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Environmental Degradation and Civil Unrest: Iran's looming environmental bankruptcy

By

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Abstract

Iran has a long history of effective and sustainable water management in one of the driest regions of the world. Recently however, the country is experiencing an exacerbating environmental crisis, reflected by its disappearing lakes and rivers, groundwater resources depletion, pollution, desertification and drought, and growing water scarcity. This crisis has indeed become not only an environmental matter, but also an existential threat to the country. For that reason, some Iranian officials have warned that the environmental crisis may turn wide regions of the county into uninhabitable places and force 50 million Iranians to abandon their homes, villages and cities. Also, over the last ten years, many scientists, and national and international institutions have warned of a looming crisis deriving from Iran's environmental degradation and resources scarcity. In particular, concerns have been raised of an imminent environmental collapse and the potential for social unrest, such as protests and riots caused by this environmental degradation.

This research will further interrogate to what extent have environmental factors such as drought, desertification, and water scarcity caused civil unrest in Iran. To answer this question, content and discourse analyses were adopted to review dozens of local and international media news published online between 2011-2019 that contained information regarding: the motive and number of protests, riots and strikes in Iran. The results indicate that environmental factors such as drought, water scarcity, and desertification are both directly and indirectly causing civil unrest in the country. Furthermore, this thesis finds that the role of environmental factors in civil unrest is progressively increasing.

By looking at a broader spectrum of social conflict, rather than limiting the analysis to civil war, this research demonstrates a strong link between environmental change and unrest. The definition of conflict is also used in many various ways. Unlike the environmental security literature, this thesis uses a broader definition of conflict that encompasses, but is not limited to, social conflict, including protest, riots, strikes and anti-government violence. By doing so, it broadens the scope to better predict more intense and entrenched conflict, heightening the need for government to make real and immediate reform.

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Finally, I thank my family, in particular, my mother and father who encouraged me during my Masters study.

Thesis declaration statement by author

I declare that this thesis does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.

Name of Candidate:

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Signature:

Date:

List of abbreviations

ACLED	The Armed Conflict Location and Event Data
CMB	Chahal Mahal and Bakhtiari
DES	Demographic and Environmental Stress
DOE	Department of Environment
GDP	Gross Domestic Product
IBWT	Inter-basin Water Transfer
IFRC	The International Federation of Red Cross
IPCC	International Panel on Climate Change
IRGC	Iranian revolutionary Guards Corps
ISNA	The Iranian student Agency
MIT	Massachusetts Institute of Technology
NASA	The National Aeronautics and Space Administration
SWIFT	The Society for Worldwide Interbank Financial Telecommunication

Chapter 1. Introduction

1.1 Research background

Since Thomas Malthus issued his article 'Essay on the Principle of Population' in 1798, many scholars and policy makers (e.g. Homer-Dixon 1994; Kaplan 2000) claimed that environmental degradation can cause and intensify conflict. More recently, other scholars have expanded their parameters to include the availability (alongside degradation) of natural resources when establishing links between natural resources and conflict (Raleigh & Urdal 2007; Koubi et al. 2012; Koubi et al. 2016). Although, environmental issues and climate change can lead to social conflict (e.g., peaceful protests, demonstrations, and short-term riots), the literature pays less attention and often excludes these types of conflict. Instead, much of this research focuses on high-intensity violent conflict such as civil war, armed conflict, and organised armed conflict (Bernauer et al. 2014; Hendrix & Salehyan 2012). This omission in the environment-conflict nexus literature is surprising given the notion that peaceful protests and civil disobedience often lead to more violent and protracted unrest (Cunningham 2014).

1.1.2 Understanding the nature of social conflict-environment nexus

Globally, the notion of national security was conventionally referred to as state sovereignty and territorial integrity from foreign military invasion. However, following the Cold War era, the concept of security was broadened to contain, resource, ecological and population matters. More specifically, it included the so-called non-traditional threats such as environmental scarcity, soil deterioration, loss of biodiversity, and ozone depletion (Koubi 2019). The evolution of environmental security issues subsequently drew a connection between the environment and conceptions of vulnerability and linked these conceptions with the likelihood of conflict (Homer-Dixon 2001). More recently, climate change has added further complexity to understanding how societies may become more vulnerable to conflict events.

The Fourth Assessment Report of International Panel on Climate Change (IPCC 2007, p. 2) claims that 'warming of the climate system is unequivocal' and suggests that states, particularly developing countries, will face difficulty in adaptation to the pressure of climate change (Koubi 2019). It suggests that by exacerbating the already existing environmental problems such as freshwater, and by sparking mass population displacement due to severe temperature increases, rising sea levels, desertification, as well as drought, climate change could turn into a root cause of conflict and civil unrest. Concurrently, a US governmental report identified environmental challenges and climate change as 'potentially the greatest challenge to global stability and security, and therefore to national security' (CNA Corp. 2007, cited in Valley 2019, p. 344).

While no country or region is immune to potential unrest due to environmental factors, the Middle East is a particular hotspot for environmentally induced socio-political unrest (Galgano 2019; Warren & Femia 2015). For example, many academics attribute the current unrest and civil conflict in Syria and Yemen to environmental degradation (Gleick 2014; Kelly et al. 2015; Robinson & Fergusson 2014; Shahi & Vachkova 2018). This factor is still playing a significant role in the socio-pollical instability in the Middle East. Iran is another underexplored candidate in the region for potential environment-induced uprising (Shahi 2019). Environmental degradation (e.g., growing water crisis, persistent drought, and desertification) is not only an environmental matter in Iran, but also an existential threat to the country. This threat is echoed by Iran's former agricultural minister, Issa Kalantari. In 2013, he warned that environmental degradation is the major problem that threatens Iran, 'more dangerous than Israel, America or political fighting… [because] the Iranian plateau is becoming uninhabitable,' as lakes disappear and groundwater depletes (Michel 2017).

Iran has a long history of effective and sustainable water management in the arid region of the world. However, today the country is experiencing a worsening water crisis, reflected by its drying lakes and rivers, depletion of groundwater, degenerating water quality, rapid expansion of deserts and drought (Madani et al. 2016; Shahi 2019). As a result of this rapid environmental degradation over the last ten years, many scientists, and national and international institutions have warned of a looming crisis deriving from Iran's environmental deterioration. In particular, concerns have been raised of an imminent environmental collapse and the potential for social unrest (Madani et al. 2016; Michel 2017; Shahi 2019; Snyder 2019). Indeed, environmental factors have been playing both a direct and indirect role in social conflict in Iran (Shahi 2019; Snyder 2019). Despite these threats, limited comprehensive academic studies exist on the increasing impacts of environmental degradation, particularly drought and water scarcity on socio-political stability and discord in Iran. This thesis is intended to address, establish and identify whether and how soaring environmental degradation and, in the context of water shortages in particular, are causing civil unrest in Iran. Further, this thesis interrogates the likelihood of environmentally-induced civil conflict leading to a failed-state scenario for Iran.

1.2 Problem Statement

Water scarcity and drought can instigate or intensify social conflict. As water is essential for human consumption, food production and industry, lack of such significant and vital source can lead to agricultural failures, population displacement, economic declines and spark or intensify social conflict. In other words, without water, societies invariably collapse.

Over the last decade, water scarcity and drought triggered or contributed to social conflict and public unrest in many countries in the world, in particular in the Middle East. This is especially true in Iran, where mounting water scarcity and prolonged drought have been playing a major role in social conflict. Over the past few decades, drought, water scarcity, and desertification in Iran, forced millions to abandon their homes and villages and migrated to the already environmentally stressed cities and towns. As a consequence, this migration triggered or intensified social conflict in the country. Furthermore, water-related social conflict in Iran is increasingly on the rise. Only within one year, more than 230 water related social conflict events occurred in the country. These mounting environmental challenges in Iran are increasingly rendering the country vulnerable to widespread social conflict.

1.3 Research hypothesis

This thesis will provide a systematic analysis of the correlation between environmental degradation such as drought, water scarcity, desertification and social conflict across Iran. The expectation of this research is to show that environmental degradation, particularly water degradation and availability, makes society vulnerable to conflict and socio-political breakdown.

While many studies of the 'environment-conflict nexus' have paid scant attention to low-intensity conflict such as riots, protests and strikes and anti-government violence, this research aims to broaden the scope to include smaller, less violent civil discord and their relationship to water-related environmental shocks and degradation.

Hence, the three main hypotheses (H) of this research are:

H1: Environmental degradation and shocks increase the occurrence of social conflict events.

H2: Environmental degradation and shocks are already a key driver in social conflict throughout Iran.

As oppressive governments with low legitimacy, and poor accountability may fail or be unwilling to respond to their environmental challenges, environmental factors will invariably play a role, triggering or intensifying ongoing civil unrest in Iran. Furthermore, this unrest may turn into a widespread uprising in Iran possibly leading to removal of the regime, or result in violent civil conflict as has happened in some of the region's countries such as Yemen and Syria.

H3: Environmentally induced social conflict in Iran may lead to more intense and violent conflict, culminating in a failed-state scenario in Iran.

1.4 Research question and aims

Research question: are environmental factors causing / or exacerbating social conflict in Iran?

The aims of this research are:

- To provide an overview and examine the deteriorating environmental situation in Iran
- To identify the causes and drivers of growing environmental degradation in Iran.
- To identify the linkage between environmental degradation and civil unrest in Iran
- To investigate the Iranian Government's response to the environmental crisis in Iran.
- To recommend and suggest some solutions to mitigate the looming environmental bankruptcy in Iran.

To answer these aims and over-arching research question, data from online news media articles on protests, riots, strikes, and other public civil unrest events in Iran were collected for the period between 2011 to 2019 (see Table 3). More specifically, the author reviewed various local, regional and international online Persian, Arabic and English news agencies and newspapers which contained information regarding; the number of protests, strikes and clashes between 2011 and 2019 in Iran (see also Table 3). In addition to the media materials used as a primary source of data, this thesis used secondary data in the form of a literature review to corroborate the findings of the media analysis.

1.4.1 Why media

Communication is a fundamental facet of how people become aware of, and to know about, important issues such as environmental problems. Indeed, media sources are a salient public domain through which people come to know about environmental issues and the way they are addressed, disputed, and settled (Hansen 2010). As such, the author of this thesis uses media articles from online news platforms as a primary source to trace the number and the motive of social conflict events. Furthermore, online news media provided the author of this thesis with critical data to establish whether environmental factors were playing a role in civil unrest in Iran. Moreover, using media as a primary source for data collection was critical in finding the increasing number and severity of social conflict events in Iran.

1.5 Study site

1.5.1 Location

Located in West Asia, Iran occupies an area of 1.648,195 square kilometres (Figure 1). It is bordered by the Caspian Sea to the north, Azerbaijan and Armenia to the northwest, Iraq and Turkey to the

west, Turkmenistan to the northeast and Pakistan and Afghanistan to the east. The Gulf of Oman and the Arabian/Persian Gulf to the south. Both the Gulf of Oman and the Persian Gulf form the entire 1,100-mile-long southern border. After Saudi Arabia, Iran is the second largest country in the Middle East and the 18th largest country in the world. With an estimated population of over 80 million, Iran is the second most populated country in the Middle East (after Egypt) and the 17th most populated country in the world (Karimi et al. 2019).

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Figure 1 Political Map of Iran (Source: Ashrafi 2015)

1.5.2 Demography

Iran is one of the world's most ethnically and linguistically diverse countries (Figure 2). Although most Iranians are fluent in Persian, non-Persian ethnic groups make up a large segment of the population – nearly half, according to some estimates (Elling 2015). Persians make up 51% of population followed

by Turk Azeri 24%, Gilaki and Mazandarani 8%, Kurd 7%, Ahwazi Arab 3% (some claim 5 million), Lur 2%, Baloch 2%, Turkmen 2%, other 1% (Figure 3) (Crane et al 2008; Elling 2013).

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Figure 2 Geographic Breakdown of Iran's Ethnic Diversity (Source: Crane et al. 2008)

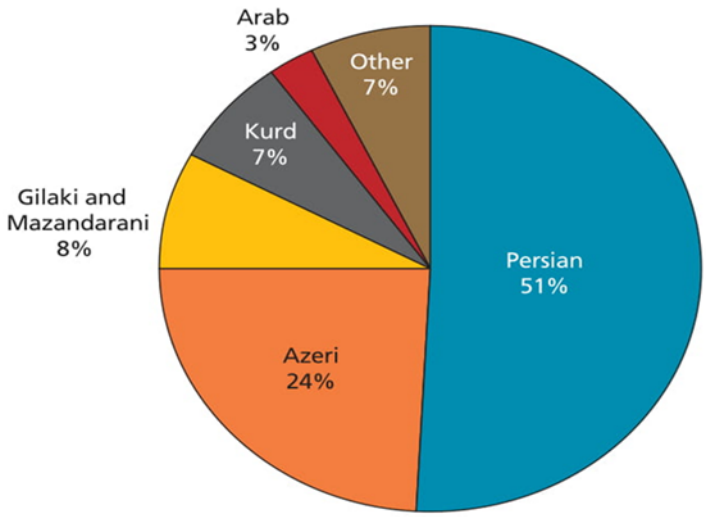

Figure 3 Iran's Ethnic Composition (Source: Crane et al. 2008)

Approximately 89 % of the population is Shi'ite (Elling 2013; Crane et al. 2018). What little religious diversity that does exist is highly correlated with ethnicity: Iran's largest non-Shi'a bloc—Sunni Muslims—are largely drawn from Iran's Kurdish, Baluch, and Turkmen populations and a small group of Arab and Gilaki populations (see Figure 2). Iranian Sunni Muslims are the largest religious minority. Other religious minorities are: Baha'i, Christian, Zoroastrian, and Jewish communities (Elling 2015).

According to many experts, this uncommon diversity engenders a Persian-dominated multinational empire, similar to the Soviet Union, rather than a largely homogenous nation-state (Bradley 2007). These ethnic groups share a widespread sense of discrimination and deprivation from the Persian-dominated government (Bradley 2007). On many occasions these ethnic minorities protested what they perceive as ethnic discrimination and socio-economic marginalisation (Shahi 2019). Indeed, Iran's greatly centralized development strategy has culminated in pervasive socioeconomic inequality between the ethnic populated provinces and central Iran, where there is also an unequal distribution of resources and political power (Bradley 2017). Intensified by these long-established political and socio-economic grievances against Tehran, unrest among Iran's large groups of ethnic communities is on the rise (Bradley 2007). For instance, the Arab populated Khuzestan province, which is the nerve centre of the economy due to its great oil, gas, and water reserves, ranks among Iran's poorest and least developed provinces. In addition, people in Khuzestan province also suffer much higher levels of unemployment and poverty than Persian populated provinces (Bradley 2007). As such, Arabs in Khuzestan province (Ahwaz region) have been regularly protesting against what they see as a systematic ethnic marginalisation and socio-economic deprivation (Elling 2015). A central theme to these protests has been water-related insecurity and deprivation.

1.5.3 Topography and climate

Iran has a diverse topography (Figure 4). The lowest location of the country is on the southern coast of the Caspian Sea which is 28m below sea level, and the highest is Mount Damavand which is 5,671 m above sea level. The mean altitude is 1,200 m above sea level, with most of the country surpassing 450 m above sea level (Madani 2016). Deserts make up one-fourth of the country's land and almost one-fourth of Iran's land is arable which means that Iran has relatively little agriculturally productive terrain. The most fertile agricultural lands that can support crops is found mostly in the north, along the Caspian Sea, and in the northwest, which enjoys a Mediterranean climate. The rest is formed by mountains and highlands (Madani 2016).

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Figure 4 Iran's Topography (Source: Friedman 2016)

Iran has multiple climate zones that are formed by the country's location and geography (Figure 5). Nearly 85% of Iran is covered by arid and semi-arid zones: 35.5% hyper-arid, 29.2% arid, and 20.1% semi-arid (Amiri and Eslamian 2010). Its two main mountain ranges, the Alborz and Zagros, impede moisture from reaching the central parts of the country, accordingly dividing the country into several climate zones, varying between hyper arid and subtropical (see Figure 5; Amiri and Eslamian 2010). As such, temperatures across Iran can differ from minus 20 degrees Celsius to 50 degrees Celsius (minus 4 to 122 degrees Fahrenheit); precipitation varies from 50 mm or under, to more than 1,000 mm (2 to 40 inches) per annum (Madani et al. 2016; Snyder 2019). The country's average rainfall is 250 mm per annum, which is nearly a third of the global average (Madani et al. 2016). However, most of the country's regions receive less than 250 mm per year– some parts receive less 100 mm per year. In addition, this sparse precipitation is also unfavourable with respect to time and location (Snyder 2019).

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Figure 5 Iran's Climate Zones (Source: Vaghefi et al 2019)

1.5.4 Economy

About 60% of Iran's economy is centrally controlled and planned (Karimi et al. 2019). Iran's economy is characterized by the hydrocarbon sector, agriculture and services sectors (World Bank 2019). The State also has a significant presence in manufacturing and financial services. Iran ranks second globally in natural gas reserves and fourth in proven crude oil reserves. Iran's economy and revenues still rely heavily on oil (World Bank 2019). This reliance places the country in a vulnerable position given recent global instability. For example, since the late 1970s, Iran's rate of Gross Domestic Product (GDP) per capita has been fluctuating due to instability in oil prices globally, as well as the 1979 revolution, the destructive Iran-Iraq war, and international sanctions (Farhidi et al. 2015).

In 2015, the country's GDP was US$393.7 billion (Karimi et al. 2019) and in 2017, according to the World Bank, Iran's estimated GDP was US$447.7 billion. Despite the prominence of natural resources, services are Iran's biggest economic sector, which make up around 51 % of GDP. The most important services are real estate and specialized and professional services (14 % of total GDP); trade restaurants and hotels (12 percent) and public services (10 %) (World Bank 2019). Oil production accounts for 23 % of the wealth. Manufacturing and mining account for 13% of the output and agriculture constitutes 10% of GDP. Construction and electricity, gas and water distribution are the smallest sectors, accounting for 7 % of total GDP (World Bank 2019).

According to the World Bank, poverty in Iran is estimated to have declined from 13.1 % to 8.1 % between 2009 and 2013 (US$5.5 a day line in 2011 PPP). However, in 2014 poverty increased, possibly correlated with diminishing social assistance in real terms caused by inflation (World Bank 2019). Most recently, economic sanctions have further jeopardised the State's socio-economic development.

Economic sanctions are not new to Iran. For example, the first significant sanctions followed the 1979 revolution (Shahi 2019). These sanctions were strengthened from 2012 to 2015 due to Iran's nuclear program. The sanctions curbed Iran's oil and petrochemical products exports, which constitute about 13% of Iran's GDP and approximately 80% of the country's total exports (Aloosh et al. 2019). Furthermore, sanctions have resulted in the blocking of fund transfers to and from Iran via the international banking system (SWIFT) which, in turn, have made international trade with Iran challenging if not impossible (Aloosh et al. 2019). In 2015, in an agreement between Iran and some major powers, most of the sanctions were lifted in exchange for limits on Iran's nuclear programs (Karimi et al. 2019), until May 2018, when the Donald Trump US administration pulled out from the agreement and reimposed economic sanctions on Iran (Aloosh et al 2019). It is estimated that Iran's economy shrunk by more than 8.7% in 2019/20 due to shocks to oil and gas sector output caused by these sanctions (World Bank 2019). Moreover, some observers maintain that one million Iranian citizens would lose their jobs as a result of economic deterioration caused by reinstated US sanctions (Shahi 2019). Considering the contemporary international tensions between Iran and many developed nations, other resource, and, water security in particular, is also at risk.

1.6 Thesis outline

This thesis is organised into five Chapters. The first Chapter begins by presenting a background of the study, followed by research questions, research aims and objectives, study site, structure of the research and, in brief, highlights and describes the significance of the research.

The second Chapter extensively reviews the existing literature in which relevant concepts, theories and the theoretical framework of the research will be presented and delineated. Chapter three explains thoroughly the process of data collection, research methods, contexts and design, followed by an explanation of the theoretical framework, finishing with the limitations of the research study. In Chapter four, the empirical findings of the study are stated and analysed. The fourth Chapter introduces the methodology and methods that are adopted for the purpose of undertaking this study. The thesis concludes with Chapter five which outlines the main findings, recommendations and opportunities for further research.

Chapter 2. Literature Review

2.1 Introduction

This Chapter provides a review of the relevant literature necessary to understand the mechanisms and causal pathways linking environment to conflict (See also aims: Chapter 1). The literature is situated in the field of environment-conflict and environmental security. It begins with a brief definition of environmental degradation followed by an overview of impacts and potential consequences of climate change on humans and nature. Then, it presents a summary of the existing literature on the environment-conflict nexus. Finally, as the Middle East is a useful example of the environment-conflict cycle, it provides an overview of the role of environmental factors in ongoing civil unrest in this region with a focus on Iran.

2.2 Defining environmental degradation

Substantial agreement exists that anthropogenic activities can contribute to environmental degradation. Often industries dump their waste and pollutants into the air and rivers, risking the health of many people, and depriving many more from using these resources for other vital activities (Croitoru & Sarraf 2010). Overuse of groundwater in particular is another issue which can lead to saltwater incursion making aquifers unusable. Furthermore, declining groundwater levels can cause land subsidence. Unsustainable agriculture can lead to further land degradation and reduce production of crops. Environmental degradation can be further summarised in the following: deforestation, biodiversity loss, soil and land degradation, water scarcity and pollution, groundwater depletion, drought, flood, desertification, dust storms, and ozone depletion (Croitoru & Sarraf 2010). These problems are exacerbated and will be magnified because of the problematical adverse impacts of global climate change (IPCC 2014).

2.3 Impacts and potential consequences of climate change

While climate change is not a primary theme in this thesis, it is important to acknowledge the complexity it adds to Iran's water security and subsequent civil unrest. Climate change means a change of climate which is attributed directly or indirectly to human activity, that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods (United Nations, 1992). Human activities generate several different greenhouse gases that contribute to climate change (Hardy 2003). These gases which include carbon dioxide, methane, and water vapor are increasing due to burning of fossil fuels and continuing industrialization (Kalkstein 2019).

The expected impacts of climate change on the planet range from a surge in the number of natural disasters such as hurricanes, tornadoes, drought and bushfires, to the acceleration in desertification and land degradation, water scarcity, salinization and soil erosion (Kalstein 2019). Additionally, sea-levels are expected to continue to rise and severe heat waves (particularly dangerous for the mid-latitudes) are also expected to become more extreme and frequent (Kalkstein 2019). However, it is not only the biophysical environment which will be adversely affected, but human security and health will be compromised and socio-political disruptions such as forced migration and civil conflict will follow (Jolly & Ahmad 2019). Therefore, climate change represents a potential threat to the planet's biodiversity and is the most urgent environmental challenge the planet is facing today (Kalkstein 2019)

Although environmental stress and climate change can lead to social conflict such as peaceful protests and demonstrations, the literature generally omits these events to focus instead on high-intensity violent conflict such as civil war, armed confrontation and organised armed conflicts. In other words, much of the debate over the security implications of environmental change revolves around whether adverse environment and climate changes lead to civil war, while glossing over impacts of these environmental changes on the likelihood of social tensions such as protests, riots, strikes, and anti-government violence (Hendrix and Salehyan 2012).

In support, Bernauer et al. (2012) claim that the absence of sufficient data on low-intensity conflict is likely to be one important reason that existing literature pays scant attention to broader examples of civil unrest, such as protests, riots and demonstrations. Thus, unlike much of the environmental security-conflict literature, this thesis pays attention to conflict that encompasses, but is not restricted to, social disruptions such as protests, riots, strikes and anti-government violence. The author contends that encompassing smaller-scale, peaceful social discord is critical in both understanding and building stronger links in the environment-conflict nexus and, to better predict and manage the likelihood of wider, high-intensity conflict (see also Chapter 1).

In order to provide a clearer picture of how environmental degradation can lead to conflict, the next section discusses and reviews the existing literature on the links between the environment, changing weather patterns and politico-social conflict.

2.4 Existing literature on the environment-conflict nexus

Since 1798 when Thomas Malthus issued his article 'Essay on the Principle of Population', many scholars such as Homer-Dixon (1994) have maintained that environmental deterioration can lead to conflict and trigger instability between and within states (Bernauer et al. 2012). Nonetheless, it was only over the last two decades that a considerable body of scientific and policy-oriented literature on the environment and conflict nexus emerged (Bernauer et al. 2012). In this regard, scholars have tended to investigate the availability of the non-renewable and renewable natural resources to establish whether or not there is a link between natural resources and conflict (Raleigh & Urdal 2007; Koubi et al. 2012; Koubi et al. 2016).

Some scholars (e.g. Collier et al. (2004), Lujala (2009) and de Soysa (2002)), have argued that the abundance of natural resources, in particular non-renewable resources such as oil and diamonds, can lead to violence and conflict (Hendrix & Salehyan 2012). This body of literature argues that natural resources can be captured by rebel groups to benefit from their revenues. Or, in the situation of scarcity, their allocation can trigger tension (Hendrix & Salehyan 2012). Advocates of this hypothesis tend to focus on non-renewable and exportable resources such as gold and oil (Bernauer et al. 2012). On the other hand, another body of literature argues that scarcity rather than abundance of vital natural resources, in particular renewable resources such as water and food, can lead to conflict (Homer-Dixon 2001; Maxwell & Reuveny 2000). These scholars argue that scarcity can cause public frustration and intensify conflict over their allocation (Hendrix & Salehyan 2012).

With regard to the mechanisms and causality pathways that link environment to conflict, the existing literature suggests several mechanisms and two potential pathways. For pathways, the first sees climate and environment changes as contributors to conflict through direct 'physiological and/or psychological' factors and scarcity (Koubi 2019, p. 351). The second pathway is that environment and climate changes indirectly contribute to conflict through declining economic productivity and

agricultural yields, inflating food prices, and increasing the movement of migrants. However, the degree of the impact remains dependent on social, economic and political factors that abate or exacerbate the effect (Koubi 2019).

The definition of conflict also is used in many various ways. Some scholars study violent acts that take place between individuals, often defined as crimes, such as rape, murder, assault, and robbery (Mares & Moffetti 2016); others examine intergroup conflict or violent acts between groups of people. Intergroup conflict includes interstate conflict (Devlin & Hendrix 2014); anti-government violence or civil war defined by greater than 1,000 conflict-related deaths (Burke et al. 2009), and, civil conflict, described by < 25 conflict-associated deaths (Von Uexkull et al. 2016); intercommunal violence or conflict between rival communities in a state (Detges 2016); social conflict, e.g. demonstrations, protests, strikes and riots (Bellemare 2015). Hence, unlike the environmental security literature, this research uses a broader definition of conflict that encompasses, but is not restricted to, social conflict such as protest, riots, strikes and anti-government violence.

In this direction, Renner et al. (1991) explore the effect of natural resources on conflict and instability. They contend that throughout human history, conflict over control and access to vital natural resources such as water and land have been a main source of contention and dissonance and that 'history provides numerous examples of how states and nations were destabilised by environmental collapses leading to famine, migration and rebellion' (Gleditch 2015, p. 82).

In the 1990s, the preeminent architect of the nexus, Thomas Homer-Dixon, co-authored an article 'Environmental Change and Violent Conflict' (Homer-Dixon, Boutwell and Rathjens 1993), in which they claimed that renewable resource scarcities such as freshwater, in combination with population growth contribute to mass internal migration and to intrastate conflict. The authors contend that this in turn disrupts global security and increases the risk of failed states (Homer-Dixon et al. 1993). Thus, '[f]ragmenting countries will be the source of large out-migrations, and they will be unable to effectively negotiate or implement international agreements on security, trade and environmental protection. Authoritarian regimes may be inclined to launch attacks against other countries to divert popular attention from internal stresses. The social impacts of environmental scarcity therefore deserve concerted attention from security scholars' (Homer-Dixon 1994, p. 40).

Homer-Dixon (1994, 1999) also argues that decreasing access to renewable resources increases frustration, which in turn creates grievances against the state, weakens the state and civil society and increases the opportunity for instigating an insurrection. He identified three forms of environmental scarcity: (1) supply induced scarcity (i.e. reduced availability of renewable resources due to consumption and degradation that develop faster than regeneration processes); (2) demand induced scarcity, which is a consequence of population growth and/or increased consumption per capita; and (3) structural scarcity caused by an unequal distribution of access to natural resources (Bernauer et al. 2012).

Homer-Dixon (1991) proposed a conflict causality model (Figure 6) which is a pioneering theoretical framework that delineates the sophisticated relationship between environment and conflict through providing a causal-route analysis. By introducing this model, he formed the basis for the following environment-conflict models and created a theoretical framework that contributed to environment-conflict paradigm (Galgano 2019, p. 23).

Kahl (2006) proposes that demographic and environmental stress (DES) as composite variables can contribute to civil violence through two causal pathways: state disintegration and state exploitation. The first one views that DES weakens the state and contributes to a conflict between rival groups vying

for political power. The second pathway views that DES provides the state with an opportunity to mobilise its adherents against other opponent groups in a violent action. Kahl (2006) asserts that not only the acuteness of DES can lead or cause conflict but also the interaction and strength of other variables: 'groupness' and 'institutional inclusiveness' can determine likelihood of conflict. Groupness relates to the degree to which a nation is sharply divided into groups organized around ethnicity, class, religion, language and so forth. Institutional inclusivity relates to the degree to which state institutions include a broad range of society members to take part in policymaking process and hence participate in governing (Homer-Dixon 2006, pp. 585-587).

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Figure 6 Environmental Change and Conflict Model (Source: Homer-Dixon 1991)

Kahl's (2006) exploitation hypothesis indicates another opportunity feature whereby a prospect for debilitated states to secure and boost a broad base of support is presented. This is achieved by mobilising ethnic sections to control the limited resources. When authorities face scarcity-induced public dissatisfaction and opposition, they may spark ethnic violent conflict in order to turn the public attention from their failure in meeting these demands and simultaneously bolster their approval among groups that are likely to take over resources at the cost of conflicting groups (Urdal 2008).

On the subject of civil conflict, Hauge and Ellingsen (1998) explore the impacts of factors such as water scarcity, land degradation, deforestation and demography on civil conflict from 1980 to 1992. The scholars discovered that all aforementioned factors directly affect the occurrence of conflict. Similarly, Hendrix and Glaser (2007) and Raleigh and Urdal (2007) conducted research over how factors linked to climate change, such as water availability and land degradation, impacted the probability of conflict in Africa. They concluded that water scarcity is the only factor that considerably intensifies the possibility of conflict. Further, in Hendrix and Glaser's (2007) study, their investigation on the effects of impermanent climatic changes (i.e. inter-annual changes in rainfall patterns) on intrastate conflict outbreak in sub-Saharan Africa, found that positive changes in precipitation considerably reduce the likelihood of conflict in the ensuing year.

In a more recent study, Hsiang et al (2011, p. 438) examined the effects of planetary-scale climatic changes on intrastate conflict and found that the 'probability of new civil conflict arising throughout the tropics doubles during El Niño years relative to La Niña years'. In a similar vein, Burk et al (2009) assert that temperature spikes from 1981 to 2002 have a substantially positive impact on the onset

intrastate armed conflict. They conclude that a one-degree Celsius temperature rise escalates the risk of intrastate violent conflict by 4.5 % in the course of the same year.

Recent studies have been conducted in addressing the interaction between environmental changes, economic performance, political factors and the risk of conflict. For example, Gizelis and Wooden (2010) and Koubi et al (2012) found that political factors and economic circumstances could negatively affect the allocation of and access to environmental resources. Nonetheless, Gizelis and Wooden (2010) zero in on and empirically discover evidence that economic and political factors could also positively remedy the negative environmental changes and assist countries to cope with environmental degradation. In other words, some societies, due to their technological capacity and economic productivity, can adapt to environmental stress, in comparison to societies who lack such technological and economic capabilities. Likewise, some states owing to their democratic political system and effective and proactive governments are likely to cope with the environmental changes better than non-democratic states (Bernauer 2012). For instance, Bernauer and Koubi (2009) and Li and Reuveny (2006) have detected a positive correlation between democracy and environmental capability.

Zhang et al (2007) identified indirect effects between agricultural productivity, climate and environmental changes and the likelihood of conflict. Based on historical evidence, they demonstrated that inverse climatic changes increase the likelihood of conflict through affecting agricultural productivity between 1400 and 1900 in the world (Bernauer 2012). Similarly, Koubi et al (2016) claim that environmental changes can lead to conflict or intensify the likelihood of conflict. They claim that environmental degradation and climate change can force people to leave their homes and villages and migrate to urban centres in search of alternative work (Koubi et al. 2016). The large number of migrants can burden the economic and resources base in the host regions, thereby intensifying competition over limited resources. For instance, migrants and locals may compete over jobs, lands, healthcare and other resources. In addition, environmental migrants can spark ethnic conflict by intensifying ethnic tensions that result from shifts in ethnic settlement patterns (Hendrix & Salehyan 2012; Koubi et al. 2016; Koubi 2019).

In Africa, Hendrix and Salehyan (2012) examined the relationship between environmental shocks, such asrainfall, flooding, drought and water shortages and socio-political unrest within the continent. In particular, they examined whether changes in rainfall patterns affect peoples' propensity to engage in social conflict such as demonstrations, riots, strikes, communal conflict and anti-government violence. Using a new database of over 6,000 events of social conflict over two decades, they found that rainfall variability has an important impact on both large-scale and smaller-scale events of political conflict. Rainfall links with conflict and rebellion, although wetter years are more likely to feature violent events. Moreover, they claim that intense deviations in precipitation, particularly very dry and very wet years, are correlated positively with all forms of political conflict, though the correlation is strongest concerning violent instances, which are more responsive to abundant than scarce rainfall.

Hendrix and Salehyan (2012) further propose several causal mechanisms linking environmental factors to conflict. One of the proposed mechanisms is that the adverse environmental changes (e.g. drought and rainfall deviation) can lead to conflict among consumers of water (e.g. herders and farmers). As water is a vital commodity for agricultural productivity and pastoralists, it is also of utmost importance for other sectors such mining and manufacturing industries (Eriksen & Lind 2009). Therefore, farmers, manufacturers and other producers may engage in conflict over water resources when water is scarce (Hendrix & Salehyan 2012). In addition, drought and less rainfall aggravate encroachment of deserts

into the agricultural land, intensifying competition over productive lands and pastures (Hendrix & Salehyan 2012)

In relation to food inflation and public unrest, they claim that environmental shocks, both excess (i.e. flooding) and shortages of water (drought), can lead to food shortages and spikes in food prices, leading to various forms of social unrest, such as protests and riots (Hendrix & Salehyan 2012; Koubi 2018). In support, Smith (2014) finds a positive linkage between food price inflation and the onset of urban unrest in African societies. The 2017-2018 nationwide protests in Iran over increased food prices is another example. Although, environmental factors were one of the causal considerations, raising the price of eggs and other staple crops in 2017-2018 led to nationwide protests and riots in Iran (Shahi 2019). Environmental degradation-induced food price inflation can also increase the risk of civil conflict. For example, by using disaggregated data for 113 African markets from 1997 to 2010, Raleigh et al. (2015) found that reduced precipitation increases the instances of violent conflict through its impact on prices of food (Koubi 2019).

Hendrix and Salehyan (2012) propose that migration is another factor that can lead environmental degradation to conflict. This mechanism takes place when livelihoods in regions affected by environmental shock come under stress and many move to urban centres in search of alternative livelihood. This can lead to intensified competition over services and resources, e.g., jobs, housing, and healthcare in the urban centres or receiving areas. Also, the flux of environmental migration to urban centres can lead to a concentration of unemployed youth and people frustrated with the government response to the environmental crisis. This situation can spark social unrest (Snyder 2019) however, the degree of the impact remains dependent on social, economic and political factors that abate or exacerbate the effect (Koubi 2019).

Flux of migration can also change ethnic settlement patterns in the receiving areas, which may intensify intercommunal conflict (Suhrke, 1997; Reuveny 2007). Urban growth also places strain upon governments as demand increases for basic services such as sanitation, electricity, police protection, and roads (Neuwirth 2005, cited in Hendrix and Salehyan 2012). Thus, migration can create friction between locals and new arrivals as well as place increased demands on providers of local services.

Hendrix and Salehyan (2012) also propose that deviation from normal rainfall patterns can have adverse macro-economic consequences which in turn can take a heavy toll on financial and human resources in developing countries. Displacement, agricultural failure, loss etc. associated with negative environmental shocks, can inflict damage on overall economic output. Studies have revealed in general that negative environmental shocks have an adverse impact on overall productivity (Miguel, Satyanath & Sergenti, 2004; Jensen & Gleditsch, 2009). Public unease over troubled or a sluggish economy may in turn lead to social disorder and civil conflict (Koubi 2018; Koubi 2019).

Building on these ideas, Bueno de Mesquita & Smith (2017) found that output shrinkages due to environmental shocks could also shrink government coffers through a contraction in tax revenue. Diminished resources reduce government capacity to provide its citizens with goods and services and keep its political promises, thereby, paving the way for uprising and overthrowing the government (Bueno de Mesquita & Smith 2017). In a similar vein, Koubi (2019) contends the inability of a government to provide goods and services for its people after an environmental shock could spark protests and riots against the authorities. Moreover, environmental shocks may hinder a government's ability to counter insurgency due to diminished revenue and destruction of infrastructure, therefore extending the duration of social conflict. Climate and environment changes contribute to conflict and instability under certain conditions and in combination and interaction with some social, economic and political factors. She maintains that climatic conditions breed conflict in

fertile grounds. In other words, regions depend on agriculture and with weak economic production and political marginalization, are more vulnerable to climate induced conflict (Koubi 2019).

Koubi (2019), in line with existing environment-climate conflict literature, suggests that there are two potential pathways that link environmental and climatic changes to conflict. The first pathway contributes to conflict through direct 'physiological and/or psychological' factors and scarcity (Koubi 2019, p. 351). The second one indirectly contributes to conflict through declining economic productivity and agricultural yields, inflating food prices and increasing the influx of migrants.

Similarly, Galgano (2019) argues that environmental stress alone was unable to instigate conflict. However, when environmental stress interacted with other factors such as unique conditions of high level socio-economic and political instability, conflict would likely ensue. More specifically, within failing states and states in which the environment plays a vital role for economic productivity, environmental degradation forms fertile grounds for conflict and instability. He argues that in addition to their weak resilience in adapting to the environmental changes, these states, due to four causality associated effects (1) diminished agricultural yields and productivity; (2) economic shrinkage; (3) population displacement; (4) and civil unrest, are more vulnerable to environmentally induced conflict and civil unrest (Homer-Dixon 1991; Galgano 2019, pp. 1-14). The ongoing socio-political instability in some of the Middle Eastern states are a case in point.

2.5 Middle East: Water scarcity, drought and unrest

The effects of climate change can be first felt with water, especially its availability and quality as a result of drought, rising temperatures and floods (Spratt & Dunlop 2017). According to the US National Intelligence Council (2017), around 1.8 billion people in the world lack access to clean drinking water and approximately two billion people lack access to sanitation. And 'more than 30 countries' – (nearly fifteen of them located in the Middle East) – will face severe high-water stress by 2040 (Figure 7) resulting in further economic, social and political disputes (Spratt and Dunlop 2017). Indeed, drought and drastically increasing water demand have already been contributing to uprisings, conflicts, migration and food insecurity in many of developing countries, particularly in the Middle Eastern states (Gleick & Iceland 2018).

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Figure 7 Country-Level Water Stress in 2040 under the Business-As-Usual Scenario (Source: Adapted from Kammeyer 2017)

The ongoing Yemeni civil war also has an apparent environmental cause too, which began by protests over water shortages. Both climate change and many decades of poor water management have rendered Yemen one of the most water-stressed states in the world. Many studies (de Plessis 2019; Robinson and Fergusson 2014; Shahi 2019) hold that drought and its social repercussions were significant triggers for the Yemenis' current deadly civil conflict (Shahi 2019). That uprising was triggered in May 2011 in Ta'iz province, where people protested against the lack of water supply by gathering in the central city square. Soon, these protests became violent and immediately spread to other parts of the country, where the regime's forces resorted to extreme measures to disperse the protestors (Robinson & Fergusson 2014).

The ongoing civil conflict in Syria is another example of environment-induced civil conflict in the Middle East. Many academics and policy makers attribute the civil conflict in Syria to the drought that occurred in late 2000 (Koubi 2019). Clearly however, the conflict is a result of a broad set of socio-economic and political factors and was fostered by a wave of widespread uprising during the Arab Spring (Gleick 2014).

Before the breakout of the Syrian uprising in 2011, the country was hit by harsh drought between 2006 and 2009 (Snyder 2019). By 2009, according to the International Federation of the Red Cross (IFRC 2009), about 800,000 Syrians had lost their livelihoods as a result of the drought. By 2011, 75% of the most vulnerable Syrian rural residents were affected by the collapse of the agricultural industry and about 85% of their livestock had been lost (Galgano 2019). This environmental catastrophe affected 1.3 million citizens, mostly in the northeast of the country, which is the hotbed of the current civil violent conflict (Galgano 2019). This total crop failure and loss of livestock initiated massive population movement, particularly farming-reliant families, from rural areas to major urban centres such as Aleppo. These urban areas simultaneously tried to adapt to the inundation of Iraqi refugees (Femina & Werrell 2012). This large influx of forced migrants strained the capacity of adaptation of the weak and corrupt Syrian regime, strained the ethnic fracture lines and instigated political tension, and typically increased the illegitimacy of the Syrian regime (Welch 2015). By early 2011, the frustrated

Syrians had begun taking to the streets, to a certain degree, to demonstrate their frustration with the drought and to express their dissatisfaction with the regime's response.

Studies show that the occurrence of heat waves in the Middle East will rise by nearly 30 % and as these events of heat waves will become longer and hotter and more frequent. In short, the region will become unliveable (Snyder 2019). In support, a Massachusetts Institute of Technology (MIT) study in 2015 anticipated that in the next three decades, temperatures in the Persian Gulf, including Iran, would transcend human adaptation ability. According to the director of the Max Planck Institute for Chemistry, Jos Lelieveld, 'prolonged heat waves and desert dust storms can render some region uninhabitable' (Amer 2016). Benjamin Cook, a NASA scientist, claimed that the temperature increases and droughts in the Middle East could lead to critical food scarcity (Snyder 2019). These warnings were reflected in a statement by the Iranian Minister of Environment who believed that by 2050 Iran's water resources may have significantly declined and forced 50 million Iranian citizens, equal to 70 % of the population, to leave the country.

Similarly, in an interview in 2018, the Iranian Home Affairs Minister said that 'mass migration from southern and central parts to the northern parts of the country has already began and internal environmental refugees will change the social landscape of the country within the next five years and in ten years it can create human catastrophe' (Shahi 2019). As this situation drags on, the environment further degrades, drought persists and water scarcity grows, it will instigate more protests and cause further public frustration. Indeed, from 2017 to 2019, the country witnessed several nationwide protests over water shortages and polluted water. Since then, more and more rural Iranians have migrated to the large cities because of the prolonged drought and water shortages (Snyder 2019). Alarmingly, this ongoing rural to urban migration bears some resemblance to the lead up events to the Syrian revolution (Shahi 2019).

2.6 Summary

This Chapter has reviewed and summarised the existing literature on the links between environment and conflict. The review indicates that there are several mechanisms and two causal pathways linking environmental degradation to conflict. In relation to the pathways, the first one sees climate and environment changes as contributors to conflict through direct physiological and/or psychological factors and scarcity. Protests and riots over water shortages or environmentally induced food inflation are examples of the social conflict that is triggered by environmental factors. Furthermore, water scarcity can lead to conflict between water consumers in a society. For instance, in a situation of water shortage, farmers, pastoralists and industrial manufactures may compete over the scarce water resources.

The second pathway is that environment and climate changes indirectly contribute to conflict through declining economic productivity and agricultural yields, inflating food prices, and increasing the movement of migrants. For example, drought and water scarcity in regions dependant on agriculture may induce migration to urban regions. Increased prices for urban consumers or increased competition over resources in urban areas leading to declining government coffers, can place strains on public finances and adversely impact public expenditure.

Also, environmentally induced rural urban migration can lead to concentration of unemployed people in the cities. Eventually, disaster-affected and unemployed people may take to the streets, expressing their frustration with the environmental crisis and their dissatisfaction with the state's response.

Chapter 3. Methodology

3.1 Introduction

This Chapter seeks to present the methodology used in the process of data collection and analysis in this research study. Jennings (2010) suggests that methodology should include; the employed methods, the reasons they have been selected, and how these methods assist to collect, examine, and analyse the data. The methodology was informed by the research's objectives discussed earlier.

First, this Chapter explains the research context and design, followed by an explanation of the theoretical framework that guides the research. A detailed explanation of the procedures for the data collection is then provided. Thus, the following outlines the research methods employed and concludes with the limitations of the research.

3.2 Research context

Since the Cold War era, it has become necessary to expand the definition of national security to incorporate environmental threats to global stability (Galgano 2019; Koubi 2019). Over the last two decades, the world witnessed a seismic shift in defining and perceiving the present-day national security terrain and global leaders have accepted that the detrimental impacts of climate change and other environmental factors are rendering numerous nations vulnerable to civil unrest and potentially violent discord. Since the 1990s, the potential effects of global environmental stress on the trigger of civil violent conflict has gained attention in the academic domain, with a particular emphasis on renewable resource scarcity (Ide 2015).

In a similar vein, this thesis seeks to investigate the correlation between environmental stresses and civil unrest, with a strong focus on; protests, riots and other forms of environmentally induced public unrest. This research investigates the Islamic Republic of Iran as a case study. Iran is an underexplored candidate for potential environmentally-induced uprising and civil conflict due to growing water scarcity, persistent droughts and adverse climate change. The country, at times, is described as a 'water bankrupt nation' (Madani et al. 2016, p. 2009).

3.3 Research design

Research was conducted to better understand the context of the study and allowed the author to review the recent scientific literature related to the environment-conflict nexus. The literature consisted of media articles and news reporting, which informed the content and the basis of the tools for data collection. Bryman (2012) indicates that case studies are sites for the use of both quantitative and qualitative research, with this knowledge in mind; a case study method was selected as it was more suitable for both the qualitative and quantitative research methods.

3.4 Theoretical framework

In order to explain the complex nexus between environmental degradation and conflict, and to establish a theoretical ground, this research draws extensively on arguments developed by Thomas Homer-Dixon, Colin Kahl and other scholars who have worked on the theme of environment-conflict nexus.

Homer-Dixon' s conflict causality models suggest that the relationship between environment and conflict starts with the anthropogenic impacts on the environment, which is a result of two dimensions: 'population and human activity per capita' (Galgano 2019). Kahl (2000) provides a framework that puts the state at the core of the analysis and zeroes in on the socio-political processes engaged in generating conflict as much as the environmental and demographic factors. Furthermore, Kahl (2000) adds other insights from other paradigms of rebellion and revolution, including theories of ethnic and domestic discord and seeks to generate a theoretical bridge between the field of environmental conflict and the field of civil war (Kahl 2000).

This research argues that environmental degradation and scarcity (i.e. droughts and water scarcity) can both directly and indirectly cause public conflict and unrest. This is especially true in Iran, the country that have been witnessing riots and communal conflict over water. In support, several studies (Michel 2017; Waldman 2018; Shahi 2019; Snyder 2019) have identified a positive relationship between environmental factors and recent civil unrest in Iran. The studies claimed that the persistent droughts, climate change and growing water scarcity had significant roles in triggering the recent demonstrations, protests and clashes in Iran and will continue to do so. This research identifies how and whether environmental factors, especially growing water scarcity and droughts, have played a key role in the ongoing demonstrations and public unrest in Iran, and whether this unrest can lead to a widespread uprising and civil conflict.

3.5 Data Collection

To find answers to the research problem and to test the hypotheses: The correlation between environmental degradation and mounting civil unrest in Iran (also see Chapter I: aims), the researcher collected data on protests, riots, strikes, etc. events in Iran between 2011 to 2019 (Table 3). The author reviewed various local, regional and international online Persian, Arabic and English newsagencies and newspapers which contained information regarding; the number of protests, strikes and clashes between 2011 and 2019 in Iran. International and regional sources were added to ensure a more holistic and unbiased reporting of protests and civil unrest in Iran. Table 3 outlines the key sources used to trace the evolution of civil unrest in Iran.

The author chose to trace media news stories from 2011-2019-for the following four reasons. First, as the author found, the first violent environmentally induced protest occurred in 2011, during which one protestor was killed. Second, in 2011, many countries in the Middle East, including Iran, witnessed a rise in the number of protests and social conflict events. Third, in Iran, two years prior to 2011, the majority of the protests were due to the issue of a rigged presidential election. In 2009, many Iranians refused the results of the tenth Iranian presidential election which was held on 12 June, and protests continued consistently until 2010 (Aljazeera 2010; CNN 2010; Worth and Fathi 2009). Hence, the cause of the protests was mainly political and not applicable to this thesis. Finally, due to time constraints, the author was unable to analyse more media reporting news prior to 2011.

As the author of this research speaks and writes in Arabic and Farsi, in addition to English, the three languages were used in searching for the required data.

In addition to the media articles and reports, secondary data formed the other main source of required data of the literature. Secondary data comprised of; peer reviewed and scholarly articles, books, reviews and online publications that were relevant to the topic of the research study. This secondary data, in addition to providing the required data, was significant in providing a sound understanding of the research context and the study area via a literature review.

To reduce the potential of state-bias, local news agencies formed part of the data collection suite, alongside a range of semi-official newswires to state-owned agencies. The semi-official newswires such as ISNA and Fars News Agency used had some ties to the Iranian regime. These sources have provided this research with some useful data about the number of protests. However, in describing the motives of the protests and the protestors themselves, they were biased toward the authorities.

3.6 Methods

This research study has adopted a mixed method approach, which combines both qualitative and quantitative approaches to analyse, interpret and code the data. A mixed methods approach is a research approach by which examiners gather and interpret both qualitative and quantitative data in the same research (Shorten & Smith 2017). The mixed methods approach allows a researcher or a group of researchers to incorporate components of quantitative and qualitative research approaches (e.g., quantitative and qualitative perspectives, analysis, data collection, and inference skills) in order to analyse and corroborate the data (Johnson et al. 2007). The flexibility of mixed methods approach allows researchers to determine their research design by what they want to discover rather than through any predetermined epistemological standpoint (Bryman 2006).

The media news articles were the primary source for data collection. In collecting data from the media about the number and motive of protests in Iran, the author first began by using Google to search for words such as protests, unrest, environment, and Iran. Looking up these words helped the author to discover numerous websites and online newsagencies that had covered the protests and civil unrest events in Iran. The latter newsagencies and online newspapers then directed the author to other useful websites that also had thrown light on the social conflict events such as protests, riots and strikes in Iran. Therefore, the author counted the number of the social conflict events that occurred in Iran from 2011 to 2019. After counting the number of events, the motive, causes and drivers were analysed which this helped the author to create three graphs: one for the number of social conflict events between 2011 and 2019, one for environmentally induced social conflict events between 2011 and 2019, the third graph was created to compare the numbers of both environmentally and nonenvironmentally induced social conflict events (see Figures 13, 14, and 15).

Once the research question and context were established, collection of materials for content analysis, discourse analysis, and thematic analysis was conducted (see Table 1).

Table 1 Project Data Sources and Methods of Analysis

Data Sources	Methods of Analysis
Media News articles	Discourse Analysis, Content Analysis, and Thematic Analysis
Secondary Data: Relevant Literature Review	Content Analysis

Adapted from Szili 2010

3.6.1 Content analysis

Content analysis, which is part mixed method approach, was the primary research method adopted for this project. Content analysis is a social research approach of analysis, examination and interpretation of texts; texts are units of analysis which appertain to data targets that convey information to a reader or group of people (Churchill 2013). The author of this research by using terms and words such as environmental degradation, protests, conflict, climate change, violent and other related words and terms analysed the content of data sources outlined in Table 2. Content analysis assisted the author to find that the number of social conflict events and their severity in Iran had dramatically increased since 2011.

3.6.2 Discourse analysis

Whilst content analysis is an effective method in establishing content and analysing meaning (Szili 2011), discourse analysis was included as a second research method to thoroughly question meaning and to analyse our data sources outlined in Table 3. Discourse analysis investigates the process of meaning construction with respect to 'intertextuality', 'visuality', 'discursive formation' and 'power' (Szili 2011). In the research, the author employed discourse analysis to identify how environmental issues/problems are represented and depicted in media reporting news and articles (see Table 3).

3.6.3 Thematic analysis

In addition to content analysis and discourse analysis, thematic analysis was adopted as a third research method in analysing the data sources outlined in Table 2. Thematic Analysis is a form of qualitative analysis. It is adopted to analyse classifications and present themes that are relevant to the data (Joffe 2012). It rigorously elucidates the data (Boyatzis 1998 cited in Ibrahim 2012). It also, helps to identify the important themes in the description of the phenomenon under investigation (Joffe 2012). It assists the researcher to connect an analysis of the prevalence of a theme with one of the whole contents (Ibrahim 2012). Thematic analysis does greater than recording number of explicit terms or phrases, it zeroes in on illustrating and identifying both explicit and implicit opinions and ideas within the data, that is, themes (Guest et al. 2014, pp. 10-11). Thematic analysis provided the author a critical method in understanding the language issues related to the public and media's ignorance about climate change and its role in the environmental plight in Iran.

3.7 Limitations

The author would like to acknowledge a number of limitations in this research. One key limitation was the language barrier. The author found that there was no exact popular term for climate change in Persian media and in public. Moreover, the author found that there was no public discourse about the

role of climate change in the declining environmental conditions in Iran. The author of this research believes that may be attributed to the language as there is not set term for climate change in Persian/Farsi language.

As this desktop online study was conducted in Australia, there could be sites that the author would not have access to in Australia. Hence, distance is another limitation in this study.

To better understand the nuances of climate change or environmentally induced civil unrest, the author should also interview individuals, protestors and potentially governmental officials about how environmental issues has been handled. However, time and word-limit constraints presented another limitation to conduct interviews. In addition to time limitations, the environmental issues in Iran are seen as a socio-political matter and are highly sensitive issues, hence, conducting interviews could put the respondents and researcher at risk.

3.8 Conclusion

This Chapter outlined the methods used for this research. Since the aim of this thesis is to identify the environmental factors in civil conflict and socio-political turmoil in Iran, the most appropriate methodology for this thesis was considered to be a mixed method in nature. Mixed methods research approach provides a significant paradigm to produce important research questions and to provide validated and justified answers to the questions of the research. These methods included content analysis, discourse analysis, and thematic analysis.

Chapter 4. Findings and discussion

4.1 Introduction

Over the last ten years, many scientists, national and international institutions have warned of a looming crisis deriving from Iran's environmental degradation and scarcity of resources (Madani et al. 2016; Michel 2017; Shahi 2019; Snyder 2019). In particular, concerns have been raised of an imminent environmental collapse and the potential for significant socio-economic consequences caused by this environmental degradation.

To examine the existing and potential socio-political consequences of environmental changes in Iran, this Chapter first provides an overview of the current status of water resources and the environmental situation. Here, it identifies the main causes and drivers of current environmental degradation and growing water scarcity. Also, this Chapter discusses the risks that the mounting water scarcity and droughts have been causing and how this situation can or may lead to nationwide uprising and potential socio-political collapse.

4.2 Iran's environmental challenges: an overview

Vanishing lakes and rivers, diminishing groundwater, land subsidence, water pollution, water supply restrictions and discontinuation, droughts, floods, forced population movements, agricultural failures, salt, sand and dust storms, and ecosystem losses are the modern, water related challenges of Iran, a country which had once been at the forefront in sustainable water management for millennia (Madani et al. 2016). Nowadays however, climate change, rapid socioeconomic development, poor water management, population growth together with other factors, have driven this country to the brink of water bankruptcy and environmental collapse. The well-known Iranian water expert Madani (2016) describes the Iranian water situation as water bankruptcy. Essentially, Iran is turning 'water broke' owing to the extensive water withdrawals and usage that have exceeded the replenishment of surface water resources and aquifer recharge rates (Collins 2017). In support, the World Resources Institute ranks Iran fourth on its list of the world's most water-stressed countries (see Figure 7).

4.2.1 Vanishing lakes

Lake Urmia in the northwest, the second-largest lake in the Middle East, has significantly diminished and is expected to entirely vanish in six to nine years. From 1985 to 2015, Lake Urmia, which once extended over more than 5000 square kilometres, diminished by 90 per cent (Shahi 2019; Figure 8). The total disappearance of Lake Hamun, in Sistan and Baluchestan province in the east, is seen as a tragedy for Iran. Between 1999 and 2001, due to climate change and unsustainable water management, the river flow into the Lake Hamun shrunk and finally, the lake totally dried up (Zafarnejad 2009; Figure 9). As a result, the inhabitants of 124 local villages were forced to migrate to other areas and urban centres. Both Lake Urmia and Lake Hamun have symbolised the deadly environmental bankruptcy in Iran (Saatsaz 2018; Shahi 2019).

Image removed due to copyright restriction.

Figure 8 Diminishing Lake Urmia (Source: The Australian Water Partnership 2017)

By 2014, Urmia had shrivelled to a mere 10% of its maximum (Source: The Australian Water Partnership 2017).

Image removed due to copyright restriction.

Figure 9 Desiccated Lake Hamun (Source: Zafarnejad 2009)

The left photo was taken in 1976 which shows thriving Lake Hamoun and the right photo was taken in 2001 which shows vanished Lake Hamun. (Source: Zafarnejad 2009)

4.2.2 Drying wetlands

Lakes Urmia and Hamun are not the only threatened lakes. Shadegan Lake, the most important site in the world for the marbled teal duck, Marmaronetta angustirostris (Madani 2014; Saatsaz 2018; Sima 2006) and Lake Parishan in the south, are the other shrinking water bodies in Iran (Madani 2014). The construction of dams, extensive water withdrawals and climate impacts have also impacted wetlands such as the Hoor-Al Azim wetland in the outlet of the Karkheh River Basin in southwest Iran (Davtalab et al. 2014). According to the deputy head of the Department of Environment (DOE) for wetlands, Masoud Bagherzadeh, the Jazmourian wetland in the south and Lake Gavkhooni in central Iran have lost 100% and 90% of their areas respectively. He stated that 60 out of 105 wetlands in Iran are entirely desiccated and some others are in critical condition (Tehran Times 2018; Radio Farda 2018).

4.2.3 Critical conditions of rivers

Due to climate change and unsustainable water management, the Zayandeh-Rud River—the backbone of human development in central Iran—already disappears seasonally, causing extreme strain on agricultural productivity and industries, and imposing pressures on urban residents (Madani Larijani 2005b). Also, the only navigable river in Iran, the Karun River, is in a critical condition. Due to aggressive dam construction and water transfer projects, the salt levels in the Karun River increased, rendering a large number of agricultural lands unproductive (Saatsaz 2018; Michel 2017).

4.2.4 Depleting groundwater reserves

The Iranian water bankruptcy is not confined to surface waters. Globally, Iran is amongst the top groundwater miners (Döll et al. 2014; Gleeson et al. 2012). In fact, according to many experts, due to

overexploitation, most of the groundwater reserves have been used or exhausted completely and the rest are rapidly depleting (Madani 2014). In each of the country's main basins, groundwater resources are in a critical condition and their levels are shrinking 3.1–11.2 mm/year (Michel 2017). At current rates of intense overexploitation, within the next five decades, 12 out of 31 provinces will completely use up their aquifers (Michel 2017). In 2017, more than 540 cities were teetering on the edge of water stress and the situation only exacerbated in 2018 (Shahi 2019).

4.2.5 Land subsidence and water issue

Declining groundwater levels have also culminated in substantial land subsidence in every part of the country (Dehghani et al. 2013; Motagh et al. 2007; Mousavi et al. 2001). According to Madani (2014), in 2014, land subsidence occurred at a rate of 36 cm in a year, with the Tehran Plain experiencing the most rapid land subsidence in the world (Madani 2014). Moreover, due to extensive agricultural activities surrounding urban centres, as well as ineffective treatment systems and a lack of proper sewage collection, the groundwater tables are becoming more polluted by the wastewater, compromising the quality of tap water in urban regions. As a result, many people have abandoned tap water and turned to purchasing unregulated bottled water (Fattahi et al. 2013). In addition to water quality issues, water supply disruptions and rationing are occurring frequently, in particular during dry seasons in major urban areas (Madani et al. 2016; Michel 2017; Tahbaz 2016). There are also suggestions that water will soon be rationed in Tehran (Peisse 2018).

4.2.6 Floods

The occurrence of floods has also increased and become more prolonged, inflicting damage to the economy, infrastructure and society. For example, regions where floods were once uncommon have received record-high rainfall in 2019, leading to severe flooding and resulting in almost 100 fatalities and nearly $10 billion USD destruction to properties and infrastructure (Snyder 2019). From 2015 to 2018, six severe floods were recorded in arid and semiarid areas of the state regions where floods were historically unusual (Vaghefi et al. 2019).

4.2.7 Environmentally-induced migration

Although the current Iranian government has taken measures to tackle the rapid environmental degradation, environmentally induced migration is increasing and millions have migrated to the major urban centres. Over the last five decades, due to desertification, drought and water scarcity, more than 30000 villages have been abandoned (Shahi 2019) and many major urban centres have been overburdened by an influx of migrants, exceeding their capacity to host more residents (Snyder 2019). For example, by 2011, due to drought and water scarcity, the residents of 4000 villages in the Fars province were forced to migrate to already environmentally stressed provincial towns and cities and half of the South Khorasan Province villages were abandoned, due to persistent drought and water scarcity (Shahi 2019). Issa Kalantari, the former Iranian agriculture minister's statement revealed how environmental degradation can pose an existential threat to the country. He maintained that desertification is threatening to endanger some regions, particularly the southern and eastern provinces, rendering them uninhabitable by 2030 (Noon 2017). He added that this situation may in turn force millions to migrate to the already water stressed and environmentally stressed provinces (Noon 2017). Moreover, some Iranian officials have claimed that in less than three decades, 50 million

Iranian citizens will be displaced to other places due to the pressing environmental conditions (Shahi 2019).

Environmental degradation, particularly desiccated water resources, drought and desertification, will escalate rural-urban migration, with widespread socio-political ramifications. Discontent over the regime's environmental management is already widespread and has triggered public unrests and clashes in impacted provinces (Shahi 2019). Seemingly, this frustration will intensify as urban centres increasingly receive more internal migrants. The number of frustrated unemployed or underemployed citizens furious with the government, will increase and become congregated in urban centres (Snyder 2019).

In addition to the above-mentioned drivers of the water crisis in Iran, it is expected that climate change will further exacerbate the country's environmental situation. As reported by many projections, climate change will exert further strains on the country's water resources (Jamali et al. 2012; Zarghami et al. 2011), having critical consequences for the agricultural sector and food production (Moradi et al. 2013), hydro electricity industry, and water security and the reliability of water supply operations (Davtalab et al. 2014; Madani 2014).

4.3 The key crisis causes and drivers

As this thesis seeks to identify the main causes and drivers of environmental degradation, above all, the growing water crisis and prolonged droughts in Iran, the next section of this Chapter provides a clear explanation of the crisis production mechanisms and the main drivers behind the impending environmental bankruptcy.

These are mostly anthropogenic and vary from external to internal factors. As many experts claim (e.g., Madani 2014; Madani et al. 2016; Michel 2017; Shahi 2019; Snyder 2019; Vaghefi 2019), they range from global warming, water mismanagement, 'thirst' for development, rapid urban and population growth and inefficient agricultural policy. Thus, this section, in line with many experts and scholars will shed light on the aforementioned factors as the major causes and drivers of Iran's environmental degradation, or environmental bankruptcy, as this thesis depicts it.

4.3.1 Climate change

The IPCC defines climate change as a change in climate over a period of time due to human practices and natural variability. Specifically, this includes quantity of rainfall, temperature and pace of evaporation (Afshar & Fahmi 2019). Scientists and high-profile scientific institutions by and large acknowledge that global warming trends are highly likely the result of human activities, particularly due to greenhouse gases and above all, carbon dioxide (du Plessis 2019, p. 28).

Iran, as a country located in one of the driest arid and semi-arid regions of the world, has been severely affected by global climate change (Figure 10). The country has experienced multiple extreme weather incidents such as major floods and severe, frequent drought events in the current and previous centuries (Modarres et al. 2016). It has been observed that climate change's significant effects linked to water resources are increasing temperature, changes in precipitation patterns, and rising the risks of extreme weather events such as floods and droughts. Also, climate change may largely disrupt the seasonal variability of rivers flows in Iran (Fahmi & Afshar 2019). Madani (2014) maintains that the current water crises in Iran are diminishing groundwater, vanishing lakes, rising water demands, declining water supply and exacerbating extreme weather events. Over the last few decades, more

than 11 million persons have been affected by floods which caused more than 2600 casualties (Madani 2014).

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Figure 10 Drought in Iran, 2016-2017 (Source: Snyder 2019)

Meteorological records explicitly demonstrate that over recent decades Iran has experienced accelerated warming, which in turn has led to various climatic effects. Meteorological data of some ground stations in Iran were examined by Modarres et al. (2016) to investigate climate change and its effects on some weather extremes. They found that the country has been warmed by approximately 1.3 degrees over the time period of 1951–2013, with a rise of the minimum temperature at a rate two times that of the maximum temperature rise. Accordingly, a rise in the occurrence of days with intensely hot weather and a decline in the occurrence of days with cold extremes have been observed. Moreover, the annual precipitation has diminished by 8 mm per ten years, leading to an expansion of the country's dry zones (Alizadeh-Choobari & Najafi 2018).

There is substantial agreement amongst scientists that climatic change will continue to contribute adversely to growing water scarcity in Iran. According to the scientific literature (Karimi et al. 2018; Vaghefi et al. 2019; Vaghefi at al. 2013), Iran's water resources will undergo major deterioration due to climate change. Several rivers and lakes have been studied by using historical hydro-meteorological statistics and run-off models, in addition to scenarios of climate change induced global warming.

Karimi et al. (2018) summarise the impacts of climate change on Iran's water resources stating that they find water resources will notably decrease in all provinces (Table 2).

Table 2 Summary of the Climate Change Impacts on Water Resources in Iran

Period	Basin/Region	Impact	Reference
2010–2039	Zayandeh-Rud, Isfahan	↓(~40–70%)	Massah Bavani and Morid (2005)
2040–2069		↓(~52–67%)	
2070–2099		↓(~58–77%)	
2025	Karkheh, Khuzestan	↓(~44%) in southern part ↓(~18.5–48.8%) in southern part	Vaghefi *et al.* (2013)
2025	Aras, Azarbayejan	↓(~2.18–3.15%)	NCCO (2010)
	Atrak, North Khorasan	↓(~7.24–11.48%)	
	Bandar Abbas	↓(~0.30–5.92%)	
	Talesh-Mordab Anzali, Gilan	↓(~2.77–4.21%)	
	Tashk-Bakhtegan and Maharloo, Fars	↓(~5.67–15.15%)	
	Western border	↓(~1.96–5.13%)	
	Zohreh-Jarrahi, Khuzestan	↓(~1.46–6.90%)	
2025	Pishin, Sistan and Baluchestan	↓(~18.7%)	Mohammadnejad (2010)
		↓(~23.1%)	
2040		↓(~21.7%)	
		↓(~33.0%)	
2015–2030	Lake Urmia	↓(~22.1.%)	Nazari (2015)
	North border	↓(~3.1%)	
	Karkheh, Khuzestan	↓(~35.4%)	
	Namak lake, Qom	↓(~17.8%)	
	Atrak, Khorasan	↓(~23.2%)	
	Zayandeh-Rud	↓(~7.2%)	
	Karoon, Khuzestan	↓(~10.3%)	
	Bakhtegan lake	↓(~13.3%)	
	Jazmoorian, Kerman	↓(~10.9%)	
	Bandar Abbas	↓(~8.8%)	
	Great Sefid-Rud, Gilan	↓(~27.9%)	
	Central desert	↓(~6.0%)	

Source: Adapted from Karimi et al (2018)

Amiri and Eslamian (2010) examined the persisting runoff alteration in 30 basins and found that decline in precipitation along with a global warming impacts would culminate in rising the proportion of runoff in winter and decreasing it in spring and summer. Mohammadnejad (2010) similarly projected that the Pishin Basin will experience 33 % decrease in its average annual runoff by 2040 (cited in Karimi et al. 2018). Also, Vaghefi et al. (2013) predicted that the average annual runoff will be almost 44% and 18.5–48.8% less in 2025. Moreover, it is projected that the impacts of climate

change will significantly vary from region to region. For example, according to climate scenarios, by 2025, the runoff of Tashk, Bakhtegan and Maharlu lakes (Fars Province) will decline around 5.67–15.15%, and the Aras Basin's runoff will experience almost 3% reduction (Karimi et al. 2018). Furthermore, the most significant runoff decline is projected in the north provinces (e.g., Mazandaran and Qom) with –11.29% and the greatest rise is expected in the northeast provinces (e.g., North Khorasan) (Karimi et al. 2018). In addition, the impacts of climate change on Iran's water resources will progressively be more significant. As stated in Table 2, Zayandeh-Rud Basin's runoff will decline from 40–70% by 2039 and between 58–77% in 2070–2099 (Karimi et al. 2018).

Another climate change related issue in Iran is the increased frequency of dust events. Alizadeh-Choobari and Najafi (2018) note that as Iran has steadily turned drier within the last few decades, the number of the vast dust days has increased. They found that this number has increased by a statistically notable rate of plus 2.4 per ten years (Alizadeh-Choobari & Najafi 2018). The rise in the number of dusty days in Iran is, as detected by Alizadeh-Choobari and Najafi (2018), in accord with the fact that climate change causes wet places to become wetter and dry places, drier (Byrne & O'Gorman 2015). Also, the issue of stressing environmental degradation in Iran is also well documented in the media stories. Using content analysis, the author reviewed media stories between 2011 and 2019 in order to identify the role of environmental degradation in civil unrest. During the content search and analysis, it was clear that the issue of environmental challenges in Iran was well documented. However, most stories document the environmental issue without referring to the broader context within which it occurs: global climate change. More specifically, the author found that climate change as a term is rarely referenced as a challenge or main cause of environmental degradation in the Persian media.

4.3.2 Unsustainable water management and 'thirst for development'

A thirst for development and what is termed unfinished 'technocratic hydraulic missions' have played major roles in today's environmental crisis in Iran, particularly its water crisis (Madani et al. 2016; Madani 2014). Iran significantly benefited from its rapid modernization before and following the 1979 revolution, including major advancement in infrastructure development. The country's 'thirst for development' spiked in the wake of the Revolution, since the Iranian regime conceived it as a strategy to demonstrate the country's independence to the world during the Iran-Iraq conflict and during the imposition of international economic sanctions (Madani et al. 2016). In the rush for this rapid modernisation, the environment was significantly neglected. In fact, this unbridled development led to severe managerial short-sightedness and lack of vision, in which the centrepiece was rapid expansion and immediate economic advantages. Consequently, the vital correlation between 'development' and 'environment' was mostly disregarded, culminating in the execution of infrastructure and engineering projects that had, or will have in the long run, adverse impacts and ruinous effects on the wellbeing of the human population and the environment (Madani et al. 2016).

Government water management in particular has unfavourably affected the availability of freshwater in Iran. Like many countries, Iran has pursued a highly technocratic approach in managing its water resources. This approach envisages water resources as predominantly economic commodities to be prevalent and diffused via technology and engineering (Michel 2017). This mission concentrates on industrializing scarce water areas, distributing water for hydropower, industry, urban areas, and irrigation through the erection of hard infrastructure such canals, groundwater pumping, and particularly dams (Michel 2017). Indeed, the country's technocratic hydraulic mission is summarised

by dam building, water diversion and inter-basin transfer (Michel 2017). As such, since 2005, Iran has regularly featured in the top 3 countries for dam construction (see Figure. 11; Saatsaz 2019). Further cementing the scale and pace of the 'hydraulic mission', by 2014 there were 500 dams operating and nearly 100 more under construction (Lehane 2014).

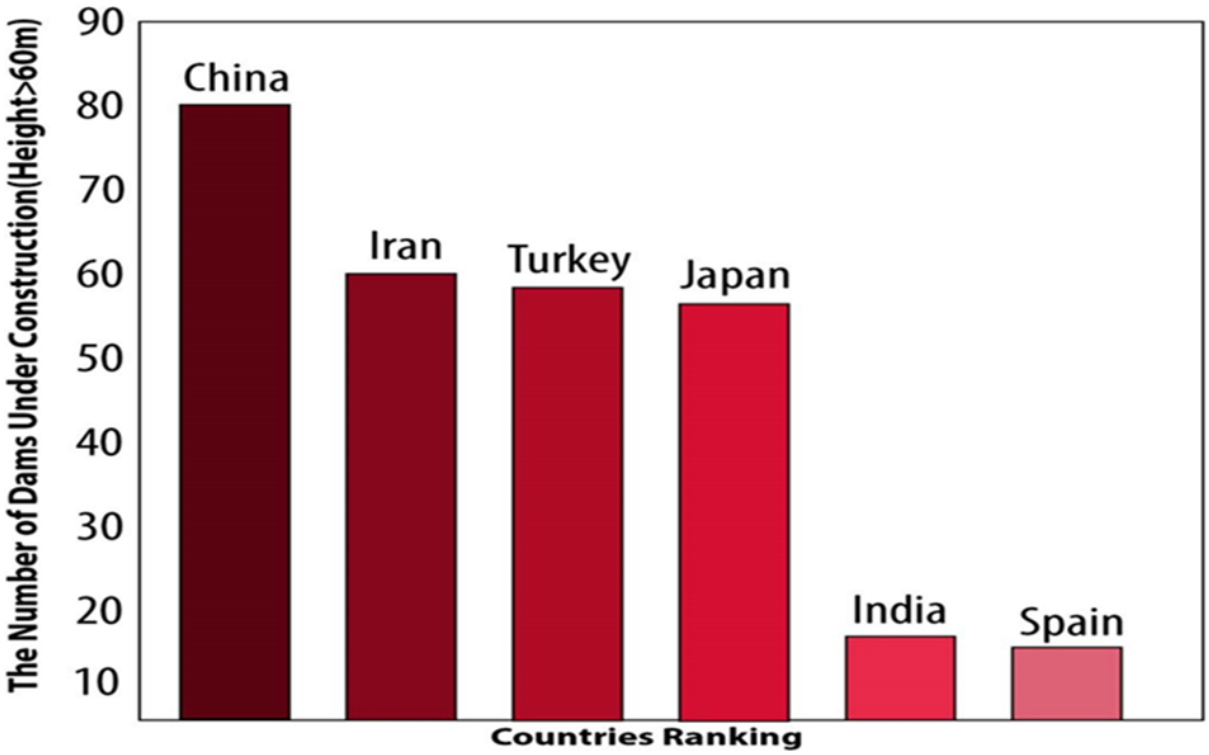

Figure 11 World's Largest Dam-Building Nations in 2005 (Source: Saatsaz 2019)

According to the International Commission on Large Dams, Iran started with 14 dams in 1979, often constructed by foreign firms, but has now built 802 large dams higher than 15 metres (Michel 2017). With most dam-constructing projects carried out by Khatam al-Anbia, an engineering body of Iran's Revolutionary Guards Corps (IRGCs), dam construction epitomises the intertwining of technological capability, security and nationalism in economic development of the Islamic Republic of Iran (Michel 2017).

The effects of this large number of dams in Iran have been consequential and adverse, causing substantial reductions in water volume and water supplies in downstream areas. According to the Habitats Office of the National Department of Environment, due to dam building and drought, three lakes in Iran, Lake Maharlu, Lake Bakhtegan and Lake Parishan, have desiccated and formed deserts (Lehane 2014).

Two examples of the destructive impacts of unchecked dam construction in Iran are the Gotvand Dam and the drying waterbeds in Khuzestan Province (see Figure 1). The Gotvand Dam is one of the largest embankment dams constructed on the Karun River in Khuzestan Province, to provide sugarcane plants with water and to produce electricity (Saatsaz 2018). The dam was built on salt formations but because of the lack of understanding and awareness of water–salt interaction, the repercussions were not clear (Saatsaz 2018). In the coming years after the dam was built, salt levels in the Karun River

increased and inflicted much damage in the catchment area, causing soil fertility decline, soil erosion and increased flood risk, rendering a large amount of the cultivated lands unproductive (Yazdanpanah et al. 2013). As a consequence, dust storms frequently occur in the region today and blight large areas of Iran (Akhani 2015). As a result of this ongoing dam building, according to the World Health Organisation, in 2015, Ahwaz city, capital of Khuzestan province, ranked as the most polluted city in the world (Akhani 2015). Extensive damming together with groundwater pumping from nearly 780,000 wells has damaged aquifers, diminishing the country's freshwater table by almost 20 m and intensifying subsidence (Motagh et al. 2008).

4.3.3 Urbanisation and population growth

Iran's population growth, particularly in urban centres, has increased in parallel with the burgeoning environmental pressures. Indeed, these two phenomena have reciprocally influenced each other (Qelichi et al. 2017; Rajaei & Mansourian 2017). Over the last 40 years, Iran's population increased from 25 million in 1966 to 75 million in 2011. Moreover, since the 1979 revolution, Iran's population has more than doubled which from 35 million in 1979 reached to nearly 80 million in 2019 (Tahbaz 2016). Simultaneously, the urban population increased from about 31.4% in 1956 to 71.4% in 2011 (Rajaei & Mansourian 2017). Further, it is expected that the urban population will continue to increase at an average annual rate of approximately 3% during the next decade (Soltani 2017).

As with many countries across the world, rural-to-urban migration, together with urban encroachment and rural regions development has led to this expansion of Iran's cities. It is projected that rural populations will plummet to 23.8% by 2050 (Michel 2017) with the influence of several drivers. 'Pull factors' such as job opportunities and education in cities and 'push factors' such as rural underdevelopment, drought and rising water stress, are feeding rural outmigration (Michel 2017, p. 13). Such rural-urban migration and rapid urbanisation strain municipal infrastructure and water supplies in cities that are already overwhelmed by unemployment, poverty, pollution, and water scarcity. For instance, in 2017, more than 540 cities in Iran were on the verge of water stress, and the situation only exacerbated in 2018 (Shahi 2019; Snyder 2019).

Consequently, in 2018, water shortages and pollution triggered fresh protests in two Arab populated cities of Mohammarah and Abadan in Khuzestan province and continued for several days (Saidi 2018). Water-related demonstrations spread to other cities in Iran, most notably in Borazjan, Bushehr Province (Saidi 2018).

Water-related unrest will continue in the growing urban centres as the Iranian authorities are failing to tackle systemic water supply issues. Iran's environmental situation and poor water management will aggravate the water crisis, further intensifying population movement, possibly leading to a mass migration of Iranians, potentially displacing millions internally or causing a refugee crisis in the tens of millions in coming years. Many Iranian officials have already warned of such environmentally induced crisis (Karimi 2018; Shahi 2019).

4.3.4 Inefficient agriculture

Unsustainable agriculture in contemporary Iran has been playing a detrimental role in the country's environmental management. Iranian decision makers have been showing strong interest in achieving food self-sufficiency, which has resulted in extensive agricultural water use. Iranian agriculture heavily depends on irrigation and utilises most of the country's scarce water resources (Seyf 2006). Although,

the cultivated lands make up only 15% of the total country's area, this sector consumes approximately 92% of the country's water.

Domestic water consumption is responsible for 7% and the industrial sector consumes 1% of the water (Madani 2014; Madani et al. 2016). Due to limited surface water, the agricultural sector also uses more than 90% of the groundwater. It is estimated that in some regions of the country the groundwater levels are dropping 2 metres per year which echoes the extent of overexploitation of this non-renewable share of groundwater (Madani 2014).

Despite growing water scarcity and drought, Iran continues to seek food self-sufficiency. Indeed, this policy is playing a major part in what is referred to as 'Iranian water bankruptcy' (Collin 2017; Madani 2014; Madani et al. 2016). Since the 1980s, the Iranian policymakers have tried to bolster the agricultural sector to achieve food security and to boost non-oil sector revenue. Although, focusing on food self-sufficiency, particularly wheat, was successful during the Iran-Iraq war, today the productivity of this sector has significantly declined. The sector's contribution to GDP has decreased from 33% to 13%, and currently provides approximately 24% of total employment (Madani 2014).

To achieve self-sufficiency, the Iranian government largely subsidises agricultural water and energy consumption which has exacerbated the country's water security. In 2007, subsidies constituted 2.8% of the country's GDP, cereal subsidies representing 50% of that amount. The policy has boosted production and consumption, rendering Iran the 12th biggest wheat grower in the world in 2013, from the 16th in 1990-1992. However, Iran continued to import its cereal needs which in 2014, amounted to 29% of its cereal imports (Figure 12) (Collins 2017).

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Figure 12 Iran's Wheat Imports and Production (Source: Collin 2017)

Having an oil-focused economy has resulted in neglecting the economic efficiency of the agricultural sector in Iran (Katouzian 2008). Notwithstanding the strong desire to have a productive agricultural

sector, the Iranians have overlooked this industry. To date, the sector has not yet been modernised and in addition to non-sustainable agricultural practices, the farming sector suffers from antiquated technologies which contribute to wide inefficiency in irrigation and farming productivities (Madani et al. 2016). Due to declining agricultural systems and growing water scarcity, forced migration from rural areas to urban centres has been taking place in some regions of the country, particularly where agricultural activities are no longer feasible (Madani et al. 2016). Nonetheless, the farming sector still provides more than 20% of the population with employment and job opportunities (Madani et al. 2016).

4.3.4.1 The Syrian parallel

This rural-urban migration due to droughts and increasing water scarcity, bear great resemblance to the lead-up events of the Syrian uprising during which massive forced rural-urban migration took place (Madani et al. 2016). The current Syrian turmoil highlights that a loss of jobs in the farming sector can lead to mass migration, generating national security threats and violent public unrest (Madani et al 2016; Snyder 2019).

The former Syrian president, Hafez Assad (1971-2000), introduced food self-sufficiency policies. In order to increase the country's agricultural productivity, his regime provided farmers with fuel subsidies to make it easier for them to access groundwater resources (Snyder 2019). This resulted in a significant depletion of the country's groundwater resources, making rural populations more susceptible to inescapable droughts. When his successor, Bashar Assad assumed power in 2000, he introduced a number of liberalization policies to reform the country's economy. Assad, indeed aimed to put an end to the fuel subsidy policies that had been introduced by his predecessor, partly to slow down overexploitation of groundwater resources (Werrell & Femia 2013; Gleick 2014; Kelly et al. 2015; Snyder 2019).

But then Syria was hit by extreme droughts. From 2007 to 2010, Syria experienced its worst droughts in its history; in 2008 Syria experienced its driest year. The droughts destroyed the small and medium scale agricultural entities. Animal framing and livestock herds were completely wiped out. The Assad regime however carried on its reform measures, aggravating farmers' lack of access to freshwater (Gleick 2014; Kelly et al. 2015).

As a direct consequence, nearly 1.5 million rural residents were forced to migrate to the major urban centres such as Aleppo, Damascus and Homs, concentrating on the fringes of urban areas and placing further strain on already under pressure infrastructure and services (Snyder 2019). The number of school students in some regions in the north of the country declined by 80 % as families with children, who were being increasingly afflicted with malnutrition, emigrated to elsewhere (Gleick 2014; Kelly et al. 2015; Snyder 2019). As a result of food production decline and livestock destruction, food prices spiked, in some areas doubled or more, rendering the already difficult living condition of many citizens untenable. The regime resorted to importing of large amounts of wheat for the first time since it claimed its self-sufficiency in wheat production, in the 1990s (Snyder 2019).

By early 2011, the frustrated Syrians had begun taking to the streets, to a certain degree, to demonstrate their frustration with the drought and to express their dissatisfaction with the regime's response (Snyder 2019; Werrell & Femia 2013).

There is a striking and alarming resemblance between the lead-up events of the Syrian revolution and the current situation in Iran. Drought and depleted groundwater caused in part by the regime policies of food self-sufficiency rendered rural residents particularly susceptible to adverse climate change and environmental stress. When a severe drought hit the country, public frustration spread but was

concentrated in the major urban centres that had hosted millions of forced rural migrants. In Iran, this is already taking place.

4.4 Environmental degradation and public unrest

Concerns over the soaring environmental crisis, particularly increasing water scarcity and drought, and frustration with the State's response to this crisis in Iran, have been eroding the social contract between state and citizen, undermining state legitimacy and fuelling further civil unrest and conflict in the country (Shahi 2019).

Iranians have been grappling with environment related grievances since 1999. The first severe drought struck the country that year and lasted until 2001, causing country-wide water shortages and forced massive number of villagers to abandon their homes (Foltz 2002). Consequently, tens of thousands of farm workers lost their jobs, hundreds of thousands of livestock perished, and millions of tons of wheat yields were lost. By 2001, Lake Hamoun, had disappeared completely. Because of the lake vanishing, dust storms increased across a large area of the country (Foltz 2002).

As a result of the 1999-2001 drought, the Dez and Karkheh rivers, two major water bodies, lost 70 per cent of their water compared to their year 2000 volume. The Zanyehdeh Rud River also completely dried up (Foltz 2002). According to the United Nations, the drought is estimated to have cost Iran 3.5 billion US dollars in 2000, and mid-year estimates for 2001 were already at 2.5 billion US dollars (Tehran Times, 16 July 2001, cited in Foltz 2002). This dire environmental situation and frustration with the government's response to the crisis, sparked anger street and public unrest in parts of the country in 2001. For example, residents of Isfahan province, the third largest city, took to the streets over water scarcity and severe water rationing (Foltz 2002). Also, the Iranian elite and many from academia began to publicly blame the state for its weak water management and response to the crisis (Foltz 2002).

Ever since, years of drought, impact of climate change, water mismanagement and population movements have been increasingly exacerbating the environmental condition in Iran, making the country stand on a threshold of total environmental collapse and potential nation-wide unrest. Over the last decade, particularly, since 2011, when the first violent environmentally-induced protests occurred, environmental factors have been playing a part in triggering violent conflict and protests in Iran (Mackey 2011; Michel 2017).

4.5 Media and public unrest

To demonstrate a clear picture of how environmental factors play a role in public unrest in Iran, this research employed a content analysis of media news and stories published between 2011 and 2019. In doing so, this research utilised different Iranian, Arabic, and English media reporting on individual social conflict events in Iran from 2011 to 2019 (see Table 3). As the author speaks, reads and writes three languages, Arabic, Persian and English, the media sources that have been reviewed ranged from local and international Persian, Arabic and English media (see Table 3).

By using a content of analysis of the media, the author found that in 2011, environmental factors began to play a major role in the social conflict in Iran. For example, the first environmentally induced violent riot occurred in Iran was in 2011 over the drying Urmia Lake. In 2011, Turkish people in West and East Azerbaijan provinces took to the streets for several weeks protesting at the government's failure to protect the lake. During these protests one citizen was killed and tens were injured or

detained by the security forces (Dehghan 2011; Mackey 2011). For that reason, the author focused on this time period (2011-2019) as environmental issues began to play a major role in the social conflict in Iran.

Table 3 Data Sources- Between 2011-2019

English Media	**Persian Media**	**Arabic Media**	**Local Media/Newswires**
Al-Jazeera English	Anadolu Agency	Al Arabiya Net	Aftab News
Arab News	Bayan Media	Al Arabiya Hadath	Alalam TV
BBC	BBC Farsi	Al Arab Newspaper	Alef News
CBS	Green Party Movement	Ahwazna TV	Asr e Iran
CNN	Hambastegimeli	Al Watan Newspaper	Bahar News
DW	HARANA	Alsharq-Awsat Newspaper	Borna News
Haaretz	Iran Emrooz	Dur Untash Study Centre	Donya-e-Eghtesad
Euro News	Iran Freedom	Orient news TV	Eghtesad News
Express	Iran Global	AL-Riyadh Newspaper	Etemad Online News
France 24	Iran Green Voice	TRT Arabic	Fars News Agency
Middle East Monitor	Iran International	RT Arabic	Iran Daily
Middle East Eye	Iran-Ma		Islamic Republic News Agency- IRNA
Newsweek	Iran TV		Iranian Labour News Agency-ILNA
The Guardian	Iran Wire		Iran Newspaper
The New York Times	Kalameh		Iran Online News
The Sun	Kurdpa		Jahan News
TRT	Manoto TV		Karoon Newspaper
The Washington Post	MeliMazhabi		Kayhan Newspaper
VOA	Mojahedin.org		Khabar Farsi
Reuters	People's Mojahedin organisation of Iran		Khabar Online
RFI English	Peyke Iran		Mehr News Agency
	Radio Frada		Shbakeye Khabr
	Radio kooche- new Persian Voice		Shabestan News Agency
	Radio Zamaneh		Tasnim News Agency
	Real Iran		Tehran Times
	Sound of Israel Radio		Young Club Journalists
	The International Radio station- RFI Persian		
	Trend Newsagency		
	VOA Persian		
	Voice of Israel radio		
	DW Farsi		
	Zeytoon News Website		

In terms of independence from the state, the local newsagencies that have been used in data collection, range from semi-official newswires to state-owned agencies. Semi-official newswires such

as ISNA and Fars News Agency have been used for data collection, which have ties to the Iranian regime. These sources have provided this research with some useful data about the number of peaceful and violent protests. However, in describing the motives of the protests and the protestors themselves, bias toward the authorities clearly operated.

The data of this research by its very nature is observational. As there were countless news outlets and sources, which at times appeared to be unreliable or inaccurate, the author used a cross-checking method (Zhang 2010) in order to ensure about accuracy and reliability of the information. To that end, the author was more cautious in terms of numbers and motives, hence, counted those protests and other social conflict events that were reported by at least one or more other resources.

In addition to the media reports, and to cross-check the findings from the content of analysis of media, some data utilised in this research were also drawn from the Armed Conflict Location and Event Data project (ACLED). The findings of the content of analysis of these media news stories is summarised in Figures 13, 14, and 15.

Figure 13 shows the increasing numbers of social conflict events in general while the second graph Figure 14 shows the number of instances of social conflict that were directly induced or intensified by environmental factors (e.g. protests over water shortage, dust storms, water diversion projects or the state's water management). The third graph (Figure 15) is created in order to show how both environmentally and non-environmentally -induced social conflict events are increasing. These graphs (Figures 13, 14, and 15) clearly reveal that civil unrest in Iran is on the rise.

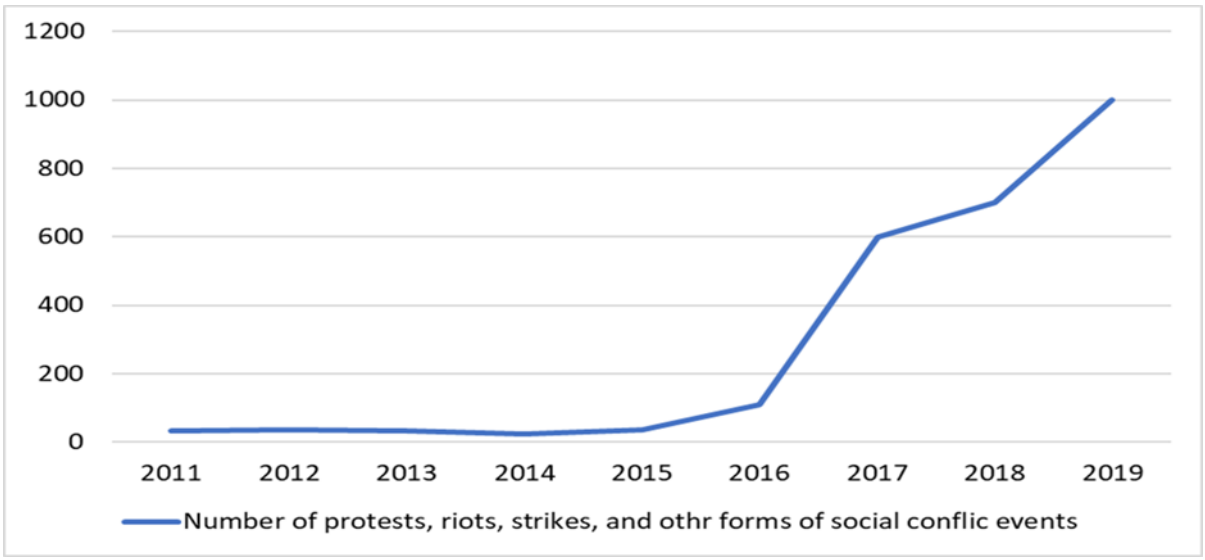

Figure 13 Number of Social Conflict events Between 2011 and 2019 in Iran

Jones and Newlee (2019) categorise the motivation of the protests and unrest in Iran into four categories: first: economic gradiences, second: political gradiences, third: by environmental degradation and fourth: cultural and religious motivation.

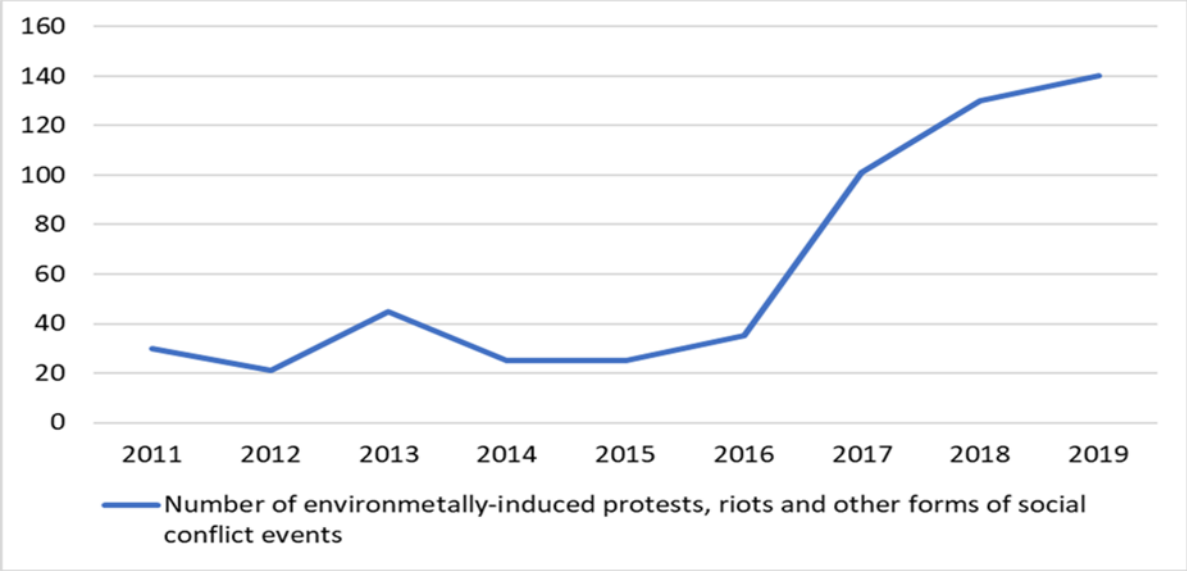

Figure 14 Number of Environmentally-Induced Protests, Riots and Other Forms of Social Conflict Events Between 2011-2019 in Iran

Since early 2011, events such as public unrest and violent protests have been related progressively to environmental issues, particularly water-related matters. From 2011 to 2019, as the figure shows, hundreds of environmentally induced protests and violent clashes occurred in Iran. Since 2011, provinces such as Khuzestan, Isfahan, West Azerbaijan, East Azerbaijan, Chahal Mahal and Bakhtiari (CMB), and Kohgiluye and Boyer-Ahmad have been water related conflict hotspots.

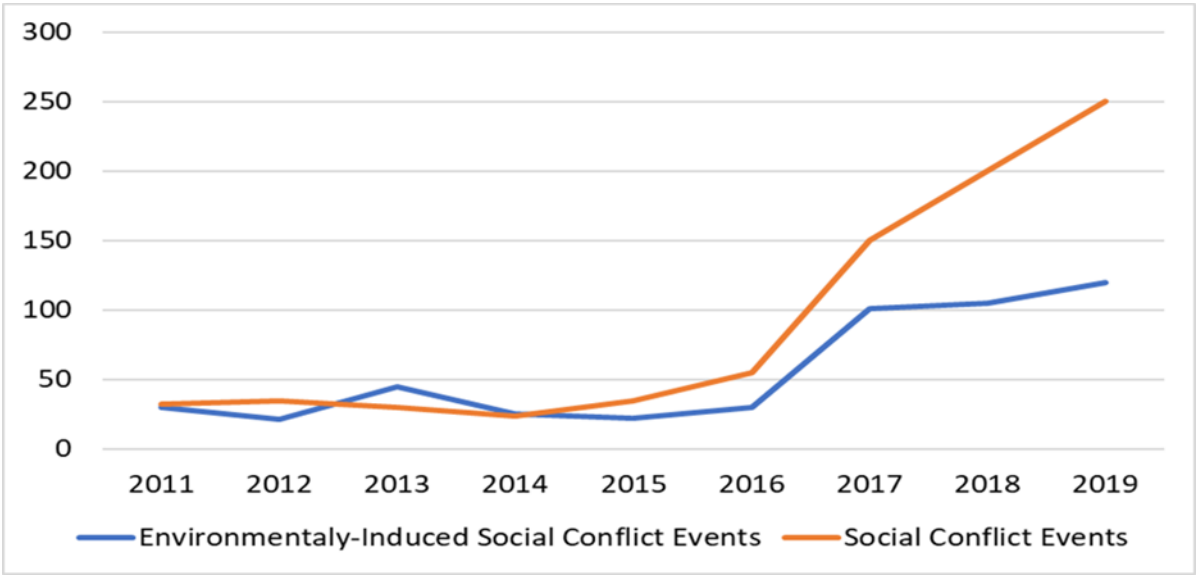

Figure 15 Environmentally-Induced Social Conflict Events and Total Social Conflict Events in Iran-Between 2011-2019

In order to support the media analysis and findings of this thesis, another graph (Figure 16) was created and adapted from a recent study that shows the number of protests and riots increasing in Iran. Specifically, this graph (Figure 16) shows the number of protests, riots and other types of social conflicts that took place from 2016 to 2019. Accordingly, the data clearly shows that public unrest in Iran has been rapidly increasing, particularly over the last three years (Figure 16). This thesis has also

found that the environmental related unrest has increased dramatically. For example, during the content analysis, the author found that over the last year more than one hundred water-related demonstrations and riots took place in several provinces in Iran.

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Figure 16 Protests and Riots in Iran from 2016 to 2019 (Source: Adapted from Geopolitical Future 2019)

4.6 Iran's minority regions: bearing the brunt of environmental degradation

While it is clear that the general populations are agitated by water insecurity, closer analysis of the nature of the protests has revealed a distinct impact on ethnic minorities. For example, repeated demonstrations, many of them violent, have been witnessed around Lake Urmia in West Azerbaijan and East Azerbaijan provinces. Lake Urmia is situated between East Azerbaijan and West Azerbaijan provinces (see Figures 1 and 2), home to the country's Turkish ethnic minority. Turkish people perceive the destruction of the lake as an extension of the State's discrimination against them (Dehghan 2011; Michel 2017). Movements to protect Lake Urmia growingly stir Turkish nationalism. For instance, in 2011 Turkish protestors carried placards declaring 'Lake Urmia is drying up; Iran has ordered its execution'. The Turkish people in West and East Azerbaijan provinces believe that Tehran's deliberate designs to strangle the lake is to render their provinces salty deserts and uninhabitable (Michel 2017).

Similarly, the Baluchi ethnic minority in eastern Sistan and Baluchistan Province perceive the Iranian officials' inaction to remedy environmental degradation in their province as a deliberate and systematic destruction of their region. This has been stoking a Baluch separatist rebellion (Michel 2017).

In 2013, thousands of residents of Khuzestan, where the majority of Iran's ethnic Ahwazi Arab minority live, protested against transferring the Karun River to Kerman and Isfahan provinces and other Persian populated areas. During this protest, a 5-km long chain was made up of men and women carrying signs in Arabic, Persian and English that read, 'Karun is for Khuzestan,' 'I am a farmer, I would not give a drop of water of Karun,' and 'We will save Karun' to protest the Karun river diversion (Arabiya 2013). As the protests escalated, Masoumeh Ebtekar, the head of the Department of the Environment, visited the province and promised the protestors to halt the river diversion project (Payvand 2013). Also, in

Markazi, CMB, and Isfahan provinces, people on numerous occasions took to the street protesting over pollution, water shortages or river diversions (Fars News 2013; Saidi 2018).

4.7 Water scarcity and transboundary conflict

This rising environmental stress has also generated transboundary water security challenges and increased violent conflict over water resources inside Iran (Feizi et al. 2019). Tensions drag on between different provinces over transboundary water systems such as Zayandeh-Rud, Urmia, Karun and Karkheh, Ghezel-Ozan (Feizi et al 2019; Madani et al 2016). In 2013, a week of protests in Isfahan province against the government's water transfer projects to divert water from Isfahan to Yazd province, turned violent with dozens being arrested or injured (Feizi et al. 2019; Feizi & Janatabadi 2017). Three years later in May 2016, riots over water caused clashes with the police in Khuzestan province resulting in one dead and several injured.

In in the western province of CMB, a clash over water turned to violence in which more than one hundred people were injured in 2016. Again, in the same province and in the same year, in a water related protest, two people died, and more were injured. Again, in 2016, in CMB, another violent dispute over water took place in which seven people died. Indeed, this province used to be water abundant but today it is a water-scarce region. In 2016, in a clash over water in Khuzestan province one citizen died and dozens injured (Feizi et al. 2019; Feizi & Janatabadi 2017). A year later in 2017, a communal violent conflict over water in Khorasan Razavi province, in the northeast, occurred resulting in several casualties (Feizi and Janatabadi 2017)

By comparing the 2013 peaceful protests over water diversion projects in Khuzestan province and following protests in Khuzestan and other provinces, it is clear that civil unrest in Iran is becoming more frequent, severe and violent. As the findings of this research suggest that the number and the severity of the social conflict event in Iran are exponentially increasing.

4.8 Environmental degradation, economic woes, unemployment and civil unrest

In 2017, nation-wide protests erupted throughout Iran in December 2017 and continued for several weeks. While these protests were initially triggered by high food prices, water shortages and unemployment (Al-Jazeera 2018; Piesse 2018), some claimed that sanctions reimposed by the US and the West were a major driver (Trew 2018; Fitch & Eqbali 2018). In addition to high prices and economic inequality, water scarcity played a direct role in the protests (Kowsar & Nader 2019). The protests first occurred in Mashhad, Iran's second-largest city by population. Over the next few days, the demonstrations in many towns and cities would become an open rebellion against the Iranian regime (Eltagouri 2018). Although the government eventually subdued the 2017 protests, the following months turned out to be turbulent for the authorities. There were hundreds of demonstrations, clashes, and strikes in Iran in the following weeks (Shahi 2019).

Once again, in June 2018, water shortages and pollution triggered fresh protests in two Arab populated cities of Muhammar and Abadan in Khuzestan province (or Ahwaz region) (see Figures 1 and 2) and continued for several days. The protests spread to other cities of the province during which the protesters clashed with the security forces (Dehghanpisheh 2018; Saidi 2018; Shahi 2019). The demonstrations in Muhammar (Khorramshahr) and Abadan also came three days after the protests in Tehran. The protests in Tehran were initiated over the country's troubled economy and unemployment during which demonstrations reached Tehran's Grand Bazaar, a national symbol of the country and one of the linchpins for the 1979 Revolution (Brennan 2018; Najjar 2018).

Another wave of unrest again erupted in August 2018 (Erdbrink 2018; Trew 2018). This time the protests began from Isfahan, the third largest city, and spread to other major cities such as Karaj, Tehran, Mashhad, Shiraz, Urmia, Ahwaz, Qom and Arak (Brennan 2018; Eltagouri 2018). Again, the protests were fuelled by dissatisfaction over weak economic performance, soaring unemployment and environmental degradation such as water scarcity and water mismanagement (Erdbrink 2018; Lipin et al. 2018; Saidi 2018; Trew 2018). Initially, however, the protests were sparked by the reimposition of the US sanctions on Iran. As a result of the sanctions, the Iranian currency dramatically declined which created public anger over the state's weak governance and its role in the increasing economic woes (Erdbrink 2018; Trew 2018; Wahab 2018).

In another round in 2018, public frustration over devastating economic pressures combined with lack of drinking water, triggered violent protests in the cities of Abadan and Muhammarah in Khuzestan province (Ahwaz region) (see Figures 1 and 2) (Shahi 2019). According to an official, from 2017 to 2018, water scarcity and pollution played a direct role in the public unrest in more than 900 protests, strikes in a single province (Khuzestan) (Economy News 2018; Zeitoon 2018). Indeed, the Ahwaz region remains a trigger point in Iran's protest scene and is a dangerous nexus for the regime. Ahwaz could become a front line in any nationwide armed conflict between future protesters and regime security forces (Saidi 2018).

In recent years, there have been more tensions between the Ahwazi Arabs and the state. The Ahwazi Arabs have long complained of systematic state discrimination against them. Consistent with the last decade of unrest, 2018 saw several clashes between frustrated Arab farmers and security forces (Shahi 2019). Thus, it is clear that the number of protests is rapidly increasing. Indeed, the number of social conflict events has not increasedas the graphs show (Figure 13, 14, 15, and 16), but their severity in terms of violence is also exacerbating. For example, in a recent article published in the New York Times, Fassihi and Gladstone (2019) claim that the most recent public unrest, November 2019, triggered by an abrupt increase of gasoline prices was the deadliest political unrest since the 1979 Iranian revolution. In these protests, which lasted for several days and geographically spread to 28 out of 31 provinces, security forces responded by opening fire on protesters, mostly unemployed or low-income young citizens, and hundreds were killed and thousands injured (Fassihi and Gladstone 2019).

The environment related protests, particularly those related to water have increased dramatically over the last two years. Jones and Newlee (2019) recently published a paper in which they examine the number of protests and their motivations and causes, in Iran. They found that there were 261 environmental protests between January 2018 and October 2019, most of which were water related. Figure (17) illustrates the pattern of these social conflict events over time (Jones & Newlee 2019).

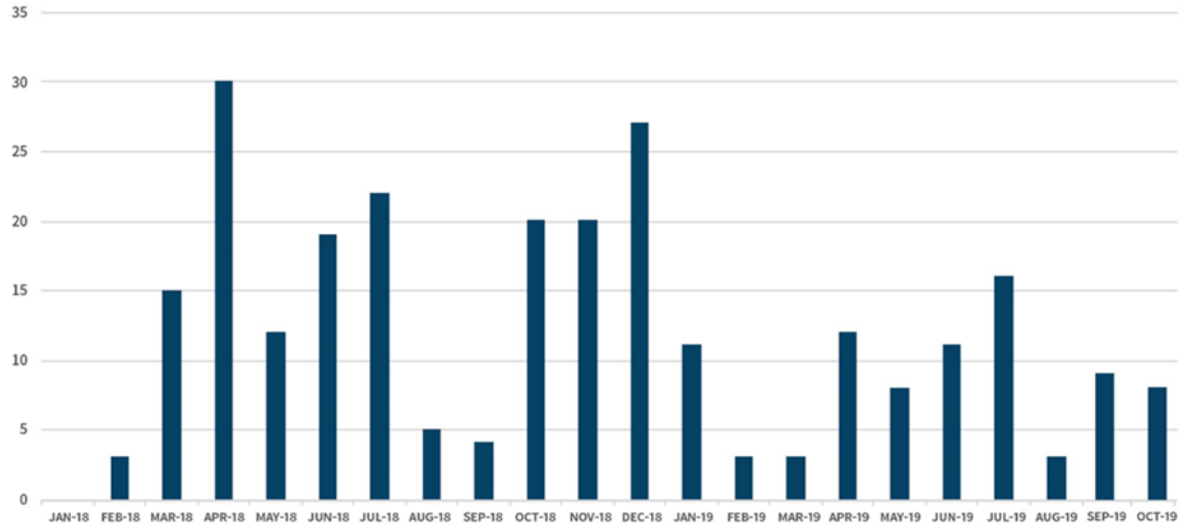

Figure 17 Number of Water-related Protests in Iran, Between January 2018 and October 2019 (Source: Jones and Newlee 2019)

By utilising ACLED, Jones and Newlee (2019) could also record more than 4200 protests, riots, strikes and other forms of social conflict events took place in Iran from January 2018 through October 2019. They found that protests occurred in nearly every province of the country, as highlighted in (Figure 18).

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Figure 18 Heat Map of Protests in Iran, Between 2018 and 2019 (Source: Jones and Newlee 2019) (Source: Jones and Newlee 2019)

As the heat map of protests (Figure 18) shows, the protests and social conflict events are geographically spread into most of the country- the geographic areas that are outside of the heat area are mostly sparsely populated areas. Thus, conflict is no longer restricted to ethnic hotspots. Furthermore, Figure 18 demonstrates the pervasiveness of social conflict in the urban centres that

have been destinations of the rural migrants. As highlighted in the map (Figure 18), current demonstrations have been particularly intense in the major urban centres such as Tehran, Ahwaz, Mashhad, Isfahan, Karaj, Tabriz, Kermanshah, Qazvin and other large cities. The Jones and Newlee (2019) study found that most protests and riots were almost always due to inflation, environmental grievances, political issues, unemployment, or a combination of these (Jones & Newlee 2019). These findings are in line with what the author of this research has found from the content analysis of news media; that protests and public unrest in Iran are progressively increasing. Furthermore, environmental factors such as water scarcity, drought and floods are playing a major role in the ongoing civil unrest. Also, these findings respond to one of the main questions of this thesis which is: whether environmental factors are causing or intensifying public unrest in Iran.

Accordingly, as this thesis demonstrated, by using content and discourse analyses of media stories published between 2011 and 2019, environmental factors are key contributing factors to social conflict in Iran. Increasing environmental degradation is widely and rapidly altering the socio-economic and political structure of the country and growingly rendering the state vulnerable to increasingly social uprising and rioting. Some scholars such as Madani (2016), Shahi (2019) and Snyder (2019) insist that environmental factors have been playing key roles in the ongoing civil unrest in Iran. Indeed, this claim is in line with what this thesis has observed in relation to the key drivers and causes of the ongoing civil unrest in Iran. From 2017 to 2019 more than a thousand protests, clashes, riots and disputes took place, which were directly or indirectly induced by water-related issues and other environmental changes.

As mentioned earlier, at times, environmental factors such as water shortages, drought, pollution and frustration with state response to the environmental changes caused social upheavals and clashes with the state security forces. Isfahan, Khuzestan, CMB provinces have been particular hotspots for conflict over water scarcity and water diversion projects.

4.9 Nation-wide protests and the role of language

With regard to the 2017-2018 nation-wide protests, Barbara Slavin, director of the Future of Iran Initiative at the Atlantic Council, stated that climate change played a significant role in the protests (Waldman 2018). Slavin added, 'Iran has had a drought for 14 years, and many of these people who come into these provincial cities and towns are there because they could not function as farmers anymore; there was no water for their farms' (Waldman 2018). Despite the prolonged environmental hardship, the government did little to respond to the needs of these rural communities, nor address the impact of climate change. Interestingly, by chance, this thesis has found that a lack of commitment to address both causes and impacts of climate change may be attributed to language. For example, during the content analysis of media articles, the author discovered no set term for 'climate change' in Farsi media articles. For example, the term of 'climate change' at times is described as changes in weather but not 'climate itself which in Persian is 'taghirat e ab va havaei (تغییرات آب و هوایی). Sometimes media refer to climate change as 'taghirat e eghlimi' (تغییرات اقلیمی). The latter term is a direct translation of the English term of climate change but it is not common in the Persian media. Moreover, it is to large degree absent in the news and media articles when they discuss the environmental challenges that Iran face such as water crises, drought, and desertification. This confusion over the climate change term could have some implication. For example, the author noticed that protesting people in Iran never mentioned that climate change could be a threat to their lives and/or called upon government to address climate change as a solution. Thus, the implication of linguistic confusion over climate change term, as the author observed, is public ignorance about the

threats that climate change can pose, or that climate change is one of the Iran's environmental bankruptcy causes.

The author of this thesis does not claim that the Persian or Farsi language lacks the ability in creating or innovating an exact term for the English term of climate change, rather, there is confusion over the meaning of the process of the climatic change that its impacts could be either positive or negative on people and environment. However, the author acknowledges that to understand the issue of language and climate change, further research must be conducted.

4.10 Media and the portrayal of environmental challenges

The issue of exacerbating environmental degradation in Iran is well documented in news media stories. However, content analysis of hundreds of articles from 2011-2019 revealed that environmental issues were referenced without acknowledging the broader context of global climate change. More specifically, while the concept regularly appeared in the international English media, the author found that only 2% of news media articles referred to 'climate change' as a challenge or a main cause of environmental degradation in the Persian media.

The content analysis of the media news reporting revealed some key differences between Arabic, Farsi, and English media in the portrayal of environmental protests. While the Persian media documented the environmental protests, they did not place the issue in a global context and did not refer to climate change as a cause or contributor to the country's environmental plight. At the same time, the author found that the protestors also failed to mention or refer to climate change as a cause of environmental crisis in Iran or called upon the government to tackle environmental issues by declaring a climate emergency as climate protestors do in the West. In support, the analysis of protestor imagery in Persian media news reporting revealed an absence of placards and signs reading or mentioning the term of climate change or even global warming. Rather, their signs and placards were reading (as Figures 19, 20, 21, 22, and 23 show) 'we are dying and dust storms burying us'; 'we do not have air nor water'; 'clean air is our dream'; 'Ahwaz has no water'; 'yes to life and no to pollution', and 'here is Ahwaz, the world capital of pollution'. The absence of the term of 'climate change' in Persian media reports and in the discourse of the protestors in Iran, support the idea that public opinion can be formed or shaped by media and vice versa.

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Figure 19 People Protesting over Water Scarcity in Ahwaz (Source: Peyke Azadi 2015)

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Figure 20 Children Protesting over Air Pollution in Arak, Iran, carrying signs reading ‘Araki’s children are exposed to cancer’, Iranian citizens, support us, we need to breath’ (Source: Aftab News Agency 2013)

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Figure 21 Environmental Protestors Carrying signs in Ahwaz reading ‘clean air is our dream’ (Source: ISNA 2017)

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Figure 22 Women Protests Over Water Scarcity in Ahwaz. One woman carrying a sign reading ‘Ahwaz has no water’ (Sources: Khordad News Agency 2017)

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Figure 23 Ahwazi Protestors Carrying Signs Reading 'No to Pollution, Yes to Life', and 'Here is Ahwaz, the World Capital of Pollution' (Source: Arabi Twenty-One 2015)

Unlike Persian news media, the majority of the English and Arabic media place the issue of the water crisis and drought in Iran in a global context and argue that climate change is a major cause or

contributor to this crisis. For example, a report published in the New York Times in 2018 stated that the water crisis is fuelling social unrest and argued that climate change is a significant cause of Iran's water crisis (Sengupta 2018). These sentiments were echoed in an Arabic report published in 2018 by An-Nahar Newspaper (An-Nahar 2018).

Apart from the media, language and public discourse, the academic domain in Iran has begun to pay more attention to environmental degradation as a potential factor that can trigger or intensify public unrest. In 2016, Madani et al. (2016) expected that environmental factors would cause public unrest in the country. They argued that through increasing job losses in the farming sector, mass migration would ensue, generating national security threats and violent public unrest (Madani et al 2016). Almost three years later, Shahi (2019) and Snyder (2019) both observed that soaring unemployment, environmental degradation and rural-urban migration caused by drought and water scarcity played a key role in the recent nation-wide public unrest. In a recent study, Feizi et al. (2019) found that adverse rainfall shocks in Iran was one of the causes of social disruptions in the country. This environmental crisis is increasingly rendering the country prone to unpredictable social upheavals and intrastate violence and is thus set to turn into a super-crisis due to increasing adverse climate change and environmental degradation (Feizi et al. 2019; Khavarian-Garmsir et al. 2019; Madani 2014; Shahi 2019; Yazdandoos 2016; Yazdanpanah et al. 2016). In other words, as increasing frequent extreme weather events and higher occurrence of floods across Iran is expected to increase, environmental degradation will continue to destabilise the country.

Environmental factors will continue to exacerbate internal migration and accordingly further unrest and conflict will occur. In coming years, this may force tens of millions of the Iranians to abandon their villages, towns and cities, potentially causing a global refugee crisis. Increasing environmental degradation caused by adverse climate change may also create uninhabitable living conditions in Iran, especially in desert climate zones (Vaghefi et al. 2019). Moreover, Iran's environmental situation and poor water management will aggravate the ongoing water crisis, and, civil unrest will continue to break out if the Iranian government fails to address its systemic problems. To avoid widespread civil unrest and state failure, the Iranian authorities need to implement radical solutions to the country's water bankruptcy and increasing environmental destruction.

4.11 State response to the environmental crisis

Iranian officials are seemingly aware of the country's critical environmental challenges. Iran has signed the Paris Climate Change Agreement but has not ratified it. The anti-west hardliners on the Iranian regime perceive the Paris climate Agreement as a western perspective that may lead to further integration of Iran in the international society (Ziabari 2019). In 2015, Iran's Supreme Leader Ayatollah Ali Khamenei demanded the State's officials to address stressing environmental challenges (Waldman 2018). Masoumeh Ebtekar (2018), the former head of the Iranian Environment Department, characterised global warming as 'a serious threat for life on Earth' and particularly to the Middle East (Karami 2015). Earlier in 2013, the former Agriculture Minister Issa Kalantari, similarly warned that water scarcity and drought are the major threats to Iran (Karami 2015). He stated 'more dangerous than Israel, America or political fighting… is that the Iranian plateau is becoming uninhabitable,' as the nation's water resources vanish (Michel 2017, p. 20). Iran's Deputy Foreign Minister, Abbas Araqchi has also maintained that the critical water crisis and environmental situation 'should be viewed within the framework of security' (Shahi 2019). Reflecting on the urgency of securing freshwater from his Cabinet past and present, President Hassan Rouhani had recently dubbed water management as an 'historic' matter and has demanded a national water-conservation plan (Michel 2017, p. 20). Despite

the awareness of the Iranian policymakers of the adverse impacts of climate change on the nation, this awareness has not permeated to the public. As discussed earlier in the Chapter, there is no public discourse about the danger that climate change can pose to the nation. In other words, the term of climate change is not only absent in the Persian media but also in the public.

In response to these concerns, some efforts have been made by Iranian policymakers in this direction. In some regions of the country for example, the government has banned further building of wells in order to facilitate the recharge of groundwater aquifers. When President Rouhani first assumed office in 2013, his Cabinet scaled down the country's dam construction (Michel 2017), ordered the cessation of the construction of 14 dams and scaled up construction of pipelines that would reduce evaporation (Snyder 2019)- still, in 2014, there were nearly 100 dams under construction (Lehane 2014). However, despite these efforts, policymakers in Iran still favour large supply-side infrastructure proposals such as transferring water from Caspian Sea into the interior, and particularly to the arid regions of the country (Snyder 2019).

Even with the abovementioned reforms, in 2018, Iranian decision-makers opted to resume water pumping project that was proposed by former president Ahmadinejad in 2012. The plan was to build pipelines to transfer water from the Caspian Sea and Sea of Oman to Iran's central desert, including Semnan, Qom, Kashan, Isfahan, and Semnan provinces (Mirchi & Madani 2016). This project would provide 200 million cubic meters of water from the sea per year for industrial and drinking use. Having said that the Caspian Sea water is saline and require billions in investment in desalination plants (Snyder 2019. The current Iranian administration hitherto has allocated 1.2 billion USD for the plan (Snyder 2019).

If Iranian policymakers decide to use desalinated water for agricultural use that would be costly for the regime. The Baker Institute estimates that to irrigate 10% of its wheat yield by increasing the production of desalination water, Iran needs to redirect almost 10% of its gas supply, which would be a very risky project (Collin 2017). As the sheer bulk of Iran's electricity is produced from natural gas, redirecting 10% of the gas supply can lead to power shortages in some regions (Snyder 2019). Given that power shortages have already caused public unrest in provinces like Khuzestan, moving forward with that project would further destabilise the country.

Over the past decades, the Iranian regime has been tempted by impressive, supply-oriented engineering solutions such as inter-basin water transfer (IBWT) project to secure water supply (Mirchi & Madani 2016). The projects are to water transfer from water-abundant regions to water-scarce regions to secure water development in recipient basins (Gohari et al. 2013). Further, IBWT projects are regarded as another beneficial engineering counteraction to alleviate the water shortage crisis in water-scarce regions in Iran (Lehane 2014). The projects are indeed one of the causes of water related conflict in Iran. From 2013 to 2018 a pump diverting water from Isfahan to Yazd triggered numerous riots and violent conflicts between farmers and security forces, as Isfahan farmers feared for their water security. The impact of water diversions had similarly led to further intra-provincial conflict between Khuzestan, CMB and Isfahan provinces over diversion of Karun River to Isfahan (Feizi et al. 2019; Feizi & Janatabadi 2017).

Considering the unrelenting droughts, decades of water mismanagement and increasing adverse climate impacts – in addition to financial challenges caused by harsh international sanctions– Iran is precariously placed to address its mounting environmental challenges. This situation is not only rendering an imminent collapse of the regime but the entire nation is now exposed to mounting civil unrest that may develop into nation-wide violent civil conflict, akin to what happened in Syria. The outlook for Iran is looking grim.

4.12 Conclusion

Environmental degradation can play a major role in triggering socio-political instability, threatening security, and causing social conflict, and subnational tensions. This thesis drew attention to a critical Iranian security issue that is highly disregarded by both media and academia. The issue is the correlation between environmental degradation and civil unrest in Iran. This research is unique in that it examined the environment-civil unrest nexus in the case of Iran via a content analysis of news media. The author found that the number of social conflict events were increasingly on the rise and their severity exponentially exacerbating.

In order to provide a clear explanation of the role of environmental degradation in civil unrest in Iran, this Chapter provided an overview of Iran's environmental situation. Vanishing lakes and rivers, diminishing groundwater, land subsidence, water pollution, water supply restriction and discontinuation, droughts, floods, forced population movements, agricultural failures, salt, sand and dust storms, and ecosystem losses are the modern, water related challenges of Iran, a country which had once been at the forefront in sustainable water management for millennia. Also, as one of the aims of the research, this Chapter identified major causes and drivers of Iran's environmental degradation, or environmental bankruptcy, as this thesis depicts it. These are mostly anthropogenic and range from climate change, water mismanagement, 'thirst' for development, rapid urban and population growth to inefficient agricultural policy.

This Chapter addressed whether environmental factors such as drought and water scarcity have been causing civil unrest in Iran. The results indicated that environmental factors such as drought, water scarcity, desertification through two pathways, direct and indirect, are linked to civil unrest in Iran. These factors by intensifying rural-urban migrations are indirectly playing a part in Iran's civil unrest. As the urban centres increasingly receive more internal migrants, the number of frustrated unemployed or underemployed citizens furious with the government will increase and become congregated in urban centres. By escalating violent clashes over water between different regions and between people and security forces, environmental factors, in particular, growing water scarcity and drought, are directly causing violent conflict in Iran.

Furthermore, this thesis found that the role of environmental factors in the civil unrest is progressively increasing; as drought and water scarcity are becoming more desperate, the protests and clashes between the state and the people are becoming more widespread. In addition to the increase in numbers of social conflict events Iran, the severity of such events is exacerbating. The civil unrest in Iran, as presented in this Chapter, is becoming more violent, for example, over last three years, in many of protests and riots people were killed and injured. One of the apparent examples is the 2019 protest in which hundreds were killed and many more injured. The recent protests were the most violent civil unrest since the 1979 Iran's revolution.

The Iranian regime seemingly is aware of the negative implications of the country's mounting environmental challenges and have taken some measures to tackle them. However, these measures seem disingenuous as there are no practical measures (i.e. policy or direct action) to meaningfully address these concerns.

In a nutshell, Iran is an environmentally bankrupt nation and this bankruptcy is an existential threat to the country. This threat can reveal itself as widespread civil conflict or trigger mass environmentally-induced migration. This environmental bankruptcy may force more than 50 million Iranians to migrate whether internally or to other countries which can be one of the worse environmentally induced migration in the world. Therefore, this thesis claims that Iran is on the brink of a humanitarian

catastrophe and in order to avoid such catastrophe the Iranian policymakers must take immediate measures.

Chapter 5. Conclusion and recommendations

This thesis provided an overview of the environmental conditions in Iran. This research found that drying lakes and rivers, diminishing groundwater, land subsidence, growing water scarcity, droughts, floods, forced population movements, agricultural failures, salt, sand and dust storms, and ecosystem losses are the modern, environment- related challenges for the country. The thesis also identified major causes and drivers of Iran's environmental degradation, or environmental bankruptcy, as this thesis depicts it. These are mostly anthropogenic and range from adverse impacts of climate change, water mismanagement, 'thirst' for development, rapid urban and population growth and inefficient agricultural policy.

This thesis addressed whether environmental factors such as drought and water scarcity have been causing civil unrest in Iran. The results indicated that environmental factors such as drought, water scarcity, desertification through two pathways, direct and indirect, are linked to civil unrest. These factors, by intensifying rural-urban migration, are indirectly playing a part in Iran's civil unrest. As the urban centres increasingly receive more internal migrants, the number of frustrated unemployed or underemployed citizens furious with the government will increase and become congregated in urban centres. By escalating violent clashes over water between different regions and between people and security forces, environmental factors, in particular, growing water scarcity and drought are directly causing violent conflict. Most importantly, this research found that social conflict events in Iran are on the rise. Furthermore, the severity of the events is exacerbating and largely related to water issues. That is, the role of environmental factors in civil unrest is progressively increasing; as drought and water scarcity are becoming more desperate, the protests and clashes between the state and the people are becoming more widespread.

This thesis also found that the Iranian regime is aware of the dire environmental situation. However, the awareness has not yet translated into practical measures and practices to tackle the looming environmental bankruptcy in Iran. Also, Persian media is, by and large, aware of the situation and this was reflected by the large amount of news reporting dedicated to environmental issues. For example, the local media in Khuzestan Province reported more than 100 environmentally induced protests in 2018. However, this coverage does not put the environmental crisis in a global context. For example, the author of this research found that the 'climate change' term was to a large extent absent in the news reporting dedicated to environmental issues. This has also impacted public discourse in Iran. For example, protestors never called upon Iranian authorities to address climate change as a cause of the country's environmental crisis.

This environmental bankruptcy is an existential threat to country. This bankruptcy may lead to widespread civil conflict or trigger internal and international mass migration. In order to avoid such widespread social conflict in Iran or forced mass population movement, this thesis recommends that the government take immediate measures in resolving the country's looming environmental bankruptcy. Notwithstanding Iran's involvement in regional tensions, the country needs to prioritise the well-being of its constituents. These measures can include: putting an end to all under construction dams, allocating more resources, e.g., further spending from the GDP on the environment, reducing the production of wheat and increase wheat imports. Perhaps most importantly, the country needs to officially acknowledge and incorporate climate change and its true meaning in Farsi-dominated discourse. Once part of the lexicon, it may mitigate another failed-state scenario and lead to long-term meaningful change and stability.

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