any data collected will be kept in a confidential manner in compliance with the University of Idaho policies.

Interview References

1. Interview with Foreign Worker, in D.C. (March, 2013).

2. Interview with Foreign Worker, in Cairo, Egypt (Jan., 2014).

3. Telephone Interview Foreign National Worker (Jan., 2014).

4. Telephone Interview Foreign National Worker (Jan., 2014).

5. Telephone Interview Foreign National Worker (Jan., 2014).

6. Interview with Egyptian Business Owner (Jan., 2014).

7. Interview with Local Egyptian Citizen (Jan., 2014).

8. Interview with Foreign Business Owner (Jan., 2014).

9. Interview with Egyptian Business Owner (Jan., 2014).

10. Interview with Egyptian Student (Jan., 2014).

Sample Question for Interviews

Officials and Agency Employees

- What is your role in the agency?
- What are the goals of this organization/ministry/agency?
- What are the underlying assumptions for development projects?
- Why are high value crops being planted in these specific areas?
- What was the process used to assess the needs of these target populations?
    - Were the target populations involved in the planning of the project?
- Are there other consequences or outcomes that were outside the scope of the projects goals that will have an impact on the success of these projects?
- What ecological aspects were a concern during the planning process of these projects?
- Are there any challenges/risks that this organization faced in other development projects?
    - How were these challenges/risked addressed?

Farmers and Other community members

- Please tell me about yourself.
- How long have you been involved in agriculture in Egypt?
- Has there been any changes in how you raise your crops?
- Has there been any changes in your land?
- What are the goals for participating in a project where you raise crops for an international market?

- Were you involved in the planning process for these projects? What input did you have?
- Please tell me your involved and understanding of development projects and agencies?
- Have you ever participated in other development projects?
- What would be your goals for your farm?
- Has your water use changed or have you noticed a difference in the Nile River waters?

CONSENT FOR PARTICIPATION IN RESEARCH

Introduction to the study

We invite you to participate in a study and interview how programs designed to enhance water and food security in the Nile Basin interact with water and agricultural management laws at a local, regional, national and international level to achieve water and food security objectives. This study will involve individual interviews conducted between the primary interviewer possibly with the aid of an Arabic interpreter. These interviews will be conducted by Amy Swoboda, a graduate and law student at the University of Idaho under the supervision of Professor Anastasia Telesetsky, Professor of Law at the University of Idaho College of Law.

Purpose of the study

The purpose of the study is to investigate how water and agricultural management laws are perceived at a local, regional, national and international level to achieve water and food security objectives This study allows people with direct knowledge and experience in this region to be part of the process.

Procedures

During this study, participants and researchers will meet at the convenience of the participant for an interview. During the interviews, the participant will have control over the subject and manner of the meeting. The researcher will ask about your experiences and opinions about local, regional, and international food and water policies. I will use your opinions within my thesis to understand the effects of food and water policy on local communities in Egypt. . The researcher will transcribe your interview within two days of your participation and you will have the opportunity to redact or further explain any information that you provided. You may ask questions or stop the interview anytime during the process. You are not required to participate but I think you may enjoy participating.

Risk or Discomfort

There is no more risk in participating in this study than there would be when a community individual speaks to someone from outside the community. . I will do everything I can to protect your personal information and responses to the interview questions. If you experience any problems as a result of participating in this study, please contact Amy E Swoboda by phone at (402) 440-XXXX or by email at swob5595@vandals.uidaho.edu

Benefits

You may enjoy participating in the interview. The information you provide may better inform processes and decisions made about agricultural practices in the region. The results of this study could shed light the effects of the programs on communities and people at the local,

national, and international levels. Your participation will help inform this research and you may learn something about the research process by participating.

Confidentiality

I will do my best to protect your personal information. Only the primary researcher will have access to information from this study. All information you provide will be kept locked in a cabinet in a secure building at the University of Idaho campus in Moscow, Idaho in the United State of America. Information will also be entered into a computer. This information will be completely de-identified; your name or other identifying information will not be used. Instead, your information will be given a random identification. No identifying information will be used in any analysis of these data, and it will not be relevant or available to future publication or any other use of these data.

Time Commitment

This study will take place during previously arranged meetings. The meetings will take place at the convenience of the participant. The interviews are expected to take less than one hour but the meetings may extend beyond one hour with the consent of the participant.

Right to Withdraw

You have the right to decide not to participate in this research, and to stop participating in this study at any time. This will not affect your relationship with the researcher or the University of Idaho.

Opportunity to ask Questions

You are welcome to ask questions at anytime, and you have the right to have your questions answered before you decide to participate in the interviews. If you have questions you may directly ask us or contact the primary interviewer, Amy E. Swoboda by phone at (402) 440-2243 or by email at swob5595@vandals.uidaho.edu

Consent and Right to Receive a Copy

You are making a voluntary decision to participate in this study. Your signature on the line below means that you have consented to participate after receiving and understanding information about this study. You will be given a copy of this consent form to keep.

نموذج موافقة على الاشتراك في البحث

مقدمة للدراسة:

ندعوكم للمشاركة في هذه الدراسة و ايضا في مقابلة تتمحور في كيفية تفاعل البرامج التي تهدف إلى تعزيز الأمن المائي والغذائي في حوض النيل مع قوانين الإدارة الزراعية على المستوى المحلي و الاقليمي والدولي لتحقيق أهداف الامن المائي والغذائي. وسوف تشمل هذه الدراسة أجراء مقابلات فردية بين المشارك و الباحث الرئيسي و ربما تتوفر مساعدة مترجم للغة العربية. وستجري هذه المقابلات طالبة الدراسات العليا في كلية الحقوق بجامعة ايداهو ايمي سوبودا تحت إشراف أستاذ القانون في كلية الحقوق بجامعة ايداهو البروفيسور اناستازيا تلستكي.

الهدف من الدراسة:

الغرض من هذه الدراسة هو التحقيق في الكيفية التي ينظر بها لقوانين المياه والإدارة الزراعية على المستوى المحلي و الاقليمي والدولي لانجاز أهداف الأمن المائي و الغذائي. هذه الدراسة ستسمح للناس ذوي المعرفة والخبرة المباشرة في هذه المنطقة أن تكون جزءا من العملية.

الإجراءات:

خلال هذه الدراسة، سيتم تحديد مواعيد المقابلات بين المشاركين والباحثين في اوقات يحددها المشارك للمقابلة. خلال المقابلات، سيكون المشاركين الحرية تسيير الموضوع وطريقة الاجتماع. سوف يستفسر الباحث عن تجاربك وآراءك حول السياسات الغذائية والمائية المحلية والإقليمية والدولية. وسوف تستخدم آرائكم في أطروحتي لفهم آثار سياسات الطعام والماء على المجتمعات المحلية في مصر. سيقوم الباحث بتدوين و كتابة نص المقابلة الخاص بك في غضون يومين من مشاركتكم وسيكون لديك الفرصة لصياغة او شرح و تفسير أي من المعلومات التي قمت بادلائها بشكل افضل. لديك مطلق الحرية بطرح اسئلة أو إيقاف المقابلة في أي وقت خلالها. لست مرغما على المشاركة ولكن أعتقد أنك قد تتمتع بالمشاركة في هذه الدراسة.

المخاطر أو المضايقات:

ليس هناك المزيد من المخاطر للمشاركة في هذه الدراسة اكثر من التي قد تصحب الحديث بين شخص من اهالي المجتمع مع شخص من خارج المجتمع. سأفعل كل ما بوسعي لحماية المعلومات الشخصية الخاصة بك والردود على اسئلة المقابلة. إذا واجهت أي مشاكل نتيجة مشاركتك في هذه المقابلة يرجى الاتصال ب ايمي سوبودا على رقم الهاتف 2243 440 (402) او عن طريق البريد الألكتروني:

swob5595@vandals.uidaho.edu

فوائد هذه الدراسة:

قد تستمتع بالمشاركة في المقابلة. المعلومات التي تقدمها قد تساعد في اتخاذ قرارات و عمليات أفضل حول الممارسات الزراعية في المنطقة. نتائج هذه الدراسة قد تلقي الضوء على آثار البرامج و الخطط على الاهالي و المجتمعات على المستويات المحلية والوطنية والدولية. سوف تساعد مشاركتكم في إثراء هذا البحث و تعلم عن عملية البحث عن طريق المشاركة.

الخصوصية:

وسوف أبذل قصارى جهدي لحماية المعلومات الشخصية الخاصة بك. الباحث الرئيسي سيكون الوحيد الذي سيطلع على المعلومات هذه الدراسة. وستبقى جميع المعلومات التي تقدمها مقفولا عليها في خزانة بمبنى آمن في الحرم الجامعي لجامعة ايداهو في مدينة موسكو، بولاية ايداهو في الولايات المتحدة الأمريكية. كما سيتم ايضا إدخال المعلومات إلى

جهاز الكمبيوتر. سيتم إزالة المعلومات الشخصية من الملفات تماما و لن يستخدم اسمك أو غيرها من المعلومات الشخصية. عوضا عن ذلك، سيتم تبديل المعلومات الخاصة بك بدلائل عشوائية. لن تستخدم أي معلومات خاصة بيك في أي من عمليات تحليل هذه البيانات، وأنها لن تكون ذات صلة أو المتاحة للنشر مستقبلا أو ان يكون هناك اي استخدام آخر لهذه البيانات.

الالتزام بالوقت:

هذه الدراسة سوف تجرى خلال اجتماعات مرتبة لها مسبقا. سوف تعقد الاجتماعات في وقت مريح للمشاركين. ومن المتوقع اجراء المقابلات في أقل من ساعة واحدة، ولكن قد تمتد إلى ما بعد ساعة واحدة بموافقة المشارك.

حق الانسحاب:

لديك الحق في أن تقرر عدم المشاركة في هذا البحث، و التوقف عن المشاركة في هذه الدراسة في أي وقت. وهذا لن يؤثر على علاقتك مع الباحث أو بجامعة ايداهو.

فرصة طرح ألاسئلة:

انت مدعو لطرح الأسئلة في أي وقت، و لديك الحق في الحصول على ردود لأسئلتك قبل أن تقرر المشاركة في المقابلات. إذا كان لديك اسئلة قد تقوم بسؤالنا مباشرة او الاتصال بالباحث الرئيسي ايمي سوبودا عن طريق الهاتف (402) 440 xxxx او عن طريق البريد الألكتروني:

swob5595@vandals.uidaho.edu

الموافقة والحق في الحصول على نسخة:

اتخاذك قرار المشاركة في هذه الدراسة هو عمل تطوعي. توقيعك على السطر أدناه يعني أنك قد وافقت على المشاركة بعد تلقيك و استيعابك كافة المعلومات حول هذه الدراسة. سوف تحصل على نسخة من نموذج الموافقة هذا للاحتفاظ بها.