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THE INTERSECTIONS OF ENVIRONMENTAL INSECURITIES AND CIVIL WAR IN YEMEN

by

Timothy S. Fitzgerald

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Thesis Advisor:

Anne M. Baylouny

Second Reader:

Emily L. Meierding

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**THE INTERSECTIONS OF ENVIRONMENTAL INSECURITIES AND CIVIL
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Timothy S. Fitzgerald
Lieutenant Commander, United States Navy
BS, U.S. Naval Academy, 2010

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**NAVAL POSTGRADUATE SCHOOL
September 2021**

Approved by: Anne M. Baylouny
Advisor

Emily L. Meierding
Second Reader

Afshon P. Ostovar
Associate Chair for Research
Department of National Security Affairs

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ABSTRACT

Yemen's most recent civil war began in 2015 and has affected nearly every person in the country. In addition to war and violence, Yemen has historically experienced a wide array of environmental insecurities, including water scarcity, famine, and migration precipitated by these factors. This thesis examines how environmental insecurities have affected the ongoing civil war and whether they have been used as a tool in the war. Also, this thesis asks whether these issues existed before the war or emerged as a by-product of the war. The thesis discovers that although environmental insecurities pre-dated the war, they were not a primary cause of the war's onset. Military forces have intermittently exploited environmental insecurities to their benefit during the war; however, not enough evidence exists at this time to prove insecurities like water scarcity have been used as a tool of war. The war has indeed exacerbated environmental insecurities to deteriorate due to destruction of water infrastructure, blockage of seaports, and internally displaced persons migrating to urban centers. Without an end to the fighting, issues like water scarcity, famine, disease, and migration will continue to worsen.

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LIST OF ACRONYMS AND ABBREVIATIONS

AQAP	Al-Qaeda in the Arabian Peninsula
AWD	Acute Watery Diarrhea
FLOSY	Front for the Liberation of South Yemen
GCC	Gulf Cooperation Council
GFDRR	Global Facility for Disaster Reduction and Recovery
GoY	Government of Yemen
IDP	Internally Displaced Person
IPC	Integrated Food Security Phase Classification
KSA	Kingdom of Saudi Arabia
MAN	Movement of Arab Nationalists
MENA	Middle East and North Africa
NDC	National Dialogue Conference
NLF	National Liberation Front
OCHA	UN Office for the Coordination of Humanitarian Affairs
PDRY	People's Democratic Republic of Yemen
ROY	Republic of Yemen
STC	Southern Transition Council
UN	United Nations
WASH	water, sanitation, and hygiene
YAR	Yemen Arab Republic
YSP	Yemeni Socialist Party

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I. INTRODUCTION

The extreme humanitarian suffering in Yemen due to water scarcity, famine, and migration currently threatens to increase instability in Yemen and the rest of the Middle East. To achieve a stable solution to the crisis, this thesis delineates how the civil conflict arose in relation to the environmental insecurities that already existed in the country. It examines the following question: How have environmental insecurities affected the ongoing conflict in Yemen? More specifically, did environmental insecurities exist before the war, were they a by-product of the war, and/or were they a tool used in the war? This inquiry explains how environmental insecurity issues arose and whether or not they are exacerbating the plight of the people facing the civil war.

In addressing the topic, the research explores whether Yemen can solve these issues on its own and, if not, what assistance is needed to help Yemen recover and create a prosperous nation. This analysis also assesses whether solving the environmental insecurity issues is a viable means of stemming the conflict and what the United States and other leading nations in the world can do to find a solution.

Unfortunately, Yemen is not a key foreign policy issue for the United States, nor is it an important resource for the rest of the world.¹ In other words, the crisis in Yemen is not one that is known throughout the globe. Edwards and Cromwell go to great lengths to expose how the media has failed to do its duty by accurately and forcefully reporting on atrocities in the country.² Helen Lackner alludes to the killing of Saudi journalist, Jamal Khashoggi, as the only reason the United States and other Western countries became aware of the crisis in Yemen.³ An increase in media coverage on Yemen has led to higher global

¹ Jeremy M Sharp and Christopher M Blanchard, “Yemen: Peace Talks and Current Congressional Action,” CRS (Washington, DC: Congressional Research Service, December 10, 2018), <https://crsreports.congress.gov/product/pdf/IN/IN11006>.

² David Edwards and David Cromwell, “Yemen: Feeding the Famine,” in *Propaganda Blitz: How the Corporate Media Distort Reality* (London: Pluto Press, 2018), 125–41, <https://www.jstor.org/stable/j.ctv69tg4v>.

³ Helen Lackner, *Yemen in Crisis: The Road to War*, U.S. edition (London ; New York: Verso, 2019), xxvii.

awareness and challenges being made by the U.S. House of Representatives on arms sales to Saudi Arabia. More public knowledge of the environmental insecurities may promote foreign governments to take action.

The Republic of Yemen's (ROY) government is to blame for many of the environmental insecurities prevailing throughout the country. The ROY is the result of the union between the Yemen Arab Republic (YAR) in the North and the People's Democratic Republic of Yemen (PDRY) in the South in the 1990s. Looney points to the lack of internal policy reforms as the cause of poor economic performance for many Middle East and North Africa (MENA) countries, including Yemen.⁴ Although the transition years appeared hopeful from 1992–1994, the country struggled to become a fully functioning economy under Yemen's former and first president, Ali Abdullah Saleh. Understanding the economic and political struggles of the ROY is imperative in order to grasp why its environmental insecurity issues have continued to grow.

A. SIGNIFICANCE OF THE RESEARCH QUESTION

Environmental security can serve as a catalyst for conflict or reconciliation. People need food, shelter, and basic amenities like water, sanitation, and hygiene (WASH) to survive.⁵ If people are withheld any of these items, then, most likely, a population will do anything in their power to secure them. Therefore, people have two options: fight for their lives to obtain those items or reconcile with others in order to find a peaceful solution together, possibly one the society could not achieve on their own. The humanitarian crisis in Yemen has real world implications for the stability in the country. In Syria, ISIS was able to convince starving people to give them willing family members to conduct suicide raids.⁶ In return, ISIS offered protection and food to those families. Because the families

⁴ Robert Looney, "Why Has the Middle East Been so Slow to Globalize?," *Review of Middle East Economics and Finance* 3, no. 3 (December 2005): 173–202, <https://doi.org/10.1080/14753680500407043>.

⁵ United Nations High Commissioner for Refugees, "UNHCR WASH Manual: Practical Guidance for Refugee Settings - UNHCR WASH Programme Guidance," Program Manual (Geneva: UNHCR, January 2020).

⁶ Nadim Houry, "Children of the Caliphate," November 22, 2016, <https://www.foreignaffairs.com/articles/levant/2016-11-22/children-caliphate>.

were in extreme need of main essentials, they were more than willing to accept this bargain. Such a situation could be easily replicated in Yemen.

This thesis brings to light the history and suffering of the people in Yemen through the lens of environmental security issues. In doing so, humanitarian assistance will be explored in how it plays a significant role in the United States' foreign affairs and acts as a vital function of the U.S. military. Yemen is unique because, in some regards, the U.S. inadvertently contributed to events that opposed the goals of humanitarianism. Because America provided arms sales to Saudi Arabia and mid-air refueling capabilities for Saudi fighter jets, America may hold a share of the responsibility for the conflict, and for finding a peaceful solution.⁷ As this thesis explains, the solution to ending the conflict will not be found by rectifying environmental insecurities in the region. Arguably, the suffering of millions of people and an outbreak of another civil war in Yemen was avoidable if, in 2010, the ROY government had addressed the country's plethora of political, economic, social, and security problems.⁸

Yemen suffers from a plethora of environmental issues. The country is in dire straits with regards to water, food production, infrastructure, migration, and terrorism. All of these have increased since the outbreak of the country's third civil war in 2015. Ashok Swain declares, "Water can be an impetus for war or an impetus for peace."⁹ In the case of Yemen, it appears to be an impetus for war. The country is heavily dependent on agricultures even though less than 2.6% of its land is arable, causing negative effects on water and food production.¹⁰ Migration continues to place a strain on water sources in urban areas as rural areas begin to run dry. Additionally, Yemen has been a safe haven for terrorist groups over

⁷ Rick Rowley, *Kingdom of Silence* (Jigsaw Productions, 2020), pt. 53:17, <https://www.youtube.com/watch?v=T5MlpQgwHY0>.

⁸ Ibrahim Galal Fakirah, "Yemen Conflict," *Middle East Institute (MEI)*, no. Yemen and Gulf Program (October 2020): 4.

⁹ Ashok Swain, *Managing Water Conflict: Asia, Africa and the Middle East* (London: Taylor and Francis, 2004), 33, <https://doi.org/10.4324/9780203502969>.

¹⁰ Milen Dyoulgerov, Ana Bucher, and Fernanda Zermoglio, "Vulnerability, Risk Reduction, and Adaption to Climate Change: Yemen," *Climate Risk and Adaptation Country Profile* (The World Bank Group, April 2011), 2.

the past half century.¹¹ Yemen and other countries continue to argue about the definition of water scarcity rather than the root causes and do not give water the platform it arguably deserves.¹² If governments and more importantly, humans, do not learn that fighting rebel factions and assassinating their leaders is not the answer to ending the environmental insecurities, then water scarcity can seriously hinder a country from developing.

The conflict in Yemen reverberates across the world, albeit behind the scenes. The clash in Yemen afflicts Washington's ability to maintain peace in the region and ensure the safe passage of oil and other energy exports within the surrounding waters.¹³ The catastrophically poor situation in five countries in the region suggests that the United States and other countries interested in the security of the region may need to re-evaluate possible solutions to ending the conflict.¹⁴ Saudi Arabia plays a pivotal role in this war; for decades, the KSA has continued to back the losing side of any turmoil in Yemen.¹⁵ The importance of these interactions will be further developed in chapter two and will delineate how Saudi Arabia plays a crucial part in affecting environmental security issues within the ROY.

B. LITERATURE REVIEW

Many examples stress how water insecurity, famine, migration, and other environmental insecurity issues have threatened Yemen over time. Nonetheless, research on how environmental insecurity issues have affected the civil war in Yemen are lacking in a substantial regard. Available literature points to an overwhelming number of responses that do not necessarily believe environmental insecurities can start a war; however, literature on other countries indicates that such insecurities can be used as a weapon and

¹¹ Aaron Edwards, "Yemen: Civil War and Humanitarian Catastrophe," *Political Insight* 10, no. 2 (June 2019): 15, <https://doi.org/10.1177/2041905819854310>.

¹² Nicholas S. Robins and James Fergusson, "Groundwater Scarcity and Conflict – Managing Hotspots," *Earth Perspectives* 1, no. 1 (February 2014): 2,6, <https://doi.org/10.1186/2194-6434-1-6>.

¹³ Stephen A. Cook, "No Exit: Why the Middle East Still Matters to America," *Foreign Affairs* 99, no. 6 (December 2020): 140.

¹⁴ Cook, 133.

¹⁵ Bruce Riedel, "Saudi Arabia and the Civil War Within Yemen's Civil War," The Brookings Institution, *Order from Chaos* (blog) (Washington, August 15, 2019), https://search-proquest-com.libproxy.nps.edu/docview/2273530465?rfr_id=info%3Axri%2Fsid%3Aprimo.

prolong a conflict. This literature review will examine whether conflict arises from issues like water scarcity along with the development of environmental insecurities in Yemen.

1. Broad Environmental Security Issues

Many authors argue that a decrease in the water supply can provoke armed conflicts. Ashok Swain illustrates this phenomenon with the argument map depicted in Figure 1, which shows how environmental insecurity issues can lead to conflict. Many of the factors in this map are relevant in the Yemen case. Urbanization and agricultural growth have increased due to the explosion in population growth in Yemen. These two factors increased the need for water. Meanwhile, a lack of government infrastructure and growth in subsistence farming have led to conflicts and destruction of water sources.

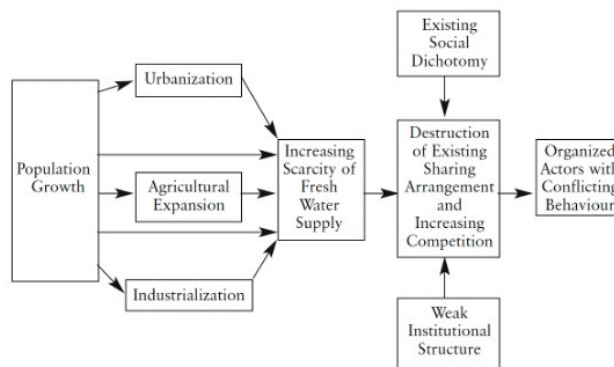


Figure 1. Increasing Demand Over Water and Creation of Conflicting Actors¹⁶

Scholars debate whether water scarcity can provoke armed conflicts. Cooley provides an example of traditional “water war” narratives; he argues that wars have been caused over water and points directly to the 1967 Arab-Israeli War and other water conflicts between Lebanon, Syria, and Palestine as proof.¹⁷ The Pacific Institute has identified more

¹⁶ Source: Swain, *Managing Water Conflict*, 20.

¹⁷ John K. Cooley, “The War Over Water,” *Foreign Policy*, no. 54 (April 1984): 3, <https://doi.org/10.2307/1148352>.

than 4500 water-related conflicts from around the world.¹⁸ Gleick, the institute's director, attributes many of the conflicts surrounding water supply to the lack of international humanitarian law and the reduced ability of a global agency to effectively persecute those who violate the laws in place.¹⁹ King argues that water scarcity causes conflicts and instability in regions like Syria in 2011.²⁰ The authors also point to the use of water as a weapon in a conflict and directly show how opposing sides will make positive gains by causing the civilians in the region to suffer.²¹

However, other authors have challenged the idea that water causes armed conflict. Meierding explains even though many researchers have propositioned that climate change and conflicts will arise, she questions the validity of these studies due to the complexity of the relationships the scientists examine.²² Wolf states, "War over water seems neither strategically rational, hydrographically effective, nor economically viable."²³ Edwards asserts that a lack of medicine and access to clean water and food directly attributes to the war rather than a fight over water itself.²⁴ Alam argues that "war over water is the exception" whereas cooperation and water sharing among nations and within nations is the undisputable norm.²⁵ The debate over water wars continues and will increase as the earth consistently warms.

¹⁸ *Water Conflict Chronology*, Water Conflict Chronology Database (Pacific Institute), accessed November 10, 2020, <http://www.worldwater.org/conflict/map/>.

¹⁹ Peter H. Gleick, "Water as a Weapon and Casualty of Conflict: Freshwater and International Humanitarian Law," *Water Resources Management* 33, no. 5 (February 2019): 1738, <https://doi.org/10.1007/s11269-019-02212-z>.

²⁰ Marcus DuBois King, "The Weaponization of Water in Syria and Iraq," *The Washington Quarterly* 38, no. 4 (October 2015): 155, <https://doi.org/10.1080/0163660X.2015.1125835>.

²¹ King, 153–69; Peter H. Gleick, "Water as a Weapon and Casualty of Armed Conflict: A Review of Recent Water-Related Violence in Iraq, Syria, and Yemen," *Wiley Interdisciplinary Reviews: Water* 6, no. 4 (April 2019): 15, <https://doi.org/10.1002/wat2.1351>; Cooley, "The War Over Water," 3.

²² Emily Meierding, "Climate Change and Conflict: Avoiding Small Talk about the Weather," *International Studies Review* 15, no. 2 (2013): 185–203, <https://doi.org/10.1111/misr.12030>.

²³ Aaron T. Wolf, "Conflict and Cooperation Along International Waterways," *Water Policy* 1 (June 30, 1998): 251.

²⁴ Edwards and Cromwell, "Yemen," 128.

²⁵ Undala Z. Alam, "Questioning the Water Wars Rationale: A Case Study of the Indus Waters Treaty," *The Geographical Journal* 168, no. 4 (December 2002): 347, <https://doi.org/10.1111/j.0016-7398.2002.00060.x>.

2. Environmental Security Issues Pertaining to Yemen

Several scholars have affirmed the environmental insecurities that exist in Yemen today are due to the overextraction of ground water for agricultural use.²⁶ Lackner states, “As agriculture is estimated to use close to 90% of Yemen’s water, and 70% of the country’s population live in rural areas, it is essential to develop sustainable water management policies if Yemenis are to continue living in the country’s urban and rural areas.”²⁷ From 1962 onward, the governments in both YAR and PDRY failed to create a water infrastructure suitable for farming. Farmers dug wells whenever and however they desired, causing the groundwater supply to diminish much faster than experts predicted.²⁸ The inability of the government to regulate had a direct effect on all other environmental insecurities in the region, with the exception of climate change.

Two scholars, Lichtenthaeler and Swain, observe that well drilling increased the rate of groundwater depletion occurred in Yemen. From the period of 1970 to 2004, the deep tube water wells permitted irrigated areas to increase from 37,000 to 407,000 hectares.²⁹ Also, irresponsible crop growing persisted. Yemenis shifted from drought-resistant crops to growing water-intensive cash crops, like citrus fruits and bananas.³⁰ This caused the water crisis to grow exponentially worse. Coupled with climate change and the variation in pattern of seasonal rains to replenish surface water runoffs and dams, the Yemenis steered head first into a water scarce environment. Groundwater is not replenished as fast as other water sources; to avoid depletion, governments must regulate groundwater extraction in arid areas of the world.³¹ In another source, Swain argues that groundwater

²⁶ Daniel Varisco, “Pumping Yemen Dry: A History of Yemen’s Water Crisis,” *Human Ecology* 47, no. 3 (June 2019): 317–29, <https://doi.org/10.1007/s10745-019-0070-y>; Lackner, *Yemen in Crisis*; Swain, *Managing Water Conflict*; Gerhard Lichtenthaeler, “Water Conflict and Cooperation in Yemen,” *Middle East Report*, no. 254 (April 2010): 30–35; Aliza Herzberg, “Urban Water Scarcity in Sana’a, Yemen,” *Focus* 15, no. 1 (April 2019): 100–107.

²⁷ Lackner, *Yemen in Crisis*, 218.

²⁸ Varisco, “Pumping Yemen Dry,” 318.

²⁹ Lichtenthaeler, “Water Conflict and Cooperation in Yemen,” 1.

³⁰ Lichtenthaeler, 1.

³¹ Ashok Swain, “A New Challenge: Water Scarcity in the Arab World,” *Arab Studies Quarterly* 20, no. 1 (January 1998): 3.

can only be renewed once every 1400 years and that groundwater has to be extracted in an environmentally friendly way.³² Swain further states:

When the extraction rate from underground basins exceed renewal rate, which is known as groundwater ‘mining’, the result is a falling water table and surface level. The falling of the water tables of coastal aquifers increases the likelihood of the infiltration of saline water, making water unsuitable for human use. Away from coastal areas, over-consumption of the aquifers leads either to their drying up completely, or the water table is lowered so much that it greatly increases the cost of pumping.³³

This aptly describes the problems which Yemen is facing.

Many scholars observe that the lack of infrastructure caused by the ongoing civil war has exacerbated the water crisis and led to the emergence of more environmental insecurities such as famine and a cholera outbreak.³⁴ This increases the suffering of Yemenis and causes more of them to migrate to other settlements and cities that are already struggling to provide the bare minimum for their current inhabitants. The Integrated Food Security Phase Classification (IPC) remains at level three, crisis, or above for an estimated 15.9 million people.³⁵ The map in Figure 2 from the World Food Programme portrays how severe the lack of food remains in Yemen. Note that the famine rating applies to some of the most populated areas in the country.

³² Swain, *Managing Water Conflict*, 17.

³³ Swain, 17.

³⁴ Ali A. Rabaan, “Cholera: An Overview with Reference to the Yemen Epidemic,” *Frontiers of Medicine* 13, no. 2 (June 2018): 213–28, <https://doi.org/10.1007/s11684-018-0631-2>; Amal A. Kandeel, “Food Insecurity: The Basic Threat in an Overburdened Region,” *Middle East Policy* 21, no. 4 (November 2014): 84–91, <https://doi.org/10.1111/mepo.12097>; Robins and Fergusson, “Groundwater Scarcity and Conflict – Managing Hotspots”; William A. Rugh, “Problems in Yemen, Domestic and Foreign,” *Middle East Policy* 22, no. 4 (January 2015): 151, <https://doi.org/10.1111/mepo.12164>; Fakirah, “Yemen Conflict,” 16; Dyoulgerov, Bucher, and Zermoglio, “Vulnerability, Risk Reduction, and Adaption to Climate Change: Yemen,” 2.

³⁵ Global Network Against Food Crises and World Food Programme, “2020 Global Report on Food Crises,” United Nations World Food Programme, February 2020, 189, <https://www.wfp.org/publications/2020-global-report-food-crises#:~:text=The%202020%20edition%20of%20The,to%20their%20perpetuation%20or%20deterioration>.

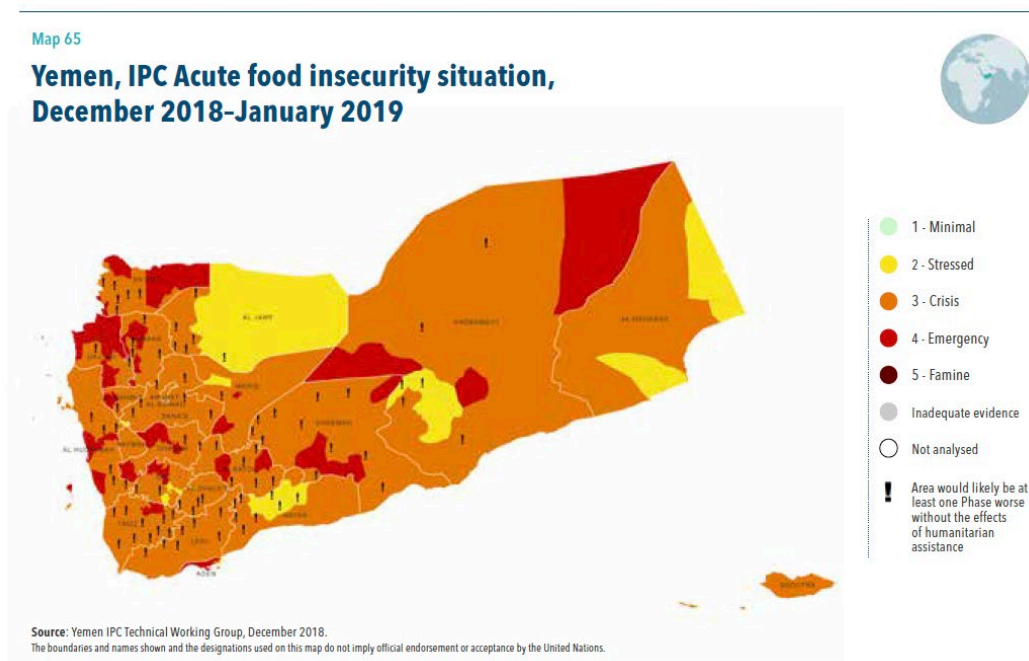


Figure 2. Yemen Food Insecurity Situation Depicted via IPCs³⁶

The cost of food plays a role in how environmental insecurities are affecting the country. Burki postulates that the hunger crisis in Yemen is directly due to a major oil pipeline being cut in 2011, causing fuel prices to increase over 500% and preventing farmers from using well pumps to irrigate their crops.³⁷ Several reports and videos point out that malnutrition is not directly reflected by the lack of farmland and availability of food for purchase. Rather, it is that the Yemenis are unable to purchase food because their society lacks the ability to build a prosperous life that can afford them the opportunity to purchase it.³⁸ This points to the lack of governance and its failure to build a sustainable

³⁶ Source: Global Network Against Food Crises and World Food Programme, 190.

³⁷ Talha Burki, "Yemen's Hunger Crisis," *The Lancet* 380, no. 9842 (August 2012): 637, [https://doi.org/10.1016/S0140-6736\(12\)61356-7](https://doi.org/10.1016/S0140-6736(12)61356-7).

³⁸ Isa Blumi, "Plundering Yemen and Its Post-Spring Hiatus," in *Destroying Yemen* (Oakland, California: University of California Press, 2018), 170–200; *Inside The World's Worst Humanitarian Crisis* (VICE on HBO, 2019), <https://www.youtube.com/watch?v=RWOPlYnTcmk>; *The War in Yemen: People Suffer Due to Lack of Clean Water* (TRT World, 2019), <https://www.youtube.com/watch?v=NK2FITwv0EY>.

infrastructure of energy and water sources as possible root causes of the country's problems.

Kandeel and Varisco conclude that climate change and lack of rainfall have exacerbated the environmental insecurities in the country.³⁹ Up until the late 1970s, Yemeni farmers depended on rainfall and irrigation ditches to accumulate water on their land. The rainfall helped feed groundwater sources and allowed for springs to flow from the mountains in the Sa'dah region to assist in irrigation. Once the rains stopped coming as frequently, the Yemenis turned to diesel pumps to extract groundwater. As the population multiplied, more people entered the realm of agriculture and caused an even larger strain on the sources of water. Varisco wrote, "Yemen needs to modernize but due to the conflict and lack of education for the populace, the only good option is attempting to figure out how local farming can be more profitable."⁴⁰ At the same time, the World Bank forecasted in 2011 that climate change would likely have a negative effect on agriculture because rainfall would be more infrequent and catastrophic when it arrived.⁴¹ Their predictions were correct and torrential rains in 2019 and 2020 killed scores of people.⁴² Climate change is likely to have a negative effect on Yemen. However, due to the lack of available data on rain patterns and climate change within the borders of Yemen, it is difficult to determine trends in the region with certainty.

In sum, there is a variety of research on environmental security issues affecting conflicts in different regions across the globe. To put it in perspective, UN Secretary General Antonio Guterres declared in 2020, "Four people out of every five, twenty-four million people in all, need lifesaving aid in what remains the world's largest humanitarian

³⁹ Kandeel, "Food Insecurity"; Daniel Martin Varisco, "Agriculture in the Northern Highlands of Yemen: From Subsistence to Cash Cropping," *Journal of Arabian Studies* 8, no. 2 (July 2018): 171–92, <https://doi.org/10.1080/21534764.2018.1551470>.

⁴⁰ Varisco, "Agriculture in the Northern Highlands of Yemen," 190.

⁴¹ Dyoulgerov, Bucher, and Zermoglio, "Vulnerability, Risk Reduction, and Adaption to Climate Change: Yemen," 2.

⁴² Declan Walsh, "As Fighting Surges, Yemen Is Hit With 1st Cluster of Covid-19 Infections," *The New York Times*, April 29, 2020, sec. World, <https://www.nytimes.com/2020/04/29/world/middleeast/yemen-saudi-coronavirus-cholera.html>.

crisis.”⁴³ Time is running out in Yemen and immediate action is required to solve this crisis. Determining how environmental insecurities have had a direct impact on the civil war here will help uncover a solution. Discovering how groups in the country are using environmental insecurities to their advantage will also assist in this endeavor. More research and synthesis are required to determine the answers to these questions.

C. POTENTIAL EXPLANATIONS AND HYPOTHESES

This thesis seeks to discover whether a country’s insecure environment could worsen a conflict. If citizens do not have food or water, does the conflict increase? I hypothesize that resource scarcity in this context will intensify the conflict. In addition, I will need to prove the opposite can be an option; that if citizens do have food or water then conflict will lessen. Many researchers have argued about whether climate change affects or causes conflict. The purpose of this research is not to find an answer to this currently unsolved question but to attempt to solve the others.

Environmental insecurity matters in the conflict in Yemen. Yet it is not clear how it matters. The research gathered so far points to one possible explanation. It seems that the environmental insecurities are a second or third order effect of the conflict. I hypothesize that environmental security issues were not a direct cause of the conflict but that the existing environmental insecurities exacerbated the ongoing crises to an unknown extent. If Yemenis cannot receive or obtain basic commodities such as electricity, water, and food, then their willingness to fight for a government or group that does not provide these services immediately diminishes.⁴⁴

As for the second question, I query whether obtaining solutions to environmental insecurities can help end the war. I hypothesize that the effects of environmental insecurity will be helpful in ending the ongoing civil war. The extreme suffering this country is experiencing is able to grab the attention of actors on the global stage. Now that more people are aware of the problems Yemen faces on a day-to-day basis, the region could

⁴³ “Yemen: ‘Hanging on by a Thread’, UN Chief Requests Funding to Meet Staggering Humanitarian Crisis,” UN News, June 2, 2020, <https://news.un.org/en/story/2020/06/1065292>.

⁴⁴ Swain, *Managing Water Conflict*, 19–24.

experience an overwhelming amount of attention and support to assist in solving their predicaments. On the other hand, the effects of environmental insecurity could be harmful because all sides in the conflict can and do weaponize the lack of food and water. This is a tactic used frequently against Yemeni citizens in order to deter their support of the established government run by Hadi. In addition, I hypothesize that environmental insecurities are a tool of state building. Due to the failure of the National Dialogue Conference in ratifying the proposed six state solution with Yemen, factions may be attempting to use insecurities like water scarcity and famine to garner support for their cause. Foreign forces, like Saudi Arabia, may actually be using insecurities in order to create security issues within the region and prolong the conflict.

Yemen faces environmental security crises that should be addressed and fixed. At this juncture, I hypothesize a viable option is to install water management teams to facilitate education and on-the-ground training to the population.⁴⁵ Is this a suitable and credible choice during an ongoing civil war? It is with adequate force protection. However, the systems the government chooses to build need to be reinforced and better developed for war zones than previous models.⁴⁶ Furthermore, if sustainable and effective farming practices can be implemented in Yemen, then a large source of their water scarcity problems can be controlled.⁴⁷ If a concerted effort is made to discuss alternative and varying water abstraction methods among villages, then progress can be made in alleviating water scarcity in farmlands and allow for other methods to come to fruition.⁴⁸ Virtual water may be helpful in environments like Yemen where politicians will not need to confront water scarcity head on; items that require a gross amount of water can be acquired via trade and wars can be avoided in the future.⁴⁹ Sustainable opportunities exist to alleviate this crisis.

⁴⁵ Robins and Fergusson, "Groundwater Scarcity and Conflict – Managing Hotspots," 1.

⁴⁶ Gleick, "Water as a Weapon and Casualty of Conflict," 1748.

⁴⁷ Varisco, "Pumping Yemen Dry," 317–18.

⁴⁸ Taha M. Taher, "Groundwater Abstraction Management in Sana'a Basin, Yemen: A Local Community Approach," *Hydrogeology Journal* 24, no. 6 (September 2016): 1593–1605, <https://doi.org/10.1007/s10040-016-1435-6>.

⁴⁹ J. A. Allan, "Virtual Water: A Strategic Resource Global Solutions to Regional Deficits," *Ground Water* 36, no. 4 (July 1998): 36, <https://doi.org/10.1111/j.1745-6584.1998.tb02825.x>.

D. RESEARCH DESIGN AND SCOPING

The research design largely focused on identifying the environmental insecurities that are affecting the ongoing civil war in Yemen. The research proceeded in several ways. To begin, preliminary grounding research included understanding how Yemen operated, what the physical environment consisted of, and how the latest civil war began. I had to make difficult choices about what data and research to include and what to exclude. I made these decisions by determining whether the data and journal articles were relevant to the environmental insecurity aspect I was pursuing. Then, I identified possible connections between environmental insecurities and the armed conflict in Yemen and evaluated whether each of these existed in this case. Finally, I assessed which policy solutions were possible in this particular case.

The time period for this research is the Yemeni civil war. Examining the war established a clear baseline for where the country currently stands. Helen Lackner's 2019 book, *Yemen in Crisis*, provided an excellent resource for this information. This analysis utilized data showing how environmental insecurity issues can be weaponized in order to reach a certain end. It is clear in my initial fact-finding that most researchers have asserted wars are not started over water; however, the idea that water can be used as a weapon is a salient one. The groundwork examined other non-traditional security threats. Food security is a category of non-traditional security threat. This theoretical perspective helped in analyzing my hypotheses. There was an opportunity to compare whether environmental securities or other non-traditional security threats are important factors.

The research identified solutions regarding how best to solve the environmental insecurity issues. There is a lack of research on how to do this in Yemen specifically but there are examples in other areas of the world that I drew on. This probe examined Yemen's history after 1962. One of the major indicators for this decision is the fact that most environmental data on Yemen is scarce and has not been recorded until the latter half of the twentieth century. The historical era prior to 1962 did not appear to bring substantial evidence to light on their environmental insecurities.

Part of my investigation invested some time in Arabic resources. Many of the sources I obtained came from a Western perspective and were written by a Western author. In order to better understand the plight of the people and their understandings of what has happened to their country, I found sources in their language. Among these were social media statements of officials and researchers in Yemen. This research focused on assessing whether Al-Qaeda in the Arabian Peninsula (AQAP) or the Houthi rebels created environmental insecurities for their benefit. For example, a government could instigate food and water shortages in order for citizens to join the military. Actions like these may be taking place in Yemen, too. Having access to additional primary sources would have amplified this thesis but due to the ongoing conflict and COVID-19, I did not have access to these.

This research uncovered specific narratives on how people experienced environmental security issues. People interpreted a lack of water in their region several different ways. Some believed the insecurity was due to the Houthis while others believed the Houthis were doing their best to combat the environmental insecurity. When humans are starving and thirsty, their individual experiences can be far different than one would suppose. In the past and world as a whole, research uncovered links between charity organizations and political regimes creating allegiances. This may also be happening in Yemen.

Some assert that the conflict in Yemen is looking increasingly unsolvable. Bruce Riedel emphasizes the following variables are hindering any progress: negative contributions from Saudi Arabia, the remaining Hadi government, the humanitarian crisis, and Iranian influence.⁵⁰ The thesis considered these additional explanatory factors in order to determine how environmental insecurities, specifically, are contributing to instability in Yemen.

⁵⁰ Bruce Riedel, "Yemen's Disaster Becomes 'Cataclysmic,'" *Brookings* (blog), July 6, 2020, <https://www.brookings.edu/blog/order-from-chaos/2020/07/06/yemens-disaster-becomes-cataclysmic/>.

II. BACKGROUND OF YEMEN

To fully understand how Yemen has fallen into the predicaments of its current day, grasping the history of this country is vital. The ROY morphed over time through several different transition periods that began in 1962. Whereas many countries have a constant glideslope in the positive direction for growth, Yemen enjoyed more of a rollercoaster effect. Nonetheless, the governments of both the Yemen Arab Republic (YAR) and People's Democratic Republic of Yemen (PDRY) failed to develop a sustainable economy for their citizens. The country's lack of infrastructure, especially for water, sanitation, and hygiene (WASH) and diversity of crops, directly contributed to the poor humanitarian situation in the country today.

To begin, this chapter will discuss the pre-unification period in regards to the establishment of the YAR and PDRY. The chapter will then pivot to discuss the history of the unification and the events that occurred between 1990 and 2011. The final section will explore the happenings in Yemen after the Arab Spring in 2011 and the current situation in Yemen. The history is divided into these three subsections because the different government structures ruled the country that played a pivotal role in how environmental insecurities were pushed aside or not considered. The decisions of these governments and the conflicts that revolved around them are important to explore in order to understand why Yemen faces the environmental insecurities that it does.

A. PRE-UNIFICATION PERIOD

Post-1962 Yemen was different country than the Yemen of today. To start with, the territory of the current country existed under different authorities. In the South, Yemen was called the Aden Colony, broken up into an Eastern and Western Protectorate, and was under British colonial rule until 1962.⁵¹ In the North, the YAR was well established by the

⁵¹ Robert R. Robbins, "The Legal Status of Aden Colony and the Aden Protectorate," *The American Journal of International Law* 33, no. 4 (1939): 702, <https://doi.org/10.2307/2192881>.

Mutawakkilite Imamate following World War I and the Treaty of Taif.⁵² From 1962–1968, both regions experienced civil wars that would shape their countries for the next few decades and served as a proxy for the Cold War between USSR and U.S., in addition to Egypt and Saudi Arabia.⁵³ In the following decades, both governments who ruled the two regions “claimed to be the bearers of nationalist legitimacy and to represent the whole country.”⁵⁴ This section will discuss the histories of both regions until their unification in 1990. It will become clear that the ROY of today was divided into two very different regions and that the inactions of both in regard to environmental issues contributed to the current predicament.

1. Southern Yemen—PDRY

Prior to 1962, Britain played a key role in the development of South Yemen. The British utilized the port of Aden as a crucial point to connect vessels navigating from the Suez Canal to India.⁵⁵ Although the British did not directly rule all of southern Yemen, they generally controlled much of the decision-making processes up until this point. The British government envisioned a much more unified protectorate by 1962, but, instead, the area dove into a civil war aimed at achieving liberation from British rule. Not unlike many other Middle Eastern regions where the British exercised colonial powers after WWI and WWII, setting up Yemen for success after the colonial powers were gone was not high on their list of priorities.

The first civil war lasted approximately five years from 1962–1967. Two main fronts developed against the British colonizers: the Front for the Liberation of South Yemen (FLOSY) and the National Liberation Front (NLF).⁵⁶ In 1967, the British Federal Army had enough insight to realize the NLF would succeed over FLOSY and established a truce in order to retain some semblance of power in the newly established region. The ideologies of the NLF

⁵² Asher Orkaby, *Beyond the Arab Cold War: The International History of the Yemen Civil War, 1962–68*, Oxford Studies in International History (Cambridge: Oxford University Press, 2017), 103.

⁵³ Orkaby, 22.

⁵⁴ Fred Halliday, “The Formation of Yemeni Nationalism: Initial Reflections,” in *Rethinking Nationalism in the Arab Middle East*, ed. James P. Jankowski and I. Gershoni (New York: Columbia University Press, 1997), 32.

⁵⁵ Asher Orkaby, “The North Yemen Civil War and the Failure of the Federation of South Arabia,” *Middle Eastern Studies* 53, no. 1 (January 2017): 69, <https://doi.org/10.1080/00263206.2016.1198330>.

⁵⁶ Lackner, *Yemen in Crisis*, 98.

and FLOSY were fairly similar: anti-British. However, both FLOSY and the NLF developed socialist tendencies as FLOSY was strongly affected by Nasserism and the NLF became affected by the Movement of Arab Nationalists (MAN).⁵⁷ The NLF won the war and the UK departed Yemen on 30 November 1967, the same day the PDRY was officially established.⁵⁸ Due to the lack of a permanent border between the South and North, ideologies mixed during the 1960s as members of FLOSY migrated to Northern Yemen upon their defeat and attempted to spread their left-leaning ways in the YAR. This was surprising as the guardians of FLOSY could have stayed in South Yemen and helped the NLF in the development of their own socialist agenda. Their hopes of creating socialism in both the North and the South were not successful. By the 1970s, the South became known throughout the world as the PDRY and fully embraced the socialist ideology. The leadership structure of the PDRY consisted of a President, Vice President, and Prime Minister.

Identifying who led FLOSY and NLF during the civil war was a difficult task. Following the civil war, factions in the NLF split down the middle and it was a challenge for a true leader to appear. The leadership became less murky in 1970 when Salem Ruba'i Ali, or Salmeen, became the leader of the Yemeni Socialist Party (YSP) and PDRY.⁵⁹ A clear representation of the PDRY government was finally established. He was very popular among the people of the PDRY but he fell out of favor with the NLF when he continued to circumvent party structures in order to pursue his personal objectives.⁶⁰ Salmeen was assassinated in 1978 and Abdul Fattah Ismail became the leader of the PDRY until the ascendancy of Ali Salem al-Beedh following the events in 1986 that will be discussed further below.

The people of the PDRY were primarily employed in subsistence farming and fisheries. Farmers were heavily dependent on rain-fed agriculture. The British had established

⁵⁷ Lackner, 99; Tia Culley and Steve Marsh, "'To Recognise, or Not to Recognise': Macmillan's Yemen Arab Republic Question," *Middle Eastern Studies* 55, no. 3 (May 2019): 342, <https://doi.org/10.1080/00263206.2018.1547965>.

⁵⁸ Orkaby, "The North Yemen Civil War and the Failure of the Federation of South Arabia," 81.

⁵⁹ Lackner, *Yemen in Crisis*, 112.

⁶⁰ Lackner, 112.

functional spate irrigation structures in rural areas in order to help assist this region.⁶¹ Spate irrigation is a technique in which rainwater is cultivated and held in storage areas then diverted to areas that require the water.⁶² Meanwhile, the national capital, Aden, became an international hub due to its deep-water port and international airport. The city provided the entire country with world-renowned medical facilities and an entry point for travelers to reach the YAR in the north until 1967 when the Suez Canal was closed.⁶³ As the PDRY further developed in the 1980s, the government decided to nationalize almost all private businesses in order to build revenue.⁶⁴ This initiative focused mainly on agriculture, fisheries, and infrastructure. The South struggled to attract international financial support due to the socialist nature of the state; it could only rely on the USSR until the unification of Yemen in the early 1990s.⁶⁵

Even though the socialist state failed to become an economic regional power, the PDRY succeeded in many other elements during its time in power. Education, land ownership, secularism, and women's rights were all very successful in the South compared to its neighbor to the North and many other countries in the Middle East. Tackling the illiteracy rate was a key goal of the regime. The government wanted to ensure all people had an equal opportunity to learn and seek higher education. Outside of Tunisia, the PDRY's 1974 Family Law was the most progressive for women.⁶⁶ Women had rights very similar to men in which they could initiate divorce, hold jobs, and avoid polygamy in their relationships. Women played a powerful role in the PDRY society.

Politics within the PDRY was dangerous for those who chose to run for office, as there was hardly any peace during the election processes. The lives of everyday citizens were generally unaffected, but turmoil persisted at the bureaucratic level. When the NLF morphed

⁶¹ Lackner, 104.

⁶² Derek Marchant et al., "Simulating Water Allocation and Cropping Decisions in Yemen's Abyan Delta Spate Irrigation System," *Water* 10, no. 2 (2018): 121, 125, <https://doi.org/10.3390/w10020121>.

⁶³ Orkaby, "The North Yemen Civil War and the Failure of the Federation of South Arabia," 74–77.

⁶⁴ Lackner, *Yemen in Crisis*, 106.

⁶⁵ Lackner, 106–7.

⁶⁶ Lackner, 108.

into the YSP in 1978, political violence only intensified.⁶⁷ Ali Nasser Mohammad served as the prime minister of the PDRY beginning in 1971, but in 1985 he gained the roles of secretary general of the YSP and state president.⁶⁸ In 1986, during the “13 January Events,” Ali Nasser attempted to massacre every enemy in high levels of the government.⁶⁹ Although the massacre was not completely successful, a few high-ranking members of Ali Nasser’s regime, including the current President of Yemen, Abdu Rabbu Mansur Hadi, fled the PDRY for sanctuary in the YAR and Ali al-Beedh was victorious and became the country’s leader in 1986.⁷⁰ This event marked a significant change of life for the worse for those living in the PDRY, due to a breakdown of most government functions. In addition, the rest of the world began to see the decline of Communism as the USSR began to face their own economic battles. As the PDRY discovered oil in the late 1980s their economy rebounded slightly, but negotiations to unify with the YAR had already begun.

2. Northern Yemen—YAR

Between WWI and 1962, the northern region was ruled by three separate Imams who were constantly threatened with eviction by the people. In 1962, a military coup overthrew the third Imam and attempted to establish the YAR.⁷¹ Instead, the country fell into a civil war that lasted eight years between those who supported the ruling of the Imams and those who supported a republican regime. The republican regime was supported by officers who had been educated in Egypt and understood the rise of Nasserism and Arab Nationalism, and hoped to spread it in Yemen.⁷² Egypt supported the civil war on the side of the republicans until 1967 when Egyptians were surprised by the Six Day War from Israel. At this juncture,

⁶⁷ Lackner, 113.

⁶⁸ Lackner, 113.

⁶⁹ Lackner, 113.

⁷⁰ Benoit Challand and Joshua Rogers, “The Political Economy of Local Governance in Yemen: Past and Present,” *Contemporary Arab Affairs* 13, no. 4 (December 2020): 56, <https://doi.org/10.1525/caa.2020.13.4.45>.

⁷¹ Orkaby, “The North Yemen Civil War and the Failure of the Federation of South Arabia,” 72.

⁷² Rashid Khalidi, “Chapter 8: The Superpowers and the Cold War in the Middle East,” in *The Middle East and the United States: History, Politics, and Ideologies*, ed. David W. Lesch and Mark L. Haas, Sixth edition. (New York, NY: Routledge, 2018), 124.

the region experiences two foreign interventions. Saudi Arabia intervened to support the Imams, using religion as a justification for their intervention. Egypt intervened to establish a more republican and communist ideology in the South.⁷³ As the communist government began to rise in the South, a right-of-center government began to rise in the North.

Instability within the ranks of the YAR persisted during the 1970s. The civil war ended in 1970 due to the withdrawal of Egyptian forces, the overthrow of their puppet-President, al-Sallal, and the official end of the imamate.⁷⁴ A series of coups and assassinations in the late 1960s through 1970s resulted in the rise of Colonel Ali Abdullah Saleh in July of 1978.⁷⁵ With the removal of British forces from the South during the 1960s, most Western influence was removed from both regions.⁷⁶ According to Lackner, when Yemenis recount this period in their history, the Yemeni elders tend to skip over the rulers except for one in particular.⁷⁷ His name was Ibrahim al-Hamdi and he has been immortalized in their minds as the perfect ruler for the YAR due to his ambition to develop a fair and independent Yemen. He ruled from 1974 and was assassinated in 1977 before any of these high hopes could be thoroughly created.⁷⁸ Outside of Hamdi, Saleh became the most powerful leader of the YAR until unification.

The YAR economy depended on patronage and remittances. Oil has never been a major provider of money for the government due to limited oil reserves within its borders. Saleh was unable to build a government that could financially support the people because so many Yemeni worked outside the country in order to provide their families with living wages.⁷⁹ Between 1979 to 2000, only 20% of the population moved from loose governance

⁷³ Lackner, *Yemen in Crisis*, 99.

⁷⁴ Robert D. Burrowes, "Prelude to Unification: The Yemen Arab Republic, 1962–1990," *International Journal of Middle East Studies* 23, no. 4 (November 1991): 486, <https://doi.org/10.1017/S0020743800023382>.

⁷⁵ Lackner, *Yemen in Crisis*, 101.

⁷⁶ Culley and Marsh, "'To Recognise, or Not to Recognise,'" 351.

⁷⁷ Lackner, *Yemen in Crisis*, 101.

⁷⁸ Lackner, 101.

⁷⁹ Francesco Cavatorta and Vincent Durac, "Yemen," in *Civil Society and Democratization in the Arab World* (Routledge, 2011), 97–99, <https://doi.org/10.4324/9780203850589-12>.

in rural domains to urban cities with more governance.⁸⁰ Due to open borders with Saudi Arabia until 1991, the government lacked the ability to collect taxes on many Yemeni and was unable to establish a cash flow to provide services that many other governments in the world could provide from taxation.⁸¹ Yemenis worked in Saudi Arabia and paid zero taxes towards the Yemeni government. Due to a lack of tax collection, governance, and the ability to provide adequate infrastructure for water, sanitation, electricity, and farming, many Yemenis used their own money to invest in themselves. With no government regulation or accountability, natural resources began to be over exploited. Even though many Yemenis worked abroad, their families needed food so they relied on subsistence farming. This meant that many Yemeni needed to invest in a diesel pump for extracting groundwater. This will be further discussed in Chapter 3.

Islam is a significant part of Yemen and two major sects have defined the majority of its population. In the North, a version of Shia Islam called Zaydism exists while in the South Sunni Shafi'sm is more prevalent.⁸² The key difference between the belief of Twelver Shiism, prevalent in Iran, and Zaydi Shiism, also known as the Fivers, is that the Zaydis believe their founder to be Zayd bin 'Ali, the great grandson of Ali bin Abi Talib, who revolted after the death of Imam al-Husayn's death in Karbala.⁸³ Due to its close proximity to Saudi Arabia, the North found many of their education opportunities to be funded and/or provided by Saudi Arabia. The intrusion of Wahhabism had a direct effect on the belief systems instilled in public education. The spread of movements like the Houthi movement can be directly attributed to the imposition of Saudi religious ideologies enforced on those who believed differently, especially the Zaydis in the North.⁸⁴ In addition, urban cities grew as Yemenis in the North

⁸⁰ "Sa'da in the North Yemeni Context," in *Regime and Periphery in Northern Yemen*, by Barak A Salmoni, Bryce Loidolt, and Madeleine Wells (RAND Corporation, 2010), 21, <https://doi.org/10.7249/mg962dia.11>.

⁸¹ Lackner, *Yemen in Crisis*, 102.

⁸² Marieke Brandt, *Tribes and Politics in Yemen: A History of the Houthi Conflict* (Oxford ; New York: Oxford University Press, 2017), 100.

⁸³ Brandt, 100; Thomas Juneau, "Iran's Policy Towards the Houthis in Yemen: A Limited Return on a Modest Investment," *International Affairs (London)* 92, no. 3 (May 2016): 651, <https://doi.org/10.1111/1468-2346.12599>.

⁸⁴ Ric Neo, "Religious Securitisation and Institutionalised Sectarianism in Saudi Arabia," *Critical Studies on Security* 8, no. 3 (September 2020): 208, 211, <https://doi.org/10.1080/21624887.2020.1795479>.

moved from rural areas in order to find a better quality of life and jobs. Many grew discouraged when their move was in vain and they were unable to find employment or additional education opportunities outside of those provided by Sunni-dominant ideology.

Tribalism played a role in the development of Northern Yemen and continues till today. Tribalism is difficult to define due to the way scholars have oversimplified its meaning to make sense in colonial terms in the past few decades.⁸⁵ Yemeni tribalism, not unlike many other Middle East and North African (MENA) countries, was a way of life for both regions in Yemen before the establishment of the PDRY and YAR. In the PDRY, tribalism was officially rooted out in order to create space for a more socialist society. In reality, however, tribalism was never really removed from any aspect of the Yemeni's lives.⁸⁶ The conflict surrounding the Houthis originally arose from tribal disputes in the North but the conflict itself cannot be attributed solely to tribal tendencies.⁸⁷ Tribes in Yemen are formed from a variety of factors: common ancestry, economic means of productivity, honorable circumstances, chieftain lineage, and laws.⁸⁸ The government did their best to distribute representation among all factions in government positions, but nepotism and favoritism consistent with families or tribes persisted.⁸⁹ This problem persists with the current government of Yemen and there does not appear to be any end in sight for this type of behavior.

B. UNIFICATION TO 9/11

It would be naive to think that the borders between the PDRY and YAR were not porous. Over time, families and tribes merged through trade, marriages, and other arrangements, not unlike many other countries in the Middle East. These relationships were able to pull the two countries slightly closer together.⁹⁰ Although not the sole reason for the

⁸⁵ Ahmad Mohammadpour and Kamal Soleimani, "Interrogating the Tribal: The Aporia of 'Tribalism' in the Sociological Study of the Middle East," *The British Journal of Sociology* 70, no. 5 (December 2019): 1805, <https://doi.org/10.1111/1468-4446.12656>.

⁸⁶ Jillian Schwedler, "Yemen's Aborted Opening," *Journal of Democracy* 13, no. 4 (October 2002): 51–52, <https://doi.org/10.1353/jod.2002.0073>.

⁸⁷ Brandt, *Tribes and Politics in Yemen*, 15.

⁸⁸ Brandt, 18–20.

⁸⁹ Lackner, *Yemen in Crisis*, 110.

⁹⁰ Lackner, 115.

unification in 1990, this was one of the main contributing factors. Other reasons include the discovery of oil on the country's borders and the steady decline of socialism in the world as a whole.⁹¹ Saleh was able to hastily draw the two countries together and solidify his power using patron-client relationships to make his power more concrete instead of working to create a new, democratic country that could be beneficial for all of its citizens.⁹² The countries had a choice either to go to war or overcome their differences and find a solution. The leaders chose the latter.

Helen Lackner sums up the unification process and how quickly it fell into place in November 1989:

As the negotiations were still under debate, few expected the sudden and complete unification which was agreed between Ali Abdullah Saleh and Ali Salem al-Beedh on 13 November 1989. Discussion within the ruling groups on both sides of the border had favoured a federal approach to unification based on a standard formula of allocating responsibility for foreign affairs and overall national security to agencies representing the whole country, while each existing entity would retain autonomy for economic policy and internal administration. Increasingly frequent meetings between the leadership of the two states ended with a *tête à tête* between al-Beedh and Saleh which concluded with a late-night announcement of full unification.⁹³

The era from 1990–1994 involved its own set of challenges, as the countries attempted to merge. Two key issues that ran relatively smoothly under the PDRY's ruling administration before unification were disrupted: the ROY under Saleh regressed in its openness towards women and inflation hit the country extremely hard.⁹⁴ The honeymoon phase of the unification did not last for very long, especially for women. When unification occurred, the government of the PDRY was hoping for their liberal stance on women to carry over into the new society established under the Republic of Yemen (ROY). Economically, the ROY was in great pain. President Saleh erred by deciding to support the Iraqi regime during the first

⁹¹ Lackner, 117.

⁹² Brian M. Perkins, "Yemen: Between Revolution and Regression," *Studies in Conflict and Terrorism* 40, no. 4 (2017): 304, <https://doi.org/10.1080/1057610X.2016.1205368>.

⁹³ Lackner, *Yemen in Crisis*, 117.

⁹⁴ Lackner, 118–19.

Gulf War.⁹⁵ The Yemenis working around the Middle East, especially in Saudi Arabia, were forced to return home to the ROY with no job prospects, detrimentally affecting the remittances their families depended on for their welfare.

Unfortunately, the peace between the two country's leaders lasted only a few years when the unified country fell into its first civil war in 1994.⁹⁶ Al-Beedh, who had served as vice president of the ROY, attempted to disconnect from the ROY in 1994 and create the Democratic Republican of Yemen (DRY).⁹⁷ His efforts were unsuccessful and many of the people who supported al-Beedh would go into hiding until 2011 when protests erupted throughout the country. President Saleh became the ultimate leader of Yemen after he and the General People's Congress (GPC) defeated al-Beedh and the YSP in the civil war of 1994. Saleh decided to revert the country to his previous system of governance in the YAR: a patronage system. The system relied on companies, tribal leaders, and business owners being friendly with Saleh in order to be successful.⁹⁸ Although the country proclaimed itself to be democratic and shared seats in the government with parties like YSP, the Islah, Baathist, and Zaydis, the real powerhouse in the country became the GPC. Realizing his mistake during the Gulf War, President Saleh was one of the first people in the Middle East to call President George W. Bush in Washington to give his unwavering support to the United States after 9/11.⁹⁹ This allowed Yemen to receive military aid from various countries across the world. Yet, the ROY continued to stagnate economically and Saleh's leadership proved to be more autocratic and less democratic in the long run.

C. 9/11 TO THE ARAB SPRING

During Saleh's tenure post-9/11, various political organizations took root in the ROY. Among these included the Islah and the Zaydi Houthi movement. A little more than half of

⁹⁵ Judith Miller, "Mideast Tensions; Yemen's Chief Assails Saudis On Gulf Crisis," *The New York Times*, October 26, 1990, sec. A.

⁹⁶ Perkins, "Yemen," 308.

⁹⁷ Cavatorta and Durac, "Yemen," 100.

⁹⁸ Perkins, "Yemen," 305.

⁹⁹ Lackner, *Yemen in Crisis*, xxiv.

the population of the ROY is estimated to be Sunni Muslim while the remaining population is estimated to be Zaydis, a part of Shia Islam.¹⁰⁰ Exact numbers are not known due to a lack of surveys conducted on the population of the ROY in recent years. Islah is a political Islam movement that was created in the 1990s by tribal and religious leaders, mainly headed by Shaykh Abd Allah ibn Hussayn al-Ahmar, in order to compete against the GPC and YSP.¹⁰¹ Islah received much of its funding from Saudi Arabia and desired for the ROY legal system to be based on sharia.¹⁰² Islah is an anti-communist political group with a mix of Islamist doctrine, but they are not equivalent to a party like the Muslim Brotherhood.¹⁰³ Zaydism is closely associated with the Houthi movement and is considered to be a part of Shia Islam but they diverge in the belief that Imams are infallible and legitimized by Allah.¹⁰⁴ These two groups served as the main opposing political parties to Saleh's GPC until the advent of the AQAP.

Although the Houthi name was not popular in the news until 2015, the group had actually begun fighting against the Saleh government a little over a decade before. The organization partook in six battles with the government between 2004 and 2010.¹⁰⁵ The movement grew in size following each fight. An interesting intervention came from Qatar during the fourth round of fighting. The country acted as a mediator to end the fighting, but Saleh did not approve of the Qatari's willingness to support him in his reconstruction efforts.¹⁰⁶ Saleh convinced himself that he could make Yemen successful without the support of other countries. His patronage system worked for him and his cronies. When a country that was succeeding on multiple economic fronts, like Qatar, came to his aid, he saw this as threat

¹⁰⁰ Office of International Religious Freedom, "Yemen 2019 International Religious Freedom Report" (US Department of State, 2019), 2, <https://www.state.gov/reports/2019-report-on-international-religious-freedom/yemen/>.

¹⁰¹ Jillian Schwedler, "The Islah Party in Yemen," in *Islamic Activism: A Social Movement Theory Approach*, by Quintan Wiktorowicz (Indiana University Press, 2004), 212.

¹⁰² Lackner, *Yemen in Crisis*, 129.

¹⁰³ Charles Schmitz, "Yemen's National Dialogue" (Middle East Institute, March 10, 2014), 15, <https://www.mei.edu/publications/yemens-national-dialogue>.

¹⁰⁴ Lackner, *Yemen in Crisis*, 123.

¹⁰⁵ Lackner, 152.

¹⁰⁶ Lackner, 153.

to everything he had built.¹⁰⁷ The country continued on a downward spiral after each Houthi battle due to the destruction of hospitals, roads, homes, water systems, and electric grids.

After the sixth battle with the Houthis in 2010, the world began to hear rumblings that the Houthis were receiving financial backing from Iran.¹⁰⁸ This story played out across the world and was a defining moment for the Houthis. The Houthis were painted as an accessory movement to the Iranian government with no proof other than hearsay by some researchers.¹⁰⁹ However, some believe the Quds Forces of Iran are working closely with Ansar Allah, another common name for the Houthis.¹¹⁰ Recently, the Houthis have been identified as “more of a strategic partner than a proxy” of Iran.¹¹¹ The Houthi movement wanted to unseat the Saleh government but they were not pushing for a more democratic system.¹¹² Whenever the Houthis occupied a new area, they eradicated those who resisted and burned down the dwellings they occupied. On the other hand, Saleh and his military did not show any less violent use of force towards the Houthis. As the years progressed and their ideas narrowed into a more solidified movement, a consensus was reached that the Houthis ultimately wanted a more autocratic system centered around sharia.¹¹³ They were beginning to gain land in the North to make their desires more of a reality after every clash with the

¹⁰⁷ Lackner, 153.

¹⁰⁸ Robert J. Bunker and Alma Keshavarz, “Made in Yemen: Houthi Exhibition Showcase New Drones, Missiles, and Naval Mines,” *Small Wars Journal*, April 8, 2021, <https://smallwarsjournal.com/jrnl/art/made-yemen-houthi-exhibition-showcase-new-drones-missiles-and-naval-mines>.

¹⁰⁹ Robert F. Worth, “Yemen Clashes Reflect North-South Tensions,” *The New York Times*, July 22, 2010, sec. World, <https://www.nytimes.com/2010/07/23/world/middleeast/23yemen.html>; Bruce Riedel, “A Pragmatic View on Yemen’s Houthis,” *Brookings Institution* (blog), January 11, 2021, <https://www.brookings.edu/blog/order-from-chaos/2021/01/11/a-pragmatic-view-on-yemens-houthis/>.

¹¹⁰ Afshon Ostovar, *Vanguard of the Imam: Religion, Politics, and Iran’s Revolutionary Guards* (New York, NY: Oxford University Press, 2018), 6; Trevor Johnston et al., “Could the Houthis Be the Next Hizballah?: Iranian Proxy Development in Yemen and the Future of the Houthi Movement” (Santa Monica, CA: RAND Corporation, 2020).

¹¹¹ Middle East Focus, “Hezbollah’s Regional Challenge,” *Middle East Focus*, pt. 12:03, accessed May 20, 2021, <https://podcasts.apple.com/us/podcast/middle-east-focus/id1289981629?i=1000522515444>; Juneau, “Iran’s Policy Towards the Houthis in Yemen,” 647.

¹¹² Afshon Ostovar, “Iran, Its Clients, and the Future of the Middle East: The Limits of Religion,” *International Affairs (London)* 94, no. 6 (November 2018): 1249–51, <https://doi.org/10.1093/ia/iiy185>.

¹¹³ Johnston et al., “Could the Houthis Be the Next Hizballah?,” 7–8.

government. By 2011, the country had been in clashes with the Houthis for more than six years.

D. ARAB SPRING TO PRESENT DAY

2011 began with protests around the MENA. Yemen was not spared from these events. With all that had occurred during the 2000s with skirmishes between the Houthis and the Yemen government, the protests were no surprise. The people of Yemen were fed up with the lack of resources, jobs, and economic prospects. Experts believe revolutions occur because people are tired of their government and see no other way for it to change except to hit the streets and stay there until a new government is formed.¹¹⁴ Saleh had ruled the country since 1991 and did not facilitate a prosperous life for those outside of his inner circle. Thus, revolution was inevitable in Yemen.

In the years leading up to the 2011 protests, the North and South developed into distinct problem areas for Saleh. The Houthi rebels obtained a large swath of land in the North. They merged forces with the Islah party after the protests in 2011 and their official slogan was launched in 2012: “God is great, Death to America, Death to Israel, Curse on the Jews, Victory for Islam.”¹¹⁵ In the South, a separatists movement had been established in 2006 by retired military and government officers from the PDRY who were no longer found relevant by the new Yemeni government following the 1994 civil war.¹¹⁶ During the protests of 2011, these Southern Separatists aspired to give governing another shot after seeing the haphazard way Saleh had run the country. They felt it was their turn to make decisions.¹¹⁷ In addition, the South began to struggle with food, finance, and fuel, also known as the “Triple F,” as the region experienced a series of droughts damaging many of their cash crops like coffee.¹¹⁸

¹¹⁴ Michael Axworthy, *Revolutionary Iran: A History of the Islamic Republic* (New York, New York: Oxford University Press, 2013), 130–31.

¹¹⁵ Lackner, *Yemen in Crisis*, 157; Perkins, “Yemen,” 307.

¹¹⁶ Lackner, *Yemen in Crisis*, 177.

¹¹⁷ Lackner, 177.

¹¹⁸ Lackner, 178.

The protesters began to press for a more democratic system and the desire to end corruption in the government.¹¹⁹

The protests were similar to those occurring in other parts of the MENA, but differed from them in some key ways. In Yemen, the movement was not centered in one major city. Rather, it was spread throughout the country in the North and the South.¹²⁰ This shows that people in many urban centers thought the time had come for Saleh to end his reign. It cannot be said that the protests were any larger in Yemen than elsewhere in the MENA region, but the fact that they were widespread throughout the country leads to the second major difference. Almost every walk of life in Yemen were represented at the 2011 protests.¹²¹ Tribal communities, farmers, educated citizens, and everyone in between were represented, but they were quickly discarded during the negotiation process when the protests stopped.¹²² If there was ever a time for change in Yemen, it would be at this juncture.

The protests in Yemen began in January of 2011, but Yemen did not have a new President until February of 2012. During the course of the year, there were several events that showed Saleh's unwillingness to step down. The UN and GCC stepped in to dictate how the country could survive the protests and determined that Saleh would be unable to be the leader to assist them in this process. The GCC Initiative was created in April 2011 to allow the country to create a new constitution and elect a new leader.¹²³ Saleh, unsurprisingly, did not see this as a credible option for him and his regime. In June 2011, there was an attempt on his life at a mosque that nearly killed him.¹²⁴ Fighting ensued and eventually, the GCC initiative was signed in November of 2011.¹²⁵ The initiative allowed for former Vice President Hadi

¹¹⁹ Caspian Report, *Origins of the Crisis in Yemen*, 2015, pt. 1:32, <https://www.youtube.com/watch?v=7VGo92WWeJ4>.

¹²⁰ Perkins, "Yemen," 311.

¹²¹ Lackner, *Yemen in Crisis*, 36.

¹²² Fakirah, "Yemen Conflict," 6.

¹²³ Marwa Rashad, "Yemen's Saleh Signs Deal to Give up Power," *Reuters*, November 23, 2011, <https://www.reuters.com/article/us-yemen-idUSTRE7AM0D020111123>.

¹²⁴ "Yemen: President Saleh Injured in Attack on Palace," *BBC News*, June 3, 2011, sec. Middle East, <https://www.bbc.com/news/world-middle-east-13638787>.

¹²⁵ Caspian Report, *Origins of the Crisis in Yemen*, pt. 5:53.

to become the interim president for two years until a new constitution was created and another presidential election would be held. However, Saleh retained control of his political party, the GPC, and continued to wield power behind Hadi's back.¹²⁶ The attempt at cooperation and unity within the country would begin a full year after the initial protests.

The National Dialogue Conference (NDC) was a potential step towards stability in Yemen. This conference, beginning in March 2013 and ending in January 2014, was seen as a great effort to bring all walks of life in Yemen together to forge a new plan for the country.¹²⁷ This conference commenced with high aspirations and it ended in complete failure. The conference had two main goals: ending the transitional period with a fresh constitution and conducting national elections. Both failed to come to fruition.¹²⁸ The cooperation efforts were not going well at this juncture due to so many different actors wanting to take the ROY in their own direction. The Houthis desired for a larger majority of land and resources in the North and thus seized the capital of Sana'a; leaving the South unprotected to Al-Qaeda of the Arabian Peninsula (AQAP) forces.¹²⁹ With everyone trying to take control, the country lacked clear governance on who would determine their fate.

The seventh war between the Houthis and the ROY officially began in January of 2015 when the Houthis interrupted the delivery of the finalized constitution with the proposal to divide Yemen into six regions under the Hadi government. Many foresaw the government returning power to Saleh; this would mean the eradication of the Houthis in the North.¹³⁰ Hadi initially used his military forces to fight in the North, while abandoning many in the South to AQAP. He subsequently resigned and fled Yemen for Saudi Arabia, where he remains today.¹³¹ While Saleh was out of the Hadi government, Saleh saw an opportunity to

¹²⁶ Mareike Transfeld, "Political Bargaining and Violent Conflict: Shifting Elite Alliances as the Decisive Factor in Yemen's Transformation," *Mediterranean Politics* (Frank Cass & Co.) 21, no. 1 (January 2016): 152, <https://doi.org/10.1080/13629395.2015.1081454>.

¹²⁷ Farea Al-Muslimi, "The Sana'a Illusion," *Foreign Affairs*, July 30, 2014, <https://www.foreignaffairs.com/articles/yemen/2014-07-30/sanaa-illusion>.

¹²⁸ Schmitz, "Yemen's National Dialogue," 6.

¹²⁹ Caspian Report, *Origins of the Crisis in Yemen*, pt. 9:24.

¹³⁰ Lackner, *Yemen in Crisis*, 51.

¹³¹ Caspian Report, *Origins of the Crisis in Yemen*, pt. 11:38.

align with the Houthis. After fighting began, the situation became ever more confusing when Saleh and the Houthis joined forces. Saleh believed that, with the recent spread of the Houthi movement across the North, his best chances of retaining power in Yemen would be with the Houthis. However, he was wrong.

AQAP also participated in the conflict. In 2015, they took up arms against the Houthis and attempted to create another Sunni-Shia divide.¹³² Although KSA and AQAP are fighting the Houthis, the Saudis have made it clear they are not aligning themselves with AQAP.¹³³ AQAP continues to play a substantial role as one of the three ruling powers in Yemen. Figure 3 illustrates where the Houthis expanded during the civil war.

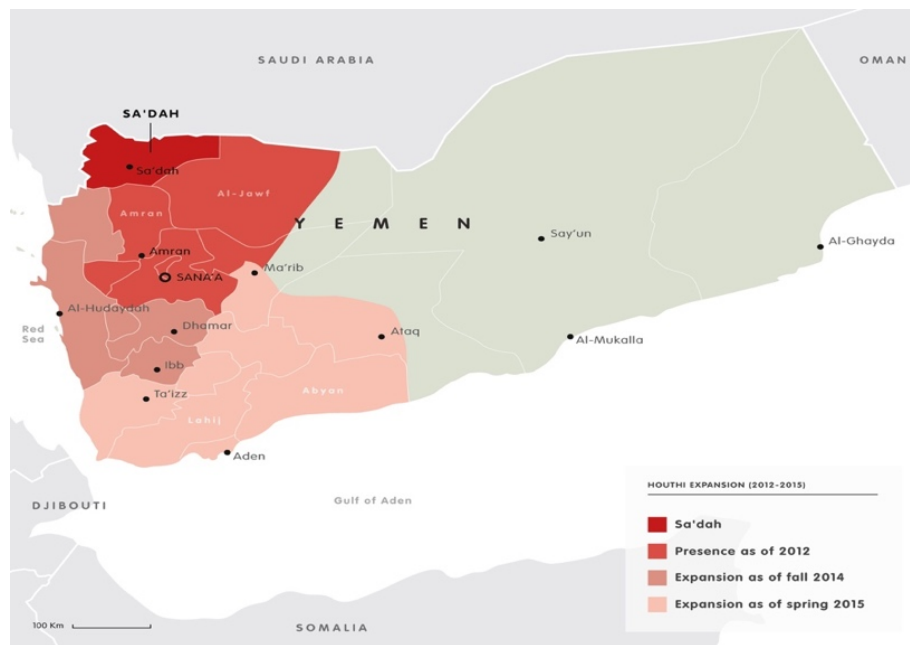


Figure 3. Houthi Expansion from 2012–2015¹³⁴

¹³² Ayisha Amr, “How Al Qaeda Rules in Yemen,” *Foreign Affairs*, October 28, 2015, <https://www.foreignaffairs.com/articles/yemen/2015-10-28/how-al-qaeda-rules-yemen>.

¹³³ Daniel L. Byman, “The U.S.-Saudi Arabia Counterterrorism Relationship,” § House Committee on Foreign Affairs (2016), 4, <https://www.brookings.edu/testimonies/the-u-s-saudi-arabia-counterterrorism-relationship/>.

¹³⁴ Source: Adam Baron, “Mapping the Yemen Conflict,” European Council on Foreign Relations, October 19, 2015, <https://ecfr.eu/special/yemen/>.

Additional impediments toward cooperation emerged after the 2015 re-eruption of violence throughout the country. These include foreign involvement in the conflict. Some observers have come to the conclusion that Saudi Arabia and the U.S. back the Hadi-led government, the UAE backs the Southern separatists, and the Houthis are backed by Iran.¹³⁵ Leaders from the former PDRY in the South also began to appear and demand a return to the old days; a separate North and South Yemen.¹³⁶ The complexity of the situation does not allow for a clear path towards cooperation between anyone in the region. Additionally, while these proxy wars are playing out, the interests of the Yemenis, who began the protests in 2011, are being left behind.

Today, Yemen is mostly controlled and influenced by the Hadi government. The Houthis maintain a stronghold in the North, which was predominantly the territory of the YAR before the ROY was established. AQAP has several other strongholds in the center of the country and the Southern Transition Council (STC) maintains control of two large southern cities.¹³⁷ The conflict has grown disturbingly similar to Syria, in that a proxy war has erupted between Saudi Arabia and Iran, moving from a conflict between characters to a conflict between political parties causing a full-blown civil war within its borders.¹³⁸ Meanwhile, unemployment has skyrocketed, birth rates have soared, educational systems have failed and morale is at an all-time low.¹³⁹ Yemen is struggling in almost every aspect of its life.

The country has a long way to go before it can be controlled by one force. Figure 4 shows the multiple forces in control of Yemen. The multiple forces existing within the borders are why dividing the country into six regions looked so amenable during the NDC.

¹³⁵ Stephen Seche, "Iran, Yemen and the Gulf Cooperation Council," *Hampton Roads International Security Quarterly*, October 2015, 5.

¹³⁶ Transfeld, "Political Bargaining and Violent Conflict," 161.

¹³⁷ Jeremy M Sharp, "Yemen: Civil War and Regional Intervention," CRS (Washington, D.C: Congressional Research Service, April 23, 2020), 1, <https://crsreports.congress.gov/product/pdf/R/R43960>.

¹³⁸ Caspian Report, *Origins of the Crisis in Yemen*, pt. 13:05.

¹³⁹ Perkins, "Yemen," 309.

Yemen's Front Lines

Territorial control and influence as of February 2021

- Government control
- Southern Transitional Council control
- Al-Qaeda in the Arabian Peninsula (AQAP) control
- Government influence
- Houthi control
- AQAP influence

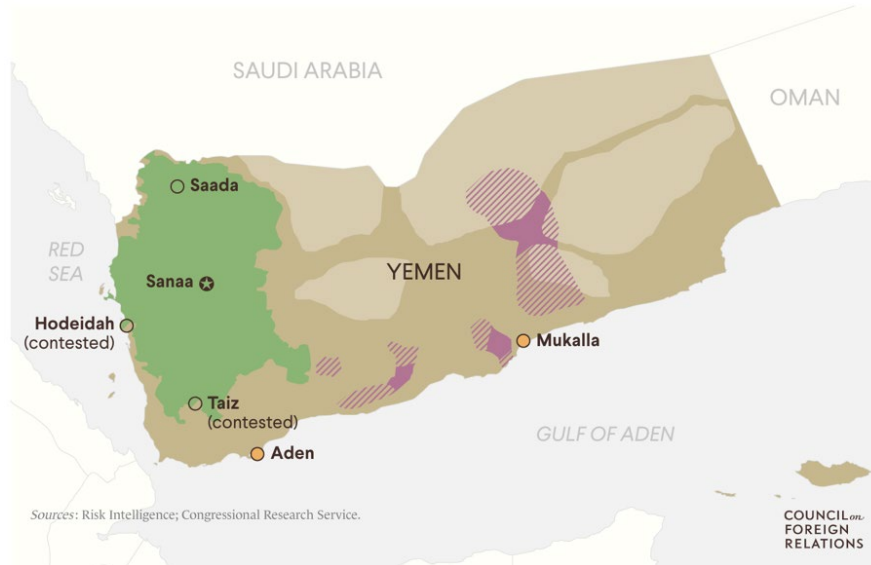


Figure 4. Current Front Lines of Forces in Yemen¹⁴⁰

E. CONCLUSION

The history of Yemen is not straightforward. There are no clear-cut allegiances. Bonds between political groups morph and change over time. Enemies become friends and friends become enemies. The history of this country matters because it demonstrates that the ROY, YAR, and the PDRY failed to effectively create institutions to take care of their citizens. The country's political instability, coupled with many rulers' limited efforts to improve the lives of the general population, meant that the governments failed to create WASH infrastructure, roads, hospitals, and effective agriculture techniques, or an effective bureaucracy where people could voice their concerns.

History causes us to look back in time and try to figure out what went wrong. An article in *The Atlantic* in 2002 poses this very question for people in the Middle East. The people in MENA, especially Yemen, need to stop asking "Who did this to us?" and instead

¹⁴⁰ Source: Kali Robinson, "Yemen's Tragedy: War, Stalemate, and Suffering," Council on Foreign Relations, February 5, 2021, <https://www.cfr.org/background/yemen-crisis>.

focus on “What did we do wrong?” and “How can we fix this?” because the sooner they stop focusing on blame, the sooner they can begin repairing their country.¹⁴¹ Congress heard testimony from the Honorable Mary Beth Long in October of 2015 in which she explained although Saudi Arabia had good intentions to protect itself from the Houthi border threat, they lacked the foresight for a clear endgame.¹⁴² The country has two major problems: lack of government, who can provide the bare minimum infrastructure like WASH, and insecurity. In order for the people to feel like their country can provide some sort of future, there needs to be a government worthy of relying on. The next chapter will provide context on how environmental insecurities contribute to the ongoing conflict and how they are being used as weapons against the people in Yemen.

¹⁴¹ Bernard Lewis, “What Went Wrong?,” *The Atlantic*, January 1, 2002, <https://www.theatlantic.com/magazine/archive/2002/01/what-went-wrong/302387/>.

¹⁴² “The U.S. Role and Strategy in the Middle East: Yemen and the Countries of the Gulf Cooperation Council,” Pub. L. No. 114–812, § Committee on Foreign Relations, 48 (2015), 14.

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III. ENVIRONMENTAL ISSUES FACING YEMEN

Environmental security issues add to the complexity of Yemen's history. Since independence in 1962, the ROY and its predecessor states have failed to sufficiently develop vital infrastructure for water and food. Today, approximately 20.7 million people are struggling to find drinkable water and suitable food for consumption within the borders of Yemen.¹⁴³ This chapter will examine the multiple environmental insecurities that exist in Yemen, including water insecurity, famine, and migration as an adaptive response. Then, the chapter will answer the questions pertaining to this thesis. How do environmental insecurity issues affect the civil war? Did environmental security issues exist before the war? Do they exist as a by-product of the war? Or, were they created as a tool for the war? The evidence shows that environmental insecurities have exacerbated the ongoing civil war and are used as a tool during fighting. The chapter also finds that, although these issues require immediate attention by the existing government and world partners, solving them will not end the conflict. The war must end to stop the disruption in migration, water and food supplies.

Three terms require definition before progressing any further: water scarcity, food insecurity, and migration. Simply put, water scarcity involves conditions "when water demand exceeds supply."¹⁴⁴ There are several ways in which a geographical area can become water scarce. The first, rainwater plays a significant role in Yemen, which is dependent on seasonal floods during the months of March through May.¹⁴⁵ As a result of climate change, rainwater is declining in Yemen and the frequency of droughts are increasing.¹⁴⁶ If there is less rainwater, then there is less opportunity for those who live in the area to collect and use it. Overconsumption of groundwater is a second cause of water

¹⁴³ UNICEF, "Yemen Country Office: Humanitarian Situation Report" (United Nations International Children's Emergency Fund, January 2021), 1.

¹⁴⁴ Varisco, "Pumping Yemen Dry," 317.

¹⁴⁵ Varisco, 320.

¹⁴⁶ Quentin Wodon et al., *Climate Change and Migration: Evidence from the Middle East and North Africa*, World Bank Study (Washington, D.C.: The World Bank, 2014), 5, <https://doi.org/10.1596/978-0-8213-9971-2>.

scarcity. Research shows that groundwater extraction rates in Yemen exceed the natural recharge rate by five times.¹⁴⁷ The third reason for water scarcity in Yemen, during its civil war, is targeting and destruction by local actors. The Saudi-led coalition in Yemen has been held responsible for 95 out of the 105 reported attacks on water infrastructure, including humanitarian storage units, water trucks, water pumps, water plants, and desalination systems.¹⁴⁸

A second term that should be defined is food insecurity. This means not knowing how, from where, or from whom your next meal will come.¹⁴⁹ Food insecurity arises for several reasons. Crop-eating insects like fall armyworms and desert locusts demolish many of Yemen's most important crops every year.¹⁵⁰ The price of food is another cause of food insecurity. In 2020, prices for rice were 83% higher and those for wheat were 50% higher than historical averages over the past decade.¹⁵¹ In addition, where conflict exists, food insecurity tends to follow, due to the inability of getting vital sustenance into a given area.¹⁵² Finally, climate change plays a role in food insecurity. As discussed before, a lack of water affects the ability of many crops to grow and be used as a food source. As Yemen and the MENA continue to increase in temperature and experience droughts, food insecurity increases.¹⁵³

The last term to be defined in this section is migration. Migration can occur into, out of, and within a country. Several factors lead to migration. Food and water insecurity

¹⁴⁷ Taher, "Groundwater Abstraction Management in Sana'a Basin, Yemen," 1593.

¹⁴⁸ Jeannie Sowers and Erika Weinthal, "Saudi-Led Attacks Devastated Yemen's Civilian Infrastructure, Dramatically Worsening the Humanitarian Crisis," *The Washington Post*, February 22, 2021.

¹⁴⁹ Mark Lowcock and David Beasley, "We've Averted Famine in the Past — We Must Do It Again," *The Times*, November 17, 2020, sec. comment, <https://www.unocha.org/story/op-ed-we%E2%80%99ve-averted-famine-past-%E2%80%93-we-must-do-it-again>.

¹⁵⁰ Global Network Against Food Crises and World Food Programme, "2020 Global Report on Food Crises," 188.

¹⁵¹ Global Network Against Food Crises and World Food Programme, 188.

¹⁵² Global Network Against Food Crises and World Food Programme, 189.

¹⁵³ Stephen Russell Fragaszy et al., "Drought Monitoring in the Middle East and North Africa (MENA) Region: Participatory Engagement to Inform Early Warning Systems," *Bulletin of the American Meteorological Society* 101, no. 7 (2020): E1149, <https://doi.org/10.1175/BAMS-D-18-0084.1>.

are two factors explained above that lead to migration. Yemen is currently home to 3.6 million internally displaced persons (IDP), over 275 thousand refugees from the West coast of Africa, and approximately 1.3 million IDP returnees from around the MENA.¹⁵⁴ IDP returnees means that Yemenis who were in other parts of MENA have returned to Yemen and are now identified as IDPs. Yemen is nonetheless experiencing a net loss of about 190 migrants per 1000 people.¹⁵⁵ In other words, more people are leaving Yemen than staying within the borders. Yemen's net migration into the country may be slowing as a factor of the persisting war.

A. ENVIRONMENTAL STRESSES BEFORE CIVIL WAR

Water scarcity, famine, and migration are not new environmental insecurity issues for the people of Yemen. Due to its climate and location in the world, these factors have always been prevalent. This next section will elaborate on how these problems arose. It is important to understand the suspected reasons for these insecurities to ascertain their effect on the civil war. The environmental insecurities explained below existed before the civil war even began.

1. Water Infrastructure

Water is vital to all life on Earth. Early inhabitants of Yemen knew this would be a struggle for them when they began searching the geographical area for this resource. Groundwater, climate change, topology, and lack of applicable laws all contributed to the reasoning behind a lack of water security in the ROY. This section discloses how water in Yemen was difficult to come by prior to the advent of the civil war.

Water in Yemen is scarce. Data shows that with its current population and annually renewed water resources being around 2.1 billion m³, Yemen has enough water for about 140 m³ per person every year, which is extremely distant from the norm in the Middle East

¹⁵⁴ Global Network Against Food Crises and World Food Programme, "2020 Global Report on Food Crises," 188.

¹⁵⁵ "Net Migration Rate," The CIA World Factbook, 2021, <https://www.cia.gov/the-world-factbook/field/net-migration-rate/country-comparison>.

and North Africa (MENA) of 1,250 m³ and worldwide of 7,500 m³.¹⁵⁶ With the increase in fuel-powered wells since the 1970s, groundwater has been depleted very quickly by private wells. In 1997, tensions arose in the Taiz valley leading to deaths over this precious resource.¹⁵⁷ The reason for the increase in use of water over time without any regulation falls on the desire of the people to raise cash crops instead of less water-intensive crops. The cash crops include fruit, vegetables, and qat, which happens to be the most profitable crop of them all in Yemen.¹⁵⁸ Water scarcity affects the ability to gain clean water, sanitation, and hygiene (WASH) but it also plays an active role in other environmental stresses like famine and migration.

The topology and climate of Yemen affects the way water is collected and dispersed throughout the region. The topographical regions of Yemen include the western mountains, the highlands in the middle of the country, and the dry east.¹⁵⁹ Water is scarce below the surface, but due to high elevations on the western side of the country, rainfall is prevalent.¹⁶⁰ Yemenis built terraces in the higher regions of Yemen in order to collect the rainfall and provide water for vegetables farmed at these altitudes. However, the system is intricate and time consuming, causing many Yemenis to invest in pumping water from groundwater.¹⁶¹ An important factor in this process is fuel; the pumps used are only operable by using fuel.¹⁶² Upper elevations receive a considerable amount of rain during monsoon seasons, but the ability to collect the water and use the runoff as a water source for irrigation and survivability was not adequately built for the region.¹⁶³ For example,

¹⁵⁶ Kamil A. Mahdi, Anna Würth, and Helen Lackner, *Yemen into the Twenty-First Century Continuity and Change*, 1st ed. (Reading, UK: Ithaca Press, 2007), 155.

¹⁵⁷ Mahdi, Würth, and Lackner, 156.

¹⁵⁸ WRENmedia Production, "New Agriculturist: Country Profile - Yemen," March 2010, <http://www.new-ag.info/en/country/profile.php?a=1371>.

¹⁵⁹ Brandt, *Tribes and Politics in Yemen*, 11.

¹⁶⁰ F. A. K. Farquharson, D. T. Plinston, and J. V. Sutcliffe, "Rainfall and Runoff in Yemen," *Hydrological Sciences Journal* 41, no. 5 (October 1996): 798, <https://doi.org/10.1080/02626669609491546>.

¹⁶¹ Farquharson, Plinston, and Sutcliffe, 799.

¹⁶² Varisco, "Agriculture in the Northern Highlands of Yemen," 189.

¹⁶³ Farquharson, Plinston, and Sutcliffe, "Rainfall and Runoff in Yemen," 805.

Sana'a is located approximately 2,200 m above sea level and lives are lost every year because of flash floods that inundate the city and surrounding areas.¹⁶⁴ Rainwater has the potential to be an important source of water for the country if adequately captured and stored.

Especially in the South, water stress began to increase after the unification of the country in 1990. The southern region's increase in the export of oil caused many farmers to stop using rainwater-based irrigation and made it easier for them to pump the water from groundwater sources due to the decreasing price of fuel.¹⁶⁵ Less than 60% of the urban population and only one-third of the rural population had access to water infrastructure provided by the government.¹⁶⁶ This led the remaining inhabitants to rely on water which was gathered with no government regulations in place, causing the Yemenis to pay very high prices for the important resource. In addition, water trucks have created a business opportunity of its own; people who own the trucks are able to drive around the countryside providing water at prices they deem fair without any regulation.¹⁶⁷ With an already very limited budget, many families were pushed further into poverty due to water stress.

Water did not cause war in Yemen during the years leading to the civil war in 2015. Water has not been the direct cause of war in any part of the world, but it may lead to friction in relationships between people who have access to water and people who do not.¹⁶⁸ The relationship with the government and the people of Yemen strained when adequate water supplies could not be established. Herzberg establishes that several factors can transform water competition in a region: "predictability of flow, number of users, visibility, 'symmetry of cause and effect', power relations, and external interference."¹⁶⁹

¹⁶⁴ Ali Al-Mujahed and Sudarsan Raghavan, "Torrential Rain and Floods Batter the Glorious Ancient Quarter of Yemen's Capital," *Washington Post*, August 20, 2020, https://www.washingtonpost.com/world/middle_east/torrential-rain-and-floods-batter-the-glorious-ancient-quarter-of-yemens-capital/2020/08/19/29be7870-e229-11ea-ade1-28daf1a5e919_story.html.

¹⁶⁵ Perkins, "Yemen," 308.

¹⁶⁶ Perkins, 308.

¹⁶⁷ Robins and Fergusson, "Groundwater Scarcity and Conflict – Managing Hotspots," 5.

¹⁶⁸ Swain, *Managing Water Conflict*, 19.

¹⁶⁹ Herzberg, "Urban Water Scarcity in Sana'a, Yemen," 102.

Conflict arose over who would lead the country but there was no documentation of fights due to the lack of water infrastructure. More on this topic will be covered in the following section, which discusses conditions after the civil war began.

After the Republic of Yemen (ROY) was created in 1990, water management attempts began. The National Water Resources Authority was created in 1995 with little jurisdiction or resources to actually stem the use of groundwater in order for future generations to have a water source.¹⁷⁰ Not all areas of Yemen utilized the authority but in 2002 the Water Law was established to curb the creation of private wells and water drilling pumps.¹⁷¹ Due to the lack of authority and resources required to account for all illegally drilled wells, this law was more a show of force than a success story for water usage in the country.¹⁷² This reiterates the importance in having buy-in among communities to make changes. The government offered a first step but when they could not fund the ability to investigate every well in the country, they fell short of their desired goal.

2. Sources of Famine

Famine begins due to different sources. Multiple types of crops are routinely grown throughout the Western part of Yemen in the mountainous landscape because the wadis allow for the collection of rainwater to assist in watering the fields.¹⁷³ Main crops in the Abyan Delta, “the south central portion of the country,” and Sa’dah plains, “the north central part of Yemen,” consist of a variety of fruits, vegetables and wheats.¹⁷⁴ In the eastern portion of the country, farming is completely unsustainable due to the inconsistency of oases and fertile land to grow crops.¹⁷⁵ The Yemenis main subsistence crops are

¹⁷⁰ Frank van Steenberg, Assefa Kumsa, and Nasser Al-Awlaki, “Understanding Political Will in Groundwater Management: Comparing Yemen and Ethiopia,” *Water Alternatives* 8, no. 1 (February 2015): 782.

¹⁷¹ Steenberg, Kumsa, and Al-Awlaki, 782.

¹⁷² Steenberg, Kumsa, and Al-Awlaki, 782.

¹⁷³ Brandt, *Tribes and Politics in Yemen*, 12.

¹⁷⁴ Brandt, 13.

¹⁷⁵ Brandt, 14.

sorghum, millet, wheat, and maize.¹⁷⁶ Cash crops can be grown only if there is enough water leftover after attempting to grow the main and subsistence crops. The cash crops usually consist of cotton, sesame, and qat.¹⁷⁷ The most water intensive crops in the world are cotton with a requirement of 7,000 to 29,000 liters of water per kilogram of crop and wheat with 900 liters of water per kilogram of crop required.¹⁷⁸ The best drought resistant crops in the region are grapes, qat, and sorghum.¹⁷⁹ In truth, cultivating agriculture for export and import use is difficult to do in a region of the world with such small rainfall amounts throughout the year that even subsistence agriculture cannot be successful without intricate irrigation methods.¹⁸⁰ With ever decreasing sources of water and the inability to retain large swaths of rainwater, crop cultivation is a difficult endeavor for Yemenis.

One major hindrance of crop cultivation has been the inadequacy of the government to effectively moderate irrigation techniques. Due to the arid climate, those who were at the top of the stream on the spate irrigation system attempted to use as much water as they could in order to develop their own fields.¹⁸¹ Although this was profitable for their needs, the people who lived downstream were unable to properly water their lands and yield a profitable crop. The people downstream were forced to search for water under ground or move due to the predicament.¹⁸² A model that Yemenis could follow in order to grow the best crops is desperately needed, one in which an organization helps the community decide where and when the appropriate crops should be grown and how much water is required for each level of the irrigation system in order to most effectively use their water and land

¹⁷⁶ Marchant et al., “Simulating Water Allocation and Cropping Decisions in Yemen’s Abyan Delta Spate Irrigation System,” 4.

¹⁷⁷ Marchant et al., 4.

¹⁷⁸ “Thirsty Crops” (World Wildlife Foundation, January 15, 2015), 9, <https://www.worldwildlife.org/publications/thirsty-crops-our-food-and-clothes-eating-up-nature-and-wearing-out-the-environment>.

¹⁷⁹ “Sa’da in the North Yemeni Context,” 32.

¹⁸⁰ Cooley, “The War Over Water,” 5.

¹⁸¹ Marchant et al., “Simulating Water Allocation and Cropping Decisions in Yemen’s Abyan Delta Spate Irrigation System,” 4.

¹⁸² Marchant et al., 4.

sources.¹⁸³ Due to the ongoing conflict, this system has not been put in place and crops are consistently grown with water use being an afterthought.

Floods of biblical proportions have caused massive destruction of crops, livestock, and infrastructure. Although climate change has caused many areas of Yemen to receive less water and further the desertification process, many seasons experience catastrophic flooding from Marib in the center of the country towards Al-Hudaydah in the West.¹⁸⁴ Flooding of these areas may sound like a good thing for a country in dire need of water. However, these massive floods usually do not replenish groundwater reserves.¹⁸⁵ In order to retain this flood of water, dams and storage tanks are needed but due to five years of conflict, many of these facilities are not in place.

World events have a major effect on food resources. Prior to the Arab Spring, the world experienced a global financial meltdown in 2008. After this occurred, the demand for agricultural goods dropped drastically and caused food prices to drop.¹⁸⁶ By the time prices returned to normal, many of the farmers who were previously employed no longer had the means to grow crops and make the profits that they had made before.¹⁸⁷ A major oil pipeline was disrupted in 2013 leading to higher fuel prices which in turn caused food prices to skyrocket.¹⁸⁸ While people were unable to purchase food for their families, their poor literacy rates inhibited their full grasp of the problem and understanding of the necessary requirements to course correct.¹⁸⁹ At the beginning of the war, not only was there a food shortage but there was a lack of people willing or able to farm the available lands to provide the necessary foods to the nation.

¹⁸³ Marchant et al., 13.

¹⁸⁴ OCHA, "Yemen Humanitarian Update," Situation Report (OCHA, April 3, 2021), 2, <https://reliefweb.int/report/yemen/yemen-humanitarian-update-issue-3-march-2021>.

¹⁸⁵ Fragaszy et al., "Drought Monitoring in the Middle East and North Africa (MENA) Region," E1156.

¹⁸⁶ Kandeel, "Food Insecurity," 85.

¹⁸⁷ Kandeel, 85.

¹⁸⁸ Burki, "Yemen's Hunger Crisis," 637.

¹⁸⁹ Burki, 637.

3. Migration Patterns

Throughout the history of Yemen, people have flowed in and out of the country. In the 1960s and 70s, Yemenis from the People's Democratic Republic of Yemen (PDRY) in the South and Yemen Arab Republic (YAR) in the North migrated to Africa and Saudi Arabia in order to escape military provocations.¹⁹⁰ After artificial irrigation was introduced in the 1970s in the Sa'dah basin of the North, many Yemenis moved to the area to prosper from the agricultural boom.¹⁹¹ Then, in the 1990s, immigrants flooded into Yemen when the Republic of Yemen (ROY) was established, in hopes of finding new jobs and opportunities for their families.¹⁹² Over the next decade, the economic outlook appeared grim for these immigrants and migration slowed up until 2011.¹⁹³ Migration can contribute to environmental insecurities like famine and water scarcity if the region is unable to provide resources and jobs for the newcomers.

The ability to find a job and provide for families is imperative for immigrants. In Yemen, average per capita income hovered around 20% of the world's average in the early 2010s.¹⁹⁴ This means that as migrants entered the country, more and more were unable to find work. When people are in need of work, then their ability to purchase necessities is deeply affected. Quality and health standards are not usually considered so the risk of becoming an environmental refugee increases.¹⁹⁵ The probability of utilizing a poor water source or becoming overly dependent on a particular authority, either a friendly NGO or a hazardous rebel group, increases.

¹⁹⁰ M. C. de Regt, "From Yemen to Eritrea and Back: A Twentieth Century Family History," *Northeast African Studies*, Michigan State University Press 17, no. 1 (2017): 26, <https://doi.org/10.14321/nortafirstud.17.1.0025>.

¹⁹¹ Brandt, *Tribes and Politics in Yemen*, 30.

¹⁹² de Regt, "From Yemen to Eritrea and Back," 26.

¹⁹³ de Regt, 33.

¹⁹⁴ The World Bank, "GDP per Capita for Yemen," The World Bank, 2019, <https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?locations=YE>.

¹⁹⁵ "Environmental Refugees: A Growing Phenomenon of the 21st Century," *Philosophical Transactions of the Royal Society B: Biological Sciences* 357, no. 1420 (April 2002): 609, <https://doi.org/10.1098/rstb.2001.0953>.

Climate change plays a role on migration. As rain patterns change for a farmer, they have three options: keep in their present location and act like nothing is happening, keep in their location and do their best to change their fate, or pack up their belongings and move to a different environment.¹⁹⁶ Yemeni farmers faced similar predicaments. People in the Horn of Africa across the Gulf of Aden and Red Sea also faced similar issues. Many moved into regions now controlled by the numerous controlling factions in Yemen. Conflict can be spurred by climate change-induced migration.¹⁹⁷ The speed of migration into a particular city or area has been proven to determine the intensity and likelihood of creating a conflict; thus, in Yemen, due to the increase over several years conflict was predictable.¹⁹⁸

B. ENVIRONMENTAL STRESSES FACED DURING CIVIL WAR

Operation *Decisive Storm* began 26 March 2015 when the Hadi government pleaded for help from Saudi Arabia and other Gulf Cooperation Council states to assist in stopping the Houthi movement and Saleh from taking over.¹⁹⁹ By 21 April, the Saudi government transitioned Operation *Decisive Storm* into Operation *Restoring Hope*; however, this operation did not truly restore hope and instead continued the brutal attacks from Operation *Decisive Storm*.²⁰⁰ In the North, Yemen confronted a Shia-led uprising while in the South, an Al-Qaeda-led conflict was brewing.²⁰¹ This section will explore how water scarcity, famine, and migration increased during the course of the war and added to the complexities of the ongoing conflict. Water can cause a cascade of other environmental insecurities. The water insecurity section will explain how diseases can spread quickly and with dire consequences for the population.

¹⁹⁶ Rafael Reuveny, "Climate Change-Induced Migration and Violent Conflict," *Political Geography* 26, no. 6 (August 2007): 656, <https://doi.org/10.1016/j.polgeo.2007.05.001>.

¹⁹⁷ Reuveny, 658.

¹⁹⁸ Reuveny, 660.

¹⁹⁹ Ralph Shield, "The Saudi Air War in Yemen: A Case for Coercive Success Through Battlefield Denial," *Journal of Strategic Studies* 41, no. 3 (2018): 463, <https://doi.org/10.1080/01402390.2017.1308863>.

²⁰⁰ Shield, 465.

²⁰¹ Caspian Report, *Origins of the Crisis in Yemen*, pt. 00:35.

1. Present Water Security Issues

Yemen has been left in a situation with very few avenues for an adequate supply of water. Although many aid organizations and foreign entities bring water in via trucks and bottles, many donors have been reluctant to provide aid prior to the outbreak of civil war due to the overwhelming security concerns that plagued the country making it difficult for distribution of this precious resource.²⁰² It is undisputed that Yemen was affected by a lack of water long before the conflict began. Water scarcity grew worse as time and fighting persisted. Water insecurity existed before the war, was exacerbated during the war, and has been used as a tool in the war. Yemen's water crisis is similar to the Syrian refugees in Jordan and Lebanon as explained by Baylouny and Klingseis.²⁰³ Yemenis need water to create food. Groundwater supply is low, there are too many water pumps extracting water, and the irrigation systems in use are inefficient.

A recent way to negatively affect the ability of civilians to access Yemen's limited water supply has been to limit the flow of oil through Yemeni ports. This process has been undertaken by Saudi Arabia.²⁰⁴ In recent months, many ships have had to stay out to sea for greater than 50 days before entering the port of Al Hodeidah, a Houthi stronghold.²⁰⁵ Fuel provides both the ability of farmers to pump groundwater to water their crops and normal citizens to obtain drinking water.²⁰⁶ By preventing fuel from reaching the citizens who desperately need it, these citizens are forced to find water from regions in the South at exorbitant prices. In addition, the vehicles, farming equipment, and water pumps that require fuel to run are no longer providing them the food and water they need to farm and live. This creates a snowball effect in which people will become more desperate for water

²⁰² Burki, "Yemen's Hunger Crisis," 638.

²⁰³ Anne Marie Baylouny and Stephen J. Klingseis, "Water Thieves or Political Catalysts? Syrian Refugees in Jordan and Lebanon," *Middle East Policy* 25, no. 1 (March 2018): 104–23, <https://doi.org/10.1111/mepo.12328>.

²⁰⁴ Mohammed Ali Kalfood and Margaret Coker, "Saudis Escalate Siege of Port in Yemen, Alarming Aid Groups," *The New York Times*, August 2, 2018, sec. World, <https://www.nytimes.com/2018/08/02/world/middleeast/yemen-saudi-hudaydah-missiles.html>.

²⁰⁵ "Yemen Humanitarian Update," 6.

²⁰⁶ Varisco, "Agriculture in the Northern Highlands of Yemen," 188.

and risk consuming unsafe water that may result in cholera or other stomach-borne illnesses, increasing their suffering exponentially.

The targeting of water facilities added to the water scarcity in Yemen. The coalition forces have disrupted water supply to citizens of Yemen.²⁰⁷ This is interesting because in previous Middle Eastern conflicts, rebel forces were usually the ones targeting water supplies.²⁰⁸ The reason for this may be the Houthis understanding of Islam and how they are sworn to protect the lives that happen to be living amongst their strongholds. Saudi air forces managed to target civilian infrastructure, either directly or through strategic mistakes, by hitting water stations and electric grids in order to coerce the people living under Houthi territories to realize that living conditions would be untenable if they stayed with the rebels.²⁰⁹ Yemen's only working desalination plant in Taizz was targeted in 2016 and completely destroyed.²¹⁰ The perpetrator of the attack is unknown but due to Houthi videos on the scene, it appears the attack was carried out by Saudi Arabia in order to force the Yemenis from the area and to stop supporting the Houthis. The result of these types of attacks have not paved a way for Yemenis under Houthi rule to turn against them. However, some researchers show that after targeting these types of structures, it takes a long time to fully understand if the actions were effective in terms of military strategy.²¹¹ The attacks were effective on destroying critical infrastructure. Attacks on water infrastructure occur during war but their effectiveness is not clearly known. In this case, these types of attacks appear to exacerbate the ongoing war by causing more and more Yemenis to suffer.

²⁰⁷ Saleh al-Batati and Sune Engel Rasmussen, "Yemen Peace Process Falters as Fighting Intensifies and Hunger Spreads," *Wall Street Journal*, October 11, 2020, sec. World, <https://www.wsj.com/articles/yemen-peace-process-falters-as-fighting-intensifies-and-hunger-spreads-11602415492>.

²⁰⁸ Gleick, "Water as a Weapon and Casualty of Armed Conflict," 10.

²⁰⁹ Shield, "The Saudi Air War in Yemen," 471.

²¹⁰ Brendan Clifford and Christiaan Triebert, "Yemen's Bombed Water Infrastructure: An OSINT Investigation," *Bellingcat*, February 5, 2016, <https://www.bellingcat.com/news/mena/2016/02/05/yemens-bombed-water-infrastructure/>.

²¹¹ Jeannie L. Sowers, Erika Weinthal, and Neda Zawahri, "Targeting Environmental Infrastructures, International Law, and Civilians in the New Middle Eastern Wars," *Security Dialogue* 48, no. 5 (October 2017): 411, <https://doi.org/10.1177/0967010617716615>.

The civil war in Yemen did not start over water. However, it is possible for water wars to develop from water scarcity, existing conflict, and public statements from leaders that create chaos.²¹² There is precedent for the weaponization of water to inflict political instability and violence as seen in Syria and Iraq.²¹³ By taking control of a water source, the person or group that controls it, especially in a water-scarce area, can exhibit a high level of leverage over the population who remains under their control. Water is a powerful tool. The threat of ISIS using water against the inhabitants of Syria and Iraq was one of the top factors for U.S. re-engagement in the region.²¹⁴ The idea that Houthi rebels and the Yemen government can do this with existing water resources is not unfathomable.

Water-borne diseases like cholera spread rapidly across the country during the civil war. Cholera is spread by many factors but researchers attribute it mainly to a lack of water infrastructure and access to clean water facilities either for use in bathrooms or for drinking.²¹⁵ Although cholera spread rampantly before the war, there was a sharp uptick in cases due to the forced movement of people into urban areas where education on how to avoid getting cholera was not in place.²¹⁶ This triggered a massive outbreak in Yemen that added to the complexity of the ongoing civil war.

Fuel plays a major role in the ability of cholera to spread. By limiting fuel supply through ports, people are unable to power their water pumps to gain access to water. When access to those water sources is unavailable, the price of water increases 50% in highly populated cities like Hajjah and Al-Hodeidah.²¹⁷ People use unclean sources of water which may lead to acute watery diarrhea (AWD) or cholera.²¹⁸ When they turn to these unclean water sources, they are dependent on the government to provide them water.

²¹² Alam, "Questioning the Water Wars Rationale," 347.

²¹³ King, "The Weaponization of Water in Syria and Iraq," 155.

²¹⁴ King, 161.

²¹⁵ Rabaan, "Cholera," 1.

²¹⁶ Rabaan, 4.

²¹⁷ OCHA, "Yemen Humanitarian Update," 6.

²¹⁸ OCHA, 6.

However, the government is not available to provide clean water, or fuel for that matter, in order to keep their citizens healthy.

Cholera is curable and requires a vaccine to stop its spread. During the outbreak in 2018, the government did not have access to oral cholera vaccines.²¹⁹ The government approached humanitarian organizations for aid when they realized they could do nothing to curb the spread of the water-borne disease. Many human rights watchdogs accused the illegal targeting of water wells, bottling facilities, and water treatment plants as the direct source of cholera outbreaks.²²⁰ Unfortunately, the humanitarian organizations were low on the stockpile of these types of vaccines and could not supply them fast enough to stop the spread.²²¹ Had there been proper water infrastructure or education on cholera, this issue could have been avoided.²²² It appears a contributing factor to the number of deaths was the lack of medical supplies that could have treated many of those who contracted the illness.

2. Migration issues

One would assume that if there is war in a territory, many people would head the other way. However, this has not proven true for Yemen. Migration would not necessarily be thought of as an issue for a country experiencing a civil war. Since the beginning of the conflict, 138,000 people have both migrated from the Horn of Africa and returned to Yemen on their way to Saudi Arabia.²²³ They have some sort of knowledge of the ongoing crisis but many believe it is more important to enter the country where their loved ones are remaining. Migration is a second order effect of the ongoing conflict. Due to the combination of climate change, water scarcity, famine, and war, people are moving around

²¹⁹ Frederik Federspiel and Mohammad Ali, "The Cholera Outbreak in Yemen: Lessons Learned and Way Forward," *Bmc Public Health* 18, no. 1 (December 2018): 1, <https://doi.org/10.1186/s12889-018-6227-6>.

²²⁰ Jeremy M Sharp and Tiaji Salaam-Blyther, "Yemen: Cholera Outbreak," CRS (Washington, D.C: Congressional Research Service, August 2, 2017), 2, <https://crsreports.congress.gov/product/pdf/IN/IN10729>.

²²¹ Federspiel and Ali, "The Cholera Outbreak in Yemen," 5.

²²² Rabaan, "Cholera," 11.

²²³ OCHA, "Yemen Humanitarian Update," 9.

the country.²²⁴ Often, they are heading to areas where basic necessities are suspected to exist: cities and urban centers. Migration has not been analyzed as much as water, famine, and diseases in relation to the conflict. Naturally, war causes the destruction of homes and livelihoods, causing people to seek refuge in an area where life can be sustained. In Yemen, people do not have the luxury of leaving the country and therefore become internally displaced persons (IDPs).²²⁵

Once an individual migrates into Yemen, they cannot leave due to the ongoing crisis and COVID-19 protocols in the surrounding countries. Internally, Yemen faces an IDP crisis that remains the fourth highest in the world with over four million people affected.²²⁶ Migration patterns existed before the war and exponentially increased during the war. This environmental insecurity has been exacerbated due to the conflict, but it is difficult to ascertain whether migration is being used as a tool of the war. There is no proof that Houthi rebels or government forces are using migration in their favor. From an outside perspective, it appears migration could be beneficial for either side depending on where the individual chooses to travel to from their destroyed home.

Migration and the movement of people throughout Yemen has increased the spread of COVID-19 in the country. Numbers of positive cases in the North under Houthi control have gone unreported while facilities in the South continue to experience high death rates of 21% due to the lack of capable facilities and human resources to fight the virus.²²⁷ Yemen will receive 1.9 million doses of AstraZeneca, a drop in the bucket for the 27 million people living within its borders.²²⁸ The war caused many people to leave their

²²⁴ George Joseph and Quentin Wodon, "Is Internal Migration in Yemen Driven by Climate or Socio-Economic Factors?," *Review of International Economics* 21, no. 2 (May 2013): 296, <https://doi.org/10.1111/roie.12037>.

²²⁵ Benjamin Q. Huynh and Sanjay Basu, "Forecasting Internally Displaced Population Migration Patterns in Syria and Yemen," *Disaster Medicine and Public Health Preparedness* 14, no. 3 (August 2019): 302, <https://doi.org/10.1017/dmp.2019.73>.

²²⁶ OCHA, "Yemen Humanitarian Update," 2.

²²⁷ OCHA, 5.

²²⁸ OCHA, 5.

houses and join others in crowded urban dwellings allowing the virus to feed on a very vulnerable population on top of all other insecurity issues.

3. Famine Issues

At the beginning of the conflict, nearly 90% of the population in Yemen depended on food imports for basic food supplies, including grain.²²⁹ Famine did not contribute to the start of the civil war but it has definitely worsened conditions on the ground. Without water, it is difficult to grow food. The country is heavily dependent on imports, yet the Saudis continually block shipments of food to the territory controlled by the Houthis. The Saudi-led coalition is not just targeting agriculture in the fields but also the direct supply and shipment of food into the country.²³⁰ If the people living under the Houthis are not allowed to eat, they will die of starvation.

If a country cannot create enough food for their inhabitants, food must be imported in. Or, if the country happens to be a rich country, like Qatar, a food embargo can create industry within the borders of a country and spur competition throughout the region.²³¹ During the Yemen conflict, food has had a difficult time reaching people under Houthi control in the North. During Operations *Decisive Storm* and *Restoring Hope*, Saudi Arabia targeted the port of Hodeidah and one of the most traveled roads in the area with multiple air strikes.²³² This effectively cut off the import of food to Yemenis living under Houthi control, causing malnutrition and famine to increase exponentially. In sum, the people in this area were now succumbing to a blockade on their port, destruction of their transportation system to acquire goods, air strikes on their infrastructure, and a complete lack of government to assist in gaining access to food.

As with water, fuel plays a major role in affecting the Yemenis' ability to obtain food. The delay in shipments of fuel at ports cause catastrophic events for Yemenis. In the

²²⁹ Sharp, "Yemen: Civil War and Regional Intervention," 13.

²³⁰ Edwards and Cromwell, "Yemen," 136.

²³¹ Natalie Koch, "Food as a Weapon? The Geopolitics of Food and the Qatar–Gulf Rift," *Security Dialogue* 52, no. 2 (April 2021): 128, <https://doi.org/10.1177/0967010620912353>.

²³² Shield, "The Saudi Air War in Yemen," 470–71.

case of the recent delay in fuel shipments at port Hodeidah, when fuel does not reach the shore, then transportation of goods throughout the country stops, fuel prices dramatically increase, food prices escalate and famine revels in the chaos.²³³ The sabotage of fuel by Saudi Arabia directly affects the ongoing famine.

Technologies to advance farming techniques and smart use of water require education and money that many Yemenis do not have. This creates an area for exploitation by outside influences. For instance, because technology is limited to those who have the ability to afford it, a patronage system can be implemented in which Yemeni farmers are exploited and caused to owe large debts to the people or countries who come in to show them new ways.²³⁴ Therefore, foreign countries and organizations can control which areas receive assistance and are able to create better living conditions for themselves during times of drought for their crops.

Sometimes forces who control the land unknowingly alleviate the harm caused by climate and water scarcity. The AQAP, due to their religious rules, have outlawed qat in the areas they hold under their control.²³⁵ It is unclear if they are aware of the benefits of this law on their people. The plant is addictive habitually chewed by men and women all over the country in order to give them a high.²³⁶ In regard to agriculture and sustainability, Qat is a super water intensive crop and actually assists in alleviating the ongoing water crisis while allowing other less water intensive plants to be developed and grown. In addition, when qat is used as frequently as it is in Yemen, the users typically do little else and allow problems like water insecurity, food scarcity, and lack of electricity to persist.²³⁷ Accidental measures like this ease the effect on water scarcity slightly but do not assist in decreasing famine.

²³³ OCHA, “Yemen Humanitarian Update,” 6.

²³⁴ “Sa’da in the North Yemeni Context,” 34.

²³⁵ Amr, “How Al Qaeda Rules in Yemen.”

²³⁶ Anonymous, “Qat Wrenching; Yemen,” *The Economist (London)* 426, no. 9073 (January 2018): 31.

²³⁷ Herzberg, “Urban Water Scarcity in Sana’a, Yemen,” 105.

C. CONCLUSION

The informative conclusion is determined that the environmental issues outlined in the previous sections are not prolonging or intensifying the conflict itself. At least, there is not enough evidence to effectively convey this argument. Environmental issues did not cause the war in Yemen. However, environmental insecurity problems continued to deteriorate as a result of the conflict. The environmental insecurities occurred through numerous channels. The existing water collection and food procurement practices were interrupted by the conflict due to the outbreak of violence and internal migration. Aid organizations were restricted in their ability to help when needed due to the conflict itself and issues outside of Yemen like supply-chain problems. Water sources were and continue to be deliberately targeted during the conflict, exacerbating the water scarcity issues. Finally, with the recent Saudi-led blockade on fuel imports and exports, obtaining water and food continues to be a struggle for the population. As a result, human insecurity has increased substantially within the confines of Yemen.

IV. OUTCOME

Yemen faces multiple crises. The history of Yemen shows that there have been multiple periods of strife within its borders. The lack of adequate amounts of water and education on proper agricultural techniques have shaped how the country has fallen into multiple environmental security crises. However, these are not the only reasons for the catastrophes facing the population. The leadership in charge of the multiple governments since 1962 did not do everything in their power to help Yemenis build a sustainable environment to live in. Yemenis became disillusioned with the lack of solutions to solve their environmental insecurity problems. The ongoing civil war has yet to end, further exacerbating the people's plight.

This chapter summarizes the thesis's findings with answers to its central questions, about whether and how environmental insecurities in Yemen contributed to its more recent conflict. In order to understand these relationships, the thesis explores a deep dive into Yemen's history, focusing on government officials' failure to counter environmental insecurities. Findings demonstrated that Yemen's complex history helps explain why these environmental insecurities went largely unnoticed by outside eyes until the outbreak of civil war in 2015. The chapter also highlights several notable discoveries about the civil war that were made during the research process. It concludes with policy recommendations and suggestions for future research.

This thesis suggests that environmental insecurities were not the cause of the current civil war, but that the country has experienced worsening environmental insecurities during the conflict partly caused by the civil war. As in other contested areas in the Middle East, it is possible to interpret episodes of withholding water and food from the population as a weapon of war. The lack of primary sources and the denial by forces to bluntly say environmental resources were targeted outright makes it difficult to ascertain whether some of the actions thus far were accidental or intently made. The next section will expand on the overall findings of the research.

A. RESEARCH GOALS AND FINDINGS

Water, food, and proper living conditions are essential to life anywhere on this planet. Yemen is no exception. Environmental insecurities, including water and food shortages, have played a major role in the history of Yemen since 1962. They continue to play a major role today. As one observer of the situation in Yemen stated in 2020, the civil war was “aggravated by escalating conflict, the COVID-19 pandemic, disease outbreaks, torrential rains and flooding, a desert locust plague, economic collapse, a fuel crisis across northern governorates, and reduced humanitarian aid.”²³⁸ This section summarizes the thesis’ answers for the four questions that drove and organized this research into relationships.

1. Did Environmental Insecurity Predate the Civil War?

Water scarcity, famine, water-borne diseases, and migration existed before the civil war broke out in 2015. These issues arose due to climate change, lack of knowledge and regulation regarding water-preserving farming techniques, and a growing population in a region where ground water is not prevalent. The issues have been documented since the country’s independence in 1962. As previously discussed in chapter 3, water insecurity accelerated when farmers took advantage of low fuel prices to increase the volume of wells dug in the farmlands. The government could not keep up nor could they effectively regulate the number of wells created. Farmers were looking to make a profit and there was no way to do this without using water. Famine and food supply issues were driven not only by climate change but the lack of education in scarce water farming techniques. Farmers chose to grow cash-crops vice crops that required lower amounts of water because they needed to turn a profit in order to support their families. There were few government officials telling them which crops to grow and how to create a more sustainable agriculture system on Yemeni lands. Migration was also widespread over the tumultuous history of the Yemen Arab Republic (YAR) in the North and the People’s Democratic Republic of Yemen (PDRY) in the South. Additionally, diseases were prevalent due to water scarcity issues, famine, and close living-quarters in urban environments prior to the war.

²³⁸ OCHA, “Yemen Humanitarian Update,” 1.

2. Did Environmental Insecurities Cause the Civil War?

These issues did not directly cause the outbreak of the civil war. Rather, one can point to the Arab Spring and lack of effective governance providing access to basic necessities as the culprits. Additional driving forces behind the war appeared to be different political beliefs and a large group of people becoming dissatisfied with the leadership of the country and their inability to provide main essentials for life. Environmental insecurities could therefore be seen as making second or third order contributions to the war's onset, but they were not the primary causes.

Although the issue of environmental insecurities has lasted for decades, the root of the conflict spurring this recent war comes from intense displeasure between the Zaydis and the Sunni government that allowed for intensifying displays of hatred to occur between them.²³⁹ The speculation that environmental insecurities caused this war appear to be untrue. In addition, the Houthis do not want to control the government; they want a greater say in how the government works and a desire in the ability to help shape the new government with inputs from their ideological views.²⁴⁰

3. Did Environmental Insecurities Intensify the Civil War?

Environmental insecurities worsened the effect of the civil war. The insecurities that began long before the conflict started only grew in size after 2015. Due to Yemen's climate and lack of water infrastructure prior to the conflict, the country was destined to experience environmental insecurity issues on this scale. The civil war permitted the suffering of the people to be popularized in the media and the general public became acutely aware of Yemeni problems. The civil war is still ongoing, thus, discovering an exact quantifiable figure to determine the difference between the environmental insecurities before and after the war is unattainable. As discussed in chapter 3, the insecurities added to the conflict and brought the attention of the world due to some of the atrocities committed by coalition forces.

²³⁹ Brandt, *Tribes and Politics in Yemen*, 112.

²⁴⁰ Juneau, "Iran's Policy Towards the Houthis in Yemen," 647.

4. Did the Civil War Intensify Environmental Insecurities?

The civil war did intensify environmental insecurities. Water scarcity likely increased as the war continued. This was due to Saudi Arabia and coalition forces targeted destruction of water desalination plants, trucks carrying water, and water purification plants in the region. However, it is difficult to assess how much these operations reduced water supplies, since water was already a scarce commodity prior to the war and reliable data points are unavailable.

For food insecurity, a similar logic applies. There is not conclusive evidence to show that the civil war independently provoked famine. Famine and food insecurity existed prior to the war due to poor farming practices and climate change. However, blockades of ships heading to Houthi-held ports may have intensified food security and accelerated famine. These blockades increased the crisis on the ground by preventing the movement of fuel, food, and aid into the region. Yet, these shortages also predated the war, so it is difficult to argue with certainty that they are by-products.

Migration was also prevalent prior to the advent of the war. During the war, migration patterns have displayed interesting fluctuations. In the beginning, people flocked to urban centers, causing a massive increase in demand on city facilities like water, fuel, food, and employment. At the same time, people continued to migrate into the country from the Horn of Africa in order to make their way to other countries in the Middle East. But, as the conflict continued, the borders that those migrants crossed began to close. In addition, due to COVID-19, the borders were obstructed. This caused many people to be stuck in Yemen without the ability to obtain adequate employment or housing. Water, food, and fuel supplies ran low in areas with severe overcrowding. In the past year, migration to Yemen has slowed and people are realizing they need to leave in order to survive. The net migration number in Yemen is negative.²⁴¹ Migration began before the war and was likely to continue, with or without it.

²⁴¹ “Net Migration Rate.”

A controlling factor in the civil war is the ability to obtain fuel. Whoever controls the port of Hodeidah controls the well-being of millions of Yemenis due to it being a major port of entry for fuel. Bombs and bullets are destructive in their own right, but in Yemen, fuel, or the lack thereof, damages every critical system. Without fuel, there is no food because the ability to move it from town to town is removed. Without fuel, there is no water because many Yemenis rely on water pumps, which are powered by fuel. The ability to get water from place to place is aggravated by the loss of transportation due to the loss of fuel. Fuel is a critical component to living conditions in Yemen.

Evaluating whether these issues of food insecurity, water scarcity, and migration should be understood or viewed as a by-product of the civil war proved to be extremely difficult, primarily due to data limitations. It will be impossible to overcome these limitations before the war ends and the country can be safely accessed. Then, if the environmental insecurities were to increase in size and scope, it might be concluded that they were not by-products of the war. However, if the environmental insecurities were to decrease in size and scope, then it might be concluded that they were a by-product of the war. This could be a research question explored for a future thesis. Obtaining data on the size and scope of environmental insecurities would be crucial in finding the answer. Data must be obtained from the ground and at this point in the conflict, there does not appear to be a path forward for this data to be gathered.

5. Were Environmental Resources Used as a Tool in the Civil War?

There are isolated incidents where some pundits may claim that environmental insecurity issues were used as a tool by parties involved in the civil war. However, from the research outlined in previous chapters, these narratives are unclear. The incidents show that water facilities and the country's only desalination plant were targeted. However, this does not prove that the culprits of the attacks had the intent to use an environmental insecurity like water scarcity as a tool to further their siege. No government explicitly stated the destruction of water facilities was targeted. It would seem like a logical tactic in the long run and maybe this hasn't been seen or reported thoroughly. A rebel group or an established government could attack water sources or food supply buildings with dual

purposes. First, they would destroy the facilities and then they themselves would provide the resources to show the population that they could provide for their basic needs. This type of action seems like a costly endeavor for a country and/or movement that does not have enough resources to begin with.

Thus, for the Zaydis or Saudis to use environmental insecurities as a tool to win the war appears to be illogical. It would be difficult to prove that the KSA or other forces are deliberately targeting environmental insecurities in order to further inflict pain on the country because there is a lack of documentation on the subject. Once more is written about the conflict, this may in fact turn out to be true. For the time being, destroying resources for the people who live under the rule of the Hadi government or the rebel forces would not appear to prove beneficial to their cause.

B. POLICY RECOMMENDATIONS

The final section concludes the thesis with recommendations on how to solve the environmental insecurities in Yemen. Several immediate actions must take place to improve the lives of impoverished Yemenis. Then, the war must end with diplomatic resolutions in place to ensure Yemen does not fall into the chaos that the country has endured for the past six years. Finally, a recovery effort should be in place to enhance Yemen's economic position. By uncovering resources like fishing and tourism, the Yemenis could reduce their reliance on subsistence farming and ease the pressure on currently available water sources. Resolving Yemen's environmental insecurities may aid in ending the war but because this recent war did not directly begin because of existing environmental insecurities, this tactic may not be effective.

1. Immediate Actions

A major problem plaguing Yemen in the context of the conflict consists of the accidental targeting of civilian infrastructure. International laws need to do a better job protecting water systems and ensuring that militaries identify legitimate targets that will

not affect the ability of civilians to access WASH facilities.²⁴² WASH infrastructure must be at the forefront of whichever power assumes responsibility for Yemen in the future.

Foreign aid will prove to be a problem in the coming months due to the economic toll of the coronavirus on the world in 2020 and 2021. This year, Yemen received billions of dollars less in foreign aid than in previous years due to fall in most of the world's economies.²⁴³ Less aid means less water, food, seeds, fuel, electricity, healthcare, and housing will be available to Yemenis who are in need. Money that has previously been present to provide for critical infrastructure systems may not be available as often. The toll of the coronavirus on Yemeni people will take years to fully understand.

NGOs and foreign governments are stepping in to provide better ways to manage water with Yemen. Early in July, the Netherlands partnered with the Food and Agriculture Organization to begin training farmers and provide them with technologies to better assist in cultivating crops while at the same time saving water.²⁴⁴ These organizations realize that even though the war has not ended, there are still items that can be accomplished to develop a more sustainable environment in Yemen. At the very least, these actions will show Yemenis that the rest of the world has not forgotten about them.

The U.S. and the world should do more to assist the Yemenis. While some argue that the U.S. needs to pull out of the Middle East, Stephen Cook argues the time is now to establish and preserve stability, especially in a country as war-torn as Yemen.²⁴⁵ Naming the Houthis a Foreign Terrorist Organization proved that the legal framework of this designation would be far too damaging to the people forced under their control.²⁴⁶ The designation should be removed in order to allow aid organizations to support the millions

²⁴² Gleick, "Water as a Weapon and Casualty of Conflict," 1738.

²⁴³ OCHA, "Yemen Humanitarian Update," 2.

²⁴⁴ "FAO and the Netherlands Renew Partnership to Strengthen Sustainable Water Management in Yemen," Food and Agriculture Organization of the United Nations, July 8, 2021, <http://www.fao.org/neareast/news/view/en/c/1415173/>.

²⁴⁵ Cook, "No Exit: Why the Middle East Still Matters to America," 134.

²⁴⁶ John Hudson and Missy Ryan, "Biden Administration to Remove Yemen's Houthi Rebels from Terrorism List in Reversal of Trump-Era Policy," *Washington Post*, February 6, 2021, https://www.washingtonpost.com/national-security/biden-yemen-rebels-terrorist-list/2021/02/05/e65e55c8-5b40-11eb-aaad-93988621dd28_story.html.

of people who are in dire need of food, water, and medical supplies to survive. By giving them this designation, the U.S. is disenfranchising a group of people who have no way to change their current situation. This is inhumane and unacceptable behavior that cannot be overlooked by Western countries.

2. Ending the War

Before more aggressive and expensive options are to be implemented, the civil war needs to end. To address the inadequacies of the current infrastructures supplying food, water, and electricity, fighting must end. Those systems cannot be rebuilt and reinvigorated until the violence stops. It would be impossible to invest in infrastructure projects that may be targeted by forces vying for power in the country. Desalination plants are expensive. Since the only one in Yemen was destroyed and taken off-line, no one is willing to risk their own money to rebuild until the developer can be assured fighting will not destroy it again. The country needs a government that will provide the means to guarantee basic WASH necessities. During a war, no one has time to learn new agricultural practices or safe means of cleaning potentially unsanitary water. These are just some of a few reasons why the conflict must end before the environmental insecurities can be addressed.

The United States and other Western countries have a role to play in ending the conflict because they are complicit in this war due to the overwhelming number of Western weapons that have ended up on the ground in Yemen.²⁴⁷ These countries also have an incentive to intervene because it is possible that if the civil war does not end and the environmental insecurities continue to grow, we could witness a mass extinction and/or migration event in the country. As Baylouny and Klingseis forewarned in Jordan and Lebanon with regards to Syrian refugees, “the refugees did not create water scarcity, but they did exacerbate it, advancing the timeline for water deprivation.”²⁴⁸ So far, Yemenis’ wartime migration and refugee patterns have not matched those of countries like Syria, Iraq, and Libya, since Yemenis have fewer options to safely move outside the country due to its geographic location. However, if more people attempt to cross the Bab al-Mandeb in

²⁴⁷ Edwards and Cromwell, “Yemen,” 131–32.

²⁴⁸ Baylouny and Klingseis, “Water Thieves or Political Catalysts?,” 104.

order to find refuge in Somalia, Djibouti, or Eritrea, this could intensify insecurity in those countries.²⁴⁹

3. Yemen's Post-War Recovery

Saudi Arabia invested in the world's most expensive desalinization plant, Ras al-Khair, and plans to build an additional one in the future.²⁵⁰ If Saudi Arabia and coalition forces retain the ability to mold Yemen post-civil war, then the avenue for investment in the highly expensive desalination process could be developed by them, too. However, a desalination plant will be ineffective for regions of Yemen at higher elevations due to the expense of pumping water to those altitudes; this would only be a solution for coastal cities.²⁵¹ Lack of water is one of the many reasons why Yemen is struggling to provide basic necessities for its people.

The government in place prior to the war does not hold all the blame for the current water crisis. Officials could have done more to create a better water infrastructure plan for its people. A popular argument surfacing is that although having a government in place to incorporate infrastructure for the benefit of its citizens is crucial, there must also be a will and desire by the people to collectively have this infrastructure in place.²⁵² This is valid in pre-war Yemen but another dimension is added when the war is considered a factor. Not only does the government and the will of the people need to be considered, but extraordinary events such as civil war need to be taken into account. The forces that retain power in a region — not just official government authority — have the ability to shape infrastructure.²⁵³ The patronage system in concert with the broken governments and rebels in control of different segments of the country rely on the chaos that ensues in order to keep the conflict stirring so there is no need for a build-up of infrastructure systems like water

²⁴⁹ de Regt, "From Yemen to Eritrea and Back," 26.

²⁵⁰ James A. Russell, "Saudi Arabia: The Strategic Dimensions of Environmental Insecurity," *Middle East Policy* 23, no. 2 (June 2016): 51, <https://doi.org/10.1111/mepo.12194>.

²⁵¹ Lichtenthaeler, "Water Conflict and Cooperation in Yemen," 31.

²⁵² Steenbergen, Kumsa, and Al-Awlaki, "Understanding Political Will in Groundwater Management," 776.

²⁵³ Steenbergen, Kumsa, and Al-Awlaki, 777.

and sanitation.²⁵⁴ In this case, the chaos is the civil war that is being fought by all sides: the Hadi government, the Houthi rebels, the Southern Separatists, and the AQAP. Continuing to fail to invest in adequate infrastructure prolongs the conflict and allows for all sides to point the proverbial finger at one another.

Yemen does not need to depend on agriculture to create a successful economy. Fisheries and ports in Yemen could be exploited to build wealth within its borders. Foreign interference does not always lead to a successful new beginning for countries in the Middle East. Yemen is located in a prime location for fishing. Exploring the local fish available for consumption and possibly as an export could be beneficial for the Yemeni. Foreign countries are fishing at high rates off the coast of Yemen making great gains in the global fishing market while Yemen does not profit from this commodity.²⁵⁵ As one of the environmental insecurity issues of the world that does not get much coverage, a future thesis should explore how Yemen could become one of the world's leading fishing exporters. They have the ports to build the infrastructure required. There are many obstacles to get there but developing a fishing economy could help create employment opportunities for farmers who are in need of work and it could alleviate the amount of pressure on existing water supplies.

There will be no Yemen if water cannot be provided for people to live and prosper. There will be no Yemen if an effective electrical grid is not created for businesses to work and internet to be used. There will be no Yemen if people cannot find or grow food to provide for themselves and their families. There will be no Yemen if migration continues to increase not only from rural farmlands into the cities but from foreign countries in Africa to Yemen's coastlines. Yemen is in dire need of foreign assistance to solve their numerous environmental insecurities.

²⁵⁴ Steenbergen, Kumsa, and Al-Awlaki, 779.

²⁵⁵ Blumi, "Plundering Yemen and Its Post-Spring Hiatus," 182.

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