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The Impact of Environmental Factors on National Security: *Post-2003 Iraq as a Case Study*

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Abstract

This paper, entitled "The Impact of Environmental Factors on National Security: Post-2003 Iraq as a Case Study," deals with how, after 2003, environmental problems play a crucial role as non-traditional threats to Iraq's national security. The study's key goal is to evaluate how Iraq's social, economic, and public health sectors, along with national unity and stability, have been influenced by environmental factors like pollution, water scarcity, land degradation, climate change, and poor environmental governance. Further, the study employs a qualitative method and utilizes scholarly literature, official documents, and secondary sources. The Copenhagen School of securitization, by Barry Buzan, Ole Waever, and Jaap de Wilde (1998), is employed for analyzing the collected data. That is, it is used to clarify how environmental factors might be viewed as security risks that demand instant institutional and political responses. It is concluded that the environmental deprivation has amplified social strains and destabilized national cohesion by placing important expenditures on Iraq, taxing rare resources, postponing the retrieval of efforts, and depressing people's way of life. Thus, Iraq's security weaknesses become worse by disregarding environmental elements. Hence, it sheds light on how vital it is to integrate environmental factors into national security planning and policies to obtain long-term security and sustainable stability in Iraq.

1. Introduction

Following the end of Baath Party rule in Iraq in 2003, brought about by the intervention of the USA and its allies, the country has faced numerous challenges. Iraq has been significantly impacted by severe environmental degradation, ongoing conflict, civil war, and the rise of the Islamic State in 2014. Among these issues, water scarcity has emerged as a critical concern, affecting Iraq's economic, social, and health security. Additionally, the country's environmental policies, particularly in managing climate change, environmental problems, and air quality, have deteriorated (UNDP, 2026). Given Iraq's heavy reliance on agriculture, as well as oil and natural resource production, these environmental challenges have had far-reaching consequences. Specifically, large-scale dam projects, water shortages, and poor water management practices have exacerbated agricultural and food security issues, alongside the broader impacts of climate change and the deterioration of natural resources (Jaradat, 2003).

These environmental challenges also have profound menaces to the social status and health of the people in the country. Air pollution due to emissions and dust storms has further worsened respiratory diseases and cancers, and long-term conflicts have shattered health infrastructure and public health emergencies. That is why social insecurity, high unemployment, and poverty rates have intensified, as well as the general decline in Iraq’s development trajectory (NUPI, 2023). This research studies the environmental factors that pose profound threats to Iraq’s national security, focusing on their extensive consequences. It emphasizes how issues such as climate change, water scarcity, conflicts, and pollution contribute to national instability and weaken the social and economic sectors. Additionally, it explores the negative effects on public health and overall well-being, underscoring the need for vital policy measures to address these environmental threats.

This study is important because it focuses on aspects that have not yet been explored, especially those environmental factors that have had a negative impact on the economic, social, and health sectors of Iraqi society. In addition, the reconstruction of Iraqi civil society after the war depends on understanding the socio-economic impacts of environmental conditions. In addition, the research helps academics and researchers to obtain accurate results for their research. The topic under discussion is significant since it focuses on previously unexplored facets of the devastating socio-economic impact that environmental factors had on Iraqi society. In addition, understanding these socio-economic effects of the environmental factors is essential for rebuilding the post-conflict civil society in Iraq. Moreover, the research will enable researchers and scholars to acquire precise results related to their studies.

Despite the critical importance of environmental factors in shaping national security, the specific impact of these factors on Iraqi national security remains poorly understood, hindering the development of effective policies and strategies to address the complex interplay between environmental degradation and national security in Iraq. This research attempts to study the term of environmental security and its relevance to national security, and analyze the impact of environmental factors on the socio-economic and health sectors of Iraqi national security.

In order to achieve the aims, this research tries to answer the following questions:

- The main question is: How do environmental factors impact Iraqi national security?
- The secondary question is: What are the major internal and external environmental risks to which Iraq was challenged?

The article begins its data presentation by providing a summary of the connection between national security and environmental security. Then we present the environmental issues as an Iraqi national security concern after 2003, especially focused on environmental factors such as water shortage, climate change, poor management, air quality, and conflicts, which have created and their overall harm to the national security of Iraq.

2. Methodology

This paper employs a qualitative research method to examine how environmental factors have influenced Iraq's national security in the post-2003 period. A qualitative approach is appropriate for this study as it allows for an in-depth analysis of complex interactions between environmental challenges and security-related outcomes within a post-conflict context.

The data set for this study consists of 17 relevant local and international reports addressing environmental, social, and security-related issues in Iraq. These include reports from international organizations such as FAO (2023), IEA (2024), IRIS (2023), IOM (2023), IOHR (2024), *The Guardian* (2010), the World Bank Group (2021), UNEP (2020; 2023), UNHCR (2008), UNHR (2023), and the United Nations in Iraq (2021). In addition, the study draws on local sources, including reports from the Ministry of Agriculture, Republic of Iraq (2017), Iraqi News Agency (2023), Kurdistan 24 (2018), Shafaq News (2024), and Rudaw (2022). These sources were selected due to their relevance, credibility, and direct engagement with environmental and security issues in Iraq.

Moreover, systematized document analysis is used as the data collection and analysis tool. This method focuses on identifying recurring themes across the selected documents, such as institutional responses, social instability, water scarcity, public health impacts, and environmental degradation. Through thematic examination, the study captures patterns and linkages between environmental challenges and national security concerns.

Furthermore, this study applies securitization theory, as developed by Barry Buzan, Ole Wæver, and Jaap de Wilde (1998) within the Copenhagen School framework. This theoretical approach enables the analysis of how environmental issues in Iraq are framed as existential threats to social stability and national security, thereby justifying the need for urgent political and institutional responses.

3. Literature Review

Environmental security is a contentious concept with different definitions. This results from the combination of two potent but equally vague ideas—environment and security—as well as the wide range of academic fields and philosophical traditions that support the study of these two ideas. An individual's or group's comprehension of each of these ideas influences how they interpret the idea of environmental security as a whole (Barnett, J., 2010). At this point, the writer's approach to the term environmental security presents one area of study. The topic focuses on the term environmental security in the context of the Copenhagen School.

Security has always been a core interest for the political players due to the fact that security is synonymous with the existence of nations and states. The importance of security comes out clearly when insecurity sets in because security is almost always followed by sovereignty and self-governance. The measures that are used by different actors to deal with threats and risks, as well as the change in threat and risk characteristics, are the key factors defining the level of risk that an actor can face. While some security threats become gradually more serious, others are inherently transformed into serious security issues. As a result, the approach with which insecurity is dealt determines friends and foes and determines the relations between state and non-state agents (Abdulrahman and Issa, 2024).

Within this broad security framework, environmental security is a critical concept in national security, addressing the interconnectedness between security concerns like armed conflict and the natural environment. Academically, environmental security studies how environmental issues, such as resource shortage, can contribute to conflicts, especially in the developing world. This emerging field is gaining significance as scholars and policymakers increasingly recognize the role of

environmental factors in shaping global stability and security dynamics. For example, according to the Commonwealth of Independent States, "Environmental security is the state of protection of vital interests of the individual, society, natural environment from threats resulting from anthropogenic and natural impacts on the environment" (1996 advisory legislative act, "On Environmental Security"). The United Nations Development Program refers to it in its 1994 annual report on human development: "Environmental threats countries are facing are a combination of the degradation of local ecosystems and that of the global system. These comprise threats to environmental security" (Glen et al., 1998).

In this regard, the 1980s environmental security debate marked a significant shift in the security agenda. The Copenhagen School has delved into environmental issues and recognized the need to consider them in contemporary security dynamics, highlighting the importance of environmental consideration in security analysis. This School originated with the Copenhagen Peace Research Institute, founded in 1985, and the seminal work of this approach was Security: A New Framework for Analysis, co-authored by Barry Buzan, Ole Wæver, and Jaap de Wilde (published in 1998) (Buzan et al.,1998. P. 21).

The idea of security in this study is adapted to align with the methodology presented in Security: A New Framework for Analysis (1998) by Barry Buzan, Ole Wæver, and Jaap de Wilde. As 21st-century political theorists, Buzan and his colleagues establish a link between security and dangerous elements. This study aims to incorporate the most significant assumptions and definitions of global threats, such as climate change, water shortages, and conflicts affecting social security, within the framework of their book.

The school examines issues through securitization theory by studying how particular matters are identified as security risks. It explores how security threats emerge through the securitization process and the construction of threats in international relations. In this regard, the security threat classification proposed by Buzan includes five sectors: military, political, economic, societal, and environmental. The environmental sector has gained increased analytical interest due to climate change, resource constraints, and ecological damage, all of which undermine state and human security. Buzan classifies environmental threats as unique because they are not generated by hostile actors but rather arise from the systemic degradation of natural resources and ecosystem destruction. This makes them more difficult to address within traditional security perspectives (Buzan et al., 1998. Pp. 71-94). During post-2003 Iraq, the political leadership, together with national security officials have started viewing environmental dangers as threats that directly jeopardize national security. Former Iraqi Prime Minister Haider al-Abadi announced water scarcity as a threat to national security because it endangers both social stability and economic prosperity when he made this declaration in 2018. The formal securitization process requires restructuring environmental challenges into urgent, life-threatening security risks, which leads to public and governmental interest. The threats have generated significant security problems across broader Iraq, thus causing tense situations in Basra water access disputes and escalating protests among farmers in Diyala and Wasit provinces (Rudaw 2018).

As part of his security agenda analysis in their book, Buzan incorporates the concept of environmental threats. The environmental issues, which include deforestation and air pollution, together with climate change and natural resource exhaustion, serve as destabilizing agents leading to security problems and conflicts. According to his examination, environmental destruction creates instability in states through economic problems, as well as population shifts and increased resource contention. A similar approach to environmental threat analysis fits current security concerns about how environmental factors produce conflicts, which manifest mainly in areas suffering from water scarcity and food shortages and climate-based population relocations (Buzan et al., 1991. Pp 130-135). The situation in post-2003 Iraq has worsened security because areas with limited water and food resources and environmental migration face greater instability due to environmental drivers

that create conflicts against national stability. For example, the environmental degradation from 2016 to 2022 resulted in the displacement of more than 55,000 people from central and southern Iraq, leading to resource depletion in dense urban areas, which creates social instability (Mansour and Al-Jawahery, 2021).

Furthermore, Buzan bases his environmental security framework on his comprehensive theory, which advocates surveillance of security at individual and state, and international levels. The sovereignty of states encounters challenges from environmental elements that do not affect them in similar ways compared to conventional security threats. Environmental security threats like rising river levels endanger entire island countries to the point of disappearance, and deforestation and desertification create domestic turmoil in transitioning nations. The character of environmental threats runs completely opposite to traditional security risks because they affect multiple countries simultaneously. Varieties of environmental concerns affecting multiple states demand international cooperation to find proper solutions. Buzan's work demonstrates that states need to change their military-focused security approach by incorporating environmental sustainability in national defense and international safety operations. (Buzan et al., 1998). In this regard, the environmental situation in Iraq since 2003 has created intensified security problems, which require International and regional collaboration. For example, Iraq became a member of the Middle East Green Initiative (MGI) during 2023 as an initiative created by Saudi Arabia for tackling desertification while promoting climate resilience through regional cooperation (Abdelraouf and Nagasawa, 2023).

Buzan’s security theories helped form the Copenhagen School’s securitization theory to demonstrate the process of framing problems as security risks. National governments now identify climate change as a threat to their security because environmental protection has successfully become securitized during recent decades. According to Buzan, the process of environmental issue securitization produces twofold outcomes, although he suggests these results can be beneficial or disadvantageous to society. The urgent approach that results from security framing might activate military action, but these military solutions could fail to tackle environmental deterioration at its source (Buzan et al., 1998. Pp. 77-79).

Moreover, Environmental influences affecting national security in post-2003 Iraq are strongly connected to securitization mechanisms. The political interpretation of urgent matters, including water shortages, desertification, and air pollution, determines whether these threats become existentially dire rather than being studied objectively. Research based on securitization theory demonstrates how security risks develop through verbal declarations. Yet, many experts accept these threats uncritically, relying on previous academic findings. As Buzan et al. (1998, p. 26) state, threats emerge from social discourse, which frames them as existential, demanding emergency responses. National security narratives are shaped by political actors who define environmental problems as security threats. Iraq typically views environmental degradation through a realist lens, linking it to state stability rather than broader societal security concerns.

To sum up, the so-called “national” security problem, as the scholars in Copenhagen have recommended, is in fact the systematic security problem in which the states’ participation, warrants, and affected individuals, as well as the regime, all play a role. Political and military factors are no less important than economic, social, and environmental factors in this matter. Among these challenges, Iraq has faced environmental problems from 2003 onward, including desertification, water shortages, and climate change, which have contributed to or aggravated civil unrest, economic difficulties, and governance challenges. To address these issues, these factors must be defined in terms of security threats to stability within the Iraqi polity, the national economy, and the Iraqi people. This approach demonstrates the importance of moving beyond the state-centered conception of security, merging human and ecological systems to better explain the complexity of security threats.

4. Results and Discussion

The invasion of Iraq in 2003 by the USA and its allies has led to significant political, economic, and social changes, as well as internal conflicts, regional rivalries, and environmental threats. During this period ،Iraq was plagued by pollution ،desertification, and water scarcity, which posed a threat to Iraqi national security. This point attempts to approach this phenomenon by presenting two studies. The first requirement is defined by Iraqi national security. The second topic is an overview of the geopolitical context of the Iraqi environment.

National security in Iraq is multidimensional, with military, political, economic, environmental, social, and health dimensions. Since 2003, the country has faced serious problems such as the emergence of terrorist groups, sectarian conflicts, and external influences, in addition to challenging environmental factors such as water shortage, climate change, mismanagement, and wars that threaten Iraqi national security. Iraq requires an overarching strategy to respond to this web of interconnected problems for sustainable national security. Iraqi national security is actually composed of the six types below:

4.1 Military security

Military security is one of Iraq's most prominent national security components, directly concerns the maintenance of Iraq's sovereignty and territorial integrity and defense against external and internal threats. This dimension includes the cultivation of military capabilities, border defence, and security challenges such as terrorism and regional instability (Cordesman and Khazai, 2014). In this context, the rise of the Islamic State (ISIS) in Iraq since 2014 has brought urgent challenges to the Iraqi government (primarily among which are military security and defence), leading it to effect major reform and action. One important measure has been the establishment of the Popular Mobilization Forces (PMF) in 2014, which the government authorized as a response to the rising threat posed by ISIS. Since then, the PMF, a broad array of Shiite militias, has been a major factor in internal security, supporting the Iraqi Security Forces (ISF) in the fight against ISIS. International coalitions have also supported the government by training, providing military expertise and equipping to rebuild and modernize Iraq's security infrastructure. Such efforts demonstrate Iraq's efforts to enhance its military capabilities and deal with the varying threats it faces, especially during a drawn-out conflict with ISIS and amidst regional instability (Mansour and Jabar, 2017). This group effort to strengthen Iraq's military security highlights how necessary it is to keep strong defense capabilities, which are essential for protecting the nation's security.

4.2 Political security

Political security is the foundation of Iraq's national stability as it includes the integrity of Iraq's political institutions, the establishment of the rule of law, and the protection of democratic processes. This is especially important, as a resilient political system can help respond to national challenges, enable economic development, and protect the rights of citizens. Iraq has had internal political issues to deal with since the fall of Saddam Hussein up until October 2023, amongst them are sectarian divisions, internal corruption, and external actors like Iran. The 2014 emergence of the Islamic State (ISIS) also highlighted some of these problems and the importance of effective political institutions that can respond to such threats (Fazil and Tartir, 2023).

In response, the government of Iraq has initiated a range of new initiatives to reinforce its political security:

First, starting with National Reconciliation Efforts: The government has been working on processes that aim to bring together various sectarian and ethnic groups in order to promote inclusivity and national unity. Such efforts are essential in promoting a sense of shared identity and purpose amongst Iraq's heterogeneous population (Al Amkhozoomi, 2015).

Second, Fighting Corruption: The widespread impact of corruption on good governance and

development has led the Iraqi government to establish this priority in the framework of legal reforms and the establishment of anti-corruption bodies. Such measures aim to enhance accountability and rebuild citizens' trust in government institutions (UN, 2020).

Third, fighting Corruption: The Iraqi government has been aware of the damage corruption causes to governance and has pursued combating it by enacting laws and establishing anti-corruption institutions. These steps are designed to hold leaders accountable and rebuild trust in government institutions (Kurdistan24, 2023).

These measures reflect the commitment of Iraq to strengthen its political stable despite the security aspect. The country is free to concentrate on internal and external threats, ensuring national resilience.

4.3 Economic Security

Economic security lies at the heart of Iraq's national stability and underpins the country's ability to create the conditions for robust economic growth, provide for the immediate needs of its citizens, and develop the resilience necessary to insulate itself from external economic pressures. Historically, oil exports have dominated the Iraqi economy, making up 85% of the government budget, and representing 99% of its exports and 42% of its gross domestic product (GDP). Such reliance renders the nation vulnerable to severe economic turbulence, necessitating diversification initiatives (World Bank, 2022).

In recent years, the Iraqi economy has employed a number of strategies to strengthen its economic security, with perhaps the most significant being:

Encouraging Foreign Investment: The government has taken dynamic steps to foster a better economic environment to lure overseas investment. This is to carry out reforms to make procedures and transactions clearer and easier to enable international businesses to invest in Iraq's non-oil sector (U.S. Department of State, n.d.).

4.4 Environmental Security

Environmental issues have become, in recent years, especially after 2003, a vital security element for the security of Iraq because they directly affect the economic and social stability of the country, as well as the prospects of public health and sustainability. Since water scarcity, in addition to desertification and climate change specific pollution, create great risks on Iraq's national security, as these factors decrease food production and disrupt social stability, disrupting local livelihoods (Naama, 2022).

To address these urgent environmental issues, the Iraqi government has launched a number of initiatives:

First, water desalination projects: To solve drinking water shortages and problems in Basra, the government announced a water desalination project around the city of Basra on a large scale in 2023. This project is to be capable of producing up to 1 million cubic meters per day; enough to provide drinking water for about 4 million people (International Energy Agency, 2023).

Second, Agricultural Resilience Programs: The World Food Programme (WFP) partnered with the Iraqi government to advance climate adaptation for food security and stability. Their programs emphasize the need for effective and sustainable climate adaptation plans to bolster local communities and agricultural resilience (World Food Programme, 2023).

4.5 Societal Security

Iraq's social stability was achieved because of the heterogeneous composition of ethnic, sectarian, and tribal divisions that form the pillar of its society. Iraq is home to Arabs, Kurds, Turkmens, Yazidis, and other ethnic groups. Both political elites and outside powers have continuously exploited sectarian tensions between Sunni and Shia communities as tools of their intrastate calculations. There was an escalation of sectarian religiosity in names and acts of violence, complemented by a plethora of perverse interpretations of Islam during the post 2003 era until the late 2010s peak of ISIS. In fact, the societal security of Iraq must be built on the two foundations of national identity and the practice of peace between groups and equal opportunities for all citizens in their political and economic life (Fazil and Tartir, 2023). The Iraqi government has taken several steps to bolster societal security, including launching conciliatory processes, eager to mend relations between groups historically entangled with one another, in hopes of fostering a more Bashar Al-Assad's led inclusive national identity. These efforts are vital in fostering a common sense of identity and mission among Iraqis of many sects (Bourhrous. et al, 2022).

4.6 Health security

Health security is an important but often overlooked aspect of Iraq's national stability. Decades of civil war, political strife, and economic woes have so ravaged the country's health care infrastructure that it is considered highly vulnerable to public health emergencies. For example, the COVID-19 pandemic exposed major gaps in Iraq's health system, including a lack of medical supplies, a low level of funding devoted to health care, and a small number of trained professionals. These weaknesses not only impede effective disease response but also fuel social disruption and erode governmental legitimacy. Fixing these problems requires a holistic approach that includes rebuilding the healthcare infrastructure and improving disease surveillance, as well as promoting international cooperation to prevent future health crises. Experiencing public health challenges that ultimately stymie national resilience, without a priority on health security, Iraq's broader goals for national security remain at risk (WHO, 2023).

Moreover, within the frame of covid-19 pandemic, the Iraqi government, in collaboration with international partners, has launched a variety of health security initiatives addressing these challenges, including:

First, Public Awareness Campaigns: In an effort to fight vaccine hesitancy and misinformation, the government, along with organizations like the World Health Organization (WHO), launched large campaigns to raise public awareness about the importance of vaccination. These efforts focused on raising awareness about the benefits of COVID-19 vaccinations, moving forward to promote individual involvement in the vaccination program (WHO, 2021).

Second, National Deployment and Vaccination Plan: The Iraqi government created an elaborate plan to clarify the mechanisms of storage, distribution, and administration of COVID-19 vaccines. The goal was to reach herd immunity by vaccinating >60% of the population and blunting virus transmission (IOM, 2021).

Third, Foreign Aid and Funding: Acknowledging the financial limitations, Iraq managed to obtain foreign support for its vaccination campaign. The World Bank allocated US$100 million to support, among other things, vaccine procurement, health care waste management, and public awareness on the importance of vaccination (World Bank, 2021).

4.7 The Geopolitical Context of the Iraqi Environment

Iraq is situated in the area that was once known as ancient Mesopotamia, the region between the Euphrates and Dijla rivers. It is located on the comparatively fertile eastern wing of the Fertile Crescent, which is an otherwise desert region. Iraq is a country in the Middle East and North Africa.

It borders Saudi Arabia and Kuwait to the south, Syria and Jordan to the west, Iran to the east, and Turkey to the north. Iraq's location is important because it is on the same latitude as the southern United States and is one of the Arab world's easternmost nations. There are four geographical regions that make up Iraq. Approximately two-fifths of Iraq is made up of deserts in the west and south, the highlands in the north and northeast, the Tigris-Euphrates alluvial plains in central and southeast Iraq, and the upland area of Al-Jazeerah in northwest Iraq between the Tigris and Euphrates rivers. In Turkey and Iran, the Tigris-Euphrates River system receives water from melting winter snow, which then flows into Iraq, supplying rich soil for agriculture, a vital economic sector (Embassy of the Republic of Iraq in Washington, D.C., n.d).

Iraq's climate is divided into two regions: the scorching deserts and the lowlands, which include the alluvial plains. Because of its higher height and mountain ranges, the drier northeastern region experiences lower winter temperatures and milder summer temperatures. The heavy alluvial soils that cover the lowlands include a considerable amount of clay that is suitable for farming and construction. The northeast experiences longer winters and shorter summers. Good seasonal pastures are maintained by the more substantial winter rainfall. It frequently has a steady wind that blows from the north and northwest, bringing with it dry air and a clear sky. Dust storms are also brought on by winds from the south and southeast all year long, though they occur most frequently in the summer (Etheredge, L. ed., 2010).

Iraq's environment is rich in history and diversity, combining cultural heritage with scenic beauty. As previously mentioned, the country's landscape features include stunning mountains, rich plains, immense deserts, and the famous Tigris and Euphrates rivers, which have supported civilizations for thousands of years. Both distinctive biodiversity and agricultural productivity are supported by these varied habitats. It implies that Iraq's resilience and potential for sustained growth are reflected in this colorful blend, especially in its national security.

Nevertheless, Iraq ranks fifth globally in terms of susceptibility to the consequences of climate change, such as food and water scarcity, but the government continues to try to address this issue (United Nations Environment Program, 2020). For example, to reach a deal with Turkey over long-standing water conflicts that have broader geopolitical consequences for peace and security, addressing climate-induced challenges requires a renewed commitment to implementing critical changes. Iraq has signed a multi-billion-dollar strategic water agreement with Turkey to resolve its worsening water crisis, according to government spokesperson Bassem al-Awadi. The deal includes a joint Iraqi-Turkish fund, where Iraq will deposit oil revenue to finance projects such as dams, canalised rivers, power generation, and pumping stations. It also aims to improve water management in the Tigris and Euphrates rivers, as water flow from Turkey to Iraq has dramatically declined in recent years, reaching only 180 cubic meters per second in 2022. The agreement, expected to provide long-term solutions, will be valid for 10 years from its implementation (Rudaw, 2024).

In fact, over the past two decades, Iraq's environment has faced serious threats, profoundly impacting the country's environmental security. Therefore, in the following point, we will discuss several factors and causes.

4.8 Environmental Threat Factors on Iraqi National Security

There are many factors that have an impact on the overall environment of Iraqi national security. Some of the issues listed below contribute to the further deterioration of the ecosystem in Iraq after 2003. These factors can be internal or external. In this regard, the writer presents the main factors that contributed to the rise of environmental threats to Iraqi national security after 2003.

4.8.1 Water Shortage

Generally, Iraq depends on the waters of the Euphrates and Tigris rivers, as well as their tributaries, for its water supplies. Iran, Syria, Iraq, and Turkey all share the basins of these rivers. Except for the Al-Adhaim tributary, whose basin is wholly inside Iraq, all of these rivers have their source beyond the country's borders. This tributary's long-term discharge is limited to 25 cubic meters per second. According to long-term data, Iraq used to receive 30 BCM of water from the Euphrates River, 21.2 BCM from the Tigris River, and roughly 24.78 BCM from its tributaries. Additionally, little wadies from Iran brought 7 BCM of water (Al-Ansari et al. 2023).

Although Iraq mainly relies on the water resources of the Tigris and Euphrates rivers, which provide between 90% and 98% of the country's surface water resources, the cumulative flow of these rivers has decreased by about 30–40% over the last 40 years due to upstream dam construction, reduced rainfall, and increased evaporation caused by higher temperatures. As a result, Iraq has been facing a water scarcity crisis during this period, significantly impacting national security (Alotaiba, 2025).

This dramatic reduction of water availability has prompted serious repercussions on Iraq's national security as well as food security. The agricultural sector, which accounts for 60–80% of the water resources in the country, has especially suffered (Metwally et al, 2024). Because of this significantly lower water flow, farmland is turning into desert, with Iraq losing around 60,000 acres of arable land every year. This loss of fertile land puts food security at risk and has driven many farmers away from their means of income, which has caused widespread unemployment and social tensions (Hamasaeed et al, 2023).

Similarly, these conditions are affecting rural communities in Iraq that are facing water shortages and desertification due to unregulated upstream water use and toxic waste. Farmers are particularly affected, with desertification and water shortages causing declines in arable land and production. For instance, cereal production in the al-Alam district declined from 103,000 tons in 2019 to 53,000 tons in 2021 (Shuker, 2023).

Moreover, according to a UNICEF report, the 2020–2021 season was one of the driest rainfall seasons in 40 years in Iraq, resulting in a 29% and 73% decrease in water flow in the Tigris and Euphrates rivers, respectively. The situation has been made worse by factors like urbanization, inadequate water management, rising food demand, and climate change (UNICEF study, 2021). 90% of Iraq's rivers are generally contaminated, according to UN data, and the nation is only predicted to be able to meet 15% of its water needs by 2035 (Shafaq News, 2024).

Several internal and external factors contribute to this crisis. As the President of the Republic of Iraq, Latif Rashid, highlighted during a meeting with the technical delegation of the Food and Agriculture Organization of the United Nations (FAO), poor water management, climate change, and reduced supply from Turkey and Iran - despite numerous international and regional agreements on water security - have exacerbated Iraq's water crisis (Iraqi News Agency, 2023).

Similarly, in June 2018, President Fuad Masum held a meeting with Vice Presidents Nouri al-Maliki, Ayad Allawi, and Osama al-Nujaifi to discuss the frightening drop in Tigris water levels. The leaders emphasized the importance of leveraging strategic engagement and ongoing communication with the Turkish authorities to mediate an equitable allocation of this important resource (Kurdistan24,2018).

Furthermore, Upstream activities by the countries around it are also affecting the flow of water. The Southeastern Anatolia Project (GAP) in Turkey, which involves the building of 22 dams and 19 hydroelectric power plants, has notably reduced the flow of the Euphrates and Tigris rivers into Iraq (Climate diplomacy, n.d) One significant example is the Ilısu Dam in Turkey; the water level

in its reservoir is filling which has led to a very important reduction in the flow of Tigris River into Iraq (Madhhachi, et al, 2020). Likewise, Tigris River water shortages in Iraq have been exacerbated due to the diversion of tributaries leading to the Tigris into Iran (Keynoush, 2021).

On the other hand, according to the Iraqi Observatory for Human Rights, on March 22, 2023, the Euphrates and Tigris rivers are filled with oil, conflict, and medical waste, and the country's water is highly poisoned. It indicates that the drinking water in Iraq has been tainted with wastewater, oil, and excrement for years. Also, the main issue of water contamination has not been addressed by Iraq's successive governments, which is another major cause of the numerous illnesses that Iraqis face. This failure occurs in spite of the "booming" government budgets that the Iraqi legislature has approved throughout the previous 20 years (Reliefweb, 2023).

4.8.2 Climate Change

The current state of climate change includes both the direct effects of global warming and its more general effects, such as the ongoing increase in the average world temperature. In a broader context, historical long-term changes in Earth's climate are also referred to as climate change. Human activity is to blame for the current rise in global temperatures, especially the Industrial Revolution's usage of fossil fuels. The combustion of fossil fuels, deforestation, and some industrial and agricultural operations all emit greenhouse gases. These gases absorb a portion of the heat that the Earth produces after warming from sunlight, which causes the lower atmosphere to warm. Carbon dioxide, the primary greenhouse gas causing global warming, has risen by about 50% and is currently at levels not seen in millions of years (Houghton, 2009).

Climate change is one of the factors; it has had an increasingly large impact on the Iraqi environment during the past 20 years. Iraq is among the nations most susceptible to the effects of climate change, according to a report by the International Energy Agency (IEA). Iraq warmed at an average rate of 0.48°C per decade between 2000 and 2023, which was higher than the global average of 0.37°C. By the end of the century, temperatures are expected to have risen by 2.5°C in a low-emissions scenario and 5.6°C in a high-emissions scenario relative to pre-industrial times (International Energy Agency (IEA), 2024).

Furthermore, according to the Iraqi Observatory for Human Rights (IOHR). With temperatures reaching over 50 degrees Celsius in certain places, sunstroke and heat exhaustion are prevalent. Due to the fact that most workers from a variety of industries have one thing in common, working in the sun during the hottest season, the Iraqi Ministry of Labor and Social Affairs reported a large number of cases of workers experiencing these problems. Delivery drivers are especially vulnerable, especially those who opt to work during the day. The ministry's spokesperson, Najm Al-Oqabi, stated in a news release, "*We recorded a large number of casualties who were transferred to the hospital as a result of excessive heat exposure*." All of this indicates that the health security of the Iraqi people is under serious threat from environmental impacts (IOHR, 2024).

According to a report by the International Organization for Migration (IOM), the Displacement in Iraq Tracking Matrix reported that, as of 2023, drought and climate change had caused over 12,000 families, or about 73,000 people, to be displaced across ten governorates in central and southern Iraq. Most of these families—76 percent of them—have been forced to relocate to cities (The International Organization for Migration (IOM), 2023). Additionally, according to a U.N. Environment Programme assessment. This is because of a mix of high temperatures, drought, water scarcity, and frequent sand and dust storms (United Nations Human Rights, 2023).

Moreover, according to a report from the World Bank Group in 2021, in many parts of Iraq, good-quality water is scarce due to salinity. Iraq's desertification and water scarcity as a result of shifting river flows make it susceptible to the negative consequences of climate change. As of 2020, around

40 million people are living in Iraq. Furthermore, the agriculture sector is regarded as one of the primary drivers of Iraq's economy. As a result, the impacts of climate change, such as rising temperatures and decreasing rainfall, are expected to affect Iraq's water resources, agriculture, biodiversity, and health sectors (The World Bank Group, 2021).

As a result, drought, water scarcity, and poor water quality in central and southern Iraq are making it difficult for households to maintain climate-sensitive livelihoods, including fishing, farming, and raising cattle. Migration in many forms, such as seasonal or temporary shifts or the removal of one household member, is a crucial adaptation strategy, even though some families can adjust in situ. However, whole families have also been forced to relocate permanently to rural areas due to worsening environmental circumstances as they attempt to escape debt and financial instability. For instance, the Displacement Tracking Matrix (DTM) of the International Organization for Migration (IOM) documented in March 2024 that 23,364 families, totaling 140,184 people, had been displaced by environmental reasons in 12 governorates. In addition to moving from rural to urban areas (55%), the majority of households shifted within their own governorate (81%) or even district (47%). Fewer people (19%) were relocated to other governorates, like Kerbala and Najaf. The impact of environmental deterioration and climate change on Iraqi foreign migration trends, however, is poorly understood (International Organisation for Migration, 2024).

Notably, Iraq is mostly a rain-fed agricultural nation, producing primarily grain and animals, with a significant amount of its acreage reliant on irrigation. Five percent of the nation's GDP comes from the agriculture sector, which is the second-largest contributor after the oil industry. According to data from 2018, 18.7% of the active workforce is involved in agriculture, with women making up 23.3% of those employed. Agriculture is vitally important for the production of food and provides income for millions of Iraqi people. Though just about 5 million hectares are now under cultivation, roughly 22% of Iraq's land, or 9.5 million hectares, is ideal for agricultural production. The industry is dominated by small-scale farming, which usually employs conventional agricultural practices that rely on surface irrigation, are heavily reliant on farmers, use little technology, and need little capital investment, creating poor production levels (Barhoum and Nalbandian, 2022).

Unfortunately, the sector has encountered numerous difficulties over the years, one of which is climate change. Iraq's economy suffers due to the deteriorating climate, particularly in the agricultural sector. Smallholder farming, the main source of food production, is heavily affected. Many farmers rely on outdated rain-fed irrigation methods, leaving them vulnerable to droughts during periods of low rainfall. Moreover, the combination of aging infrastructure and adverse climatic conditions has accelerated desertification, now impacting about 39% of Iraq's land. Consequently, the nation loses more than 100 square kilometers of fertile land per year. Many farmers are compelled by desertification to leave their property and relocate to densely populated cities, where a lack of employment prospects in the overburdened public sector pushes some into the unorganized and illicit economy. A farmer with a master's degree in economics named Said Bassem Karim stated unequivocally that “environmental and climate factors are making their lives harder and also said that it’s painful for us to see how dry our lands have become. We are even psychologically affected, frustrated, and don’t know what to do.” This has a significant impact on the growth of the Iraqi economy. (Relief web, 2022).

Furthermore, education provides an opportunity for children and young people to learn and prepare for climate change; it also plays a crucial role in enabling them to become change-makers and contributors to social stability. However, extreme weather events can disrupt education by delaying school for extended periods and reducing children's chances of returning to their studies. In Iraq, 48 percent of schools lack access to basic water services, even though water is essential for hygiene and for supporting students' ability to attend school. Students who are forced to drop out face serious risks, including child labor and early marriage, and this has caused such social impacts due to

environmental concerns (UNICEF IN Iraq, 2023).

Another sector of the economy that has been affected by climate change in Iraq is tourism. Tourism in Iraq refers to travel within the Western Asian country of Iraq. For many years, Iraq was a key destination for tourists; however, this has changed dramatically due to environmental factors. For example, Najaf Lake, once a popular tourist attraction, is now facing an environmental crisis caused by climate change and reduced water flow. The lake's declining water levels are impacting agricultural yields and fish resources in the region, jeopardizing the livelihoods of local communities. The reduction in water levels is primarily due to decreased water flow from the tributaries of the Euphrates River. Climate experts attribute this deterioration to a broader decline in water resources and reduced river inflows into Iraq. The degradation of Najaf Lake represents a significant environmental issue, threatening the country's economy and the sustainable future of the communities that rely on the lake's ecosystem. As Shaker Fayez Kadhim, Najaf's water resources manager, made it clear, "Scarcity of water coupled with climate change over the past years has affected the local population very badly. The reduced rainfall, evaporation, and less release of water to Najaf Lake resulted in a decrease in the level of water, which directly affected the income of all sectors of the region" (Kurdistan24, 2024).

4.8.3 Air Quality

Air pollution, which is one of the most common types of environmental pollution because it is easily transported from one place to another and in a short amount of time, is regarded as a form of market failure in achieving efficiency and allocating resources without it. Air pollution is one of the most important environmental resources that no living organism can harm. liquid or solid that could endanger life (AL-Fakhry and Ramo, 2021).

After the USA invasion of Iraq in 2003, the country faced one of the most serious environmental threats: poor air quality. It directly impacted the environment, and its effects on the lives and well-being of the people quickly became apparent. This issue is widely recognized by both the government and the public, particularly regarding emissions from vehicle exhaust, especially in major cities like Baghdad, Mosul, Basra, and Erbil, which have a high density of cars (Al-Sultan, 2015). According to studies, almost one out of every three Iraqi vehicles violates emission limits and other toxic materials, such as carbon monoxide (CO), nitrogen oxides (NO_x), hydrocarbons (HC), and particulate matter (PM), which flux into the atmosphere (Al-Razaq, 2018). More recent data highlights the severity of the situation. The average Air Quality Index (AQI) for Iraq was 121 in 2023, placing the country within the 'Unhealthy for Sensitive Groups' category. According to the Air Quality Index (AQI), Baghdad is the most polluted city with AQI 126, while Erbil is the least polluted with AQI 91 (IQAir, 2023).

Moreover, the electricity generation sector is another significant threat to the Iraqi environment because it emits carbon dioxide and contributes to creating an unhealthy environment for people's livelihoods. According to a study by Rudaw Research in 2021, carbon dioxide emissions in Iraq increased by 177.8% (Baban, 2023). This dramatic increase has led to the classification of Iraq as the sixth most polluted country in the world as far as air quality is concerned, with an average $PM_{2.5}$ (43.84µg/m³) which exceeded more than 8.8-fold of World Health Organization's annual guidelines of 5µg/m³ (IQAir, 2023) According to health reports, such high pollution levels correlate with higher cases of respiratory and cardiovascular diseases in the Iraqi population (Al-Saad et al., 2024). Many residents suffer chronic respiratory problems, which they believe are a result of long exposure to polluted air, interviews with locals show. The government has introduced some environmental initiatives, but pollution enforcement is lax, leading to significant health and environmental concerns (Amwaj. media, 2022).

Furthermore, another significant threat to the Iraqi environment is dust storms. It is a meteorological

phenomenon common in arid and semi-arid regions. These can pollute the air, among other environmental issues. Studies on dust storms in Iraq have been conducted, and it is well known that dust storms are a problem in that nation. In Iraq, dust storms are occurring more frequently and with more intensity than they were thirty years ago. For instance, research on dust storms in Erbil conducted by Al-Kubaisi and Gardi found that the number of dust storms increased gradually from 35 in 1992 to 65 in 2009. This indicates that, compared to the dust storms of the previous century, the frequency and intensity of dust storms in Iraq have grown dramatically and have also had a profound impact on the security of Iraq's environment (Hama-Aziz, 2022).

Additionally, UNEP emphasizes that dust storms lower agricultural output by damaging crops and removing the fertile topsoil. As desertification worsens, much of Iraq's fertile land has been literally blown away. In one year, the Iraqi government reported 283 dusty days and 122 dust storms. Iraq may have 300 dust occurrences annually in the ensuing decade (United Nations Environment Programme (UNEP), 2023). According to the Iraqi Ministry of Agriculture, the Alseneaa (Bagi), Salahalden Governorate, northern Iraq. The area (around 40,000 ha) is highly affected by dust storms. As a result, the soils of this area cannot be used for crop production. Dust storm has a statistically significant detrimental effect on crop yields in Iraq for dates, cereals, and other fruits and vegetables. The losses from an extra dust storm day range from 0.7 to 2.8 percent, with dates and vegetables suffering the most. It has been stated that Central Asian cotton yields have decreased by 5 to 15 percent (Food and Agriculture Organisation of the United Nations (FAO), 2023). Consequently, it has a profound impact on the social and national economy of Iraq.

Furthermore, the impact of the oil industry on the people living near the oil fields is enormous. In these areas, residents are paying with their lives and facing numerous dangerous diseases, especially various forms of cancer, as black smoke has completely blanketed the sky and mixed with their breath for many years. For example, in the village of Nahran Omar, 15 kilometers north of Basra, the impact of the oil industry on its population is enormous. The residents of these areas bear the cost of living near oil fields, including 44-year-old Raghad Karim, who is battling colon cancer. As Karim stands resolutely, black smoke darkens the sky behind him—a powerful reminder of the ongoing threat that has plagued the village for years. 'That’s what we’ve been breathing for years,' he says, referring to the smoke. 'This is a crisis - cancer of all kinds and respiratory diseases that steal your breath - it has devastated our people. My brother died of cancer in 2007, and today I am battling a disease that has made my life so difficult.' Beyond the illness itself, she struggles to afford expensive medical care and chemotherapy (Al-Rubaie, 2024).

Moreover, high levels of hydrocarbons, such as methane, ethane, propane, butane, and pentane, were found in measurements made at oil fields in Basra, Iraq, including Al-Tuba, Al-Hais, and Majnoon. Majnoon had the lowest average methane content (395 ppm), while Al-Hais had the highest (995 ppm). These results demonstrate how Iraqi oil fields significantly increase greenhouse gas emissions and also negatively impact the country's environment (Al-Muhyi and Azeez, 2023).

Furthermore, the extensive influence of Iraqi oil fields creates severe environmental damage that produces major health problems along with significant economic consequences. The oil well fires in Qayyarah, as well as other locations, produce dangerous airborne pollutants that generate carbon dioxide along with particulate matter, thereby causing air contamination and medical problems such as asthma and cancer proliferation. Degraded oil well operations in Qayyarah have burned nineteen out of sixty-three wells, resulting in significant carbon dioxide emissions, together with atmospheric pollutants spread through the region (Aliyas and Alhadeedy, 2021).

To address the Iraqi government devotes significant financial resources on a yearly basis to tackle environmental damage caused by high rates of oil extraction, which negatively impact public health, economic, and social stability. According to the World Bank's 2017 Damage and Needs

Assessment, environmental damages were estimated at IQD 85 billion (approximately USD 73 million), while sectoral losses due to conflicts reached IQD 3.5 trillion (USD 3 billion), further straining Iraq's economy (Conflict Pollution Hotspots in Iraq: Land Remediation for Livelihoods Restoration, 2023). While reducing oil production could help protect the environment, it would cause substantial harm to Iraq's economy.

Therefore, Iraq was originally a public health emergency that was expected to occur because the country's health care system had been severely damaged by decades of conflict, corruption, and a lack of a healthy response to environmental threats, despite being underfunded for health services compared to most of its neighbors. For example, in 2019, only 6 trillion Iraqi dinars, or 4.5 percent of the annual budget of 133 trillion dinars, were allocated to health and the environment. The World Health Organization (WHO) estimates that Iraq spent only $154 per person on health care in 2015, compared to neighboring Iran ($366) and Jordan ($257). These factors have created a society more vulnerable to environmental threats and have profoundly impacted the health security of Iraqi individuals (Al-Saiedi and Haddad, 2021).

4.8.4 Poor Management

Since the USA-led invasion of Iraq in 2003, the country has faced one of its most pressing challenges: poor environmental management. The consequences of this issue soon became evident, significantly impacting the environmental sector, the well-being of its citizens, and their daily lives. This crisis also exposed Iraq's ageing infrastructure and highlighted the weaknesses in its governance system, especially in environmental issues. As the UN's report in 2021 assumed, Iraq is weak in in-service delivery and management, particularly in addressing important environmental issues and focusing on this sector (United Nations report, 2021).

Poor governance poses a significant threat to access to a healthy environment, and Iraq appears to be experiencing its effects more rapidly than other countries in the Middle East. The catastrophic environmental situation affecting all regions of Iraq is, in part, a consequence of poor management. This challenge, along with its impact on Iraq's environment, stems from several critical trends. For example, Insufficient Infrastructure to maintain the density of population, Iraq's unchecked urbanization, particularly in big cities like Baghdad, Basra, and Mosul, has resulted in serious environmental problems. Garbage builds up on roadsides, in waterways, and in residential neighborhoods while political systems in densely populated areas are unable to offer effective waste disposal facilities. Waste that is burned outside suffocates the environment and people with smoke that contains many harmful substances (Kale, 2024).

Additionally, the inexperience of Iraqi authorities in state management is another factor contributing to poor governance across all sectors, particularly in addressing environmental issues. The opposition parties in exile did not gain experience in state management, as their focus for decades was on resisting the previous regime. State institutions excluded opposition political activists. Moreover, most opposition members, especially those in Western nations, did not seek to enhance their administrative, technical, scientific, or practical skills. Instead, they primarily interacted with other Iraqis while relying on aid from the governments of those nations. Their failure to acquire the language of their host countries is evidence of this (Alaaldin, 2021).

Furthermore, Iraq's inadequate water governance and enforcement, particularly from 2003 to the present, has resulted in disproportionately significant water losses, as well as outdated or insufficient sewage systems, which have often become a cause of untreated sewage flowing directly into rivers such as the Tigris and Euphrates, which are vital sources of water for Iraq. These rivers are now heavily polluted, affecting both human and aquatic life and leaving Iraq's environmental infrastructure and regulatory mechanisms underprioritized and dysfunctional (Institute of Regional and International Studies (IRIS), n.d).

To sum up, Iraq's environmental issues stem from weak leadership, inadequate infrastructure development, and a lack of experience in nation-state governance. Issues include uncontrolled expansion, inadequate waste management, and outdated sewerage systems. Water governance worsens pollution in rivers like the Tigris and Euphrates. Iraq's environmental regulatory mechanisms are underprioritized.

4.8.5 Conflicts and Wars

Following 2003, Iraq experienced sectarian strife, a civil war, and an extremist insurgency that took over one-third of the nation. Conflicts have wreaked havoc on Iraq, with the environment being particularly hard hit. Severe contamination of Iraq's land, air, water, and health infrastructure has been severely damaged by wars and civil conflicts, with the recent war on terrorism. In Iraq, the sand particles carry harmful compounds, contributing to dust storms and the presence of depleted uranium in the food chain. The Al-Tuwaitha nuclear research site, destroyed in the 1991 Gulf War, has been a significant source of pollution. Soil samples from the site have been contaminated with Cs-137 and Co-60, leading to increased rates of cancer and birth defects in nearby cities (Al-Shammari, 2016). According to a report by The Guardian, areas near Al-Tuwaitha account for approximately 25% of the contaminated sites, which appear to coincide with communities that have experienced increased rates of cancer and birth defects, particularly neural tube defects that affect the spinal cords and brains of newborns (The Guardian, 2010).

Furthermore, a study by Douglas Godbold, Hana Said Al-Salih, Lilyan Yaqup Matti, and Riyad Abdullah Fathi found that in many areas of Iraq, there is depleted uranium (DU) pollution, which can have negative health consequences on the general population by increasing the risk of birth abnormalities, malignancies, and poisoning. DU is known to cause cancer. Approximately 1200 tonnes of munitions were dumped on Iraq in the 1991 and 2003 Gulf Wars. As a result, over 350 locations in Iraq became contaminated. There are currently 140,000 cancer cases among Iraqis, with 7000–8000 new cases reported annually. Similar to Basra, the number of cancer cases per 100,000 people has increased in Baghdad. Overall, the prevalence of leukaemia, lymphoma, lung and breast cancer has risen or even tripled. The circumstances in Mosul are comparable to those in other areas. Mosul had a higher cancer rate prior to the Gulf Wars, but after that, the rate has gone up even more. This is illustrated in Figure 1, which was a study conducted by Riyad Abdullah Fathi, Lilyan Yaqup Matti, Hana Said Al-Salih, and Douglas Godbold.

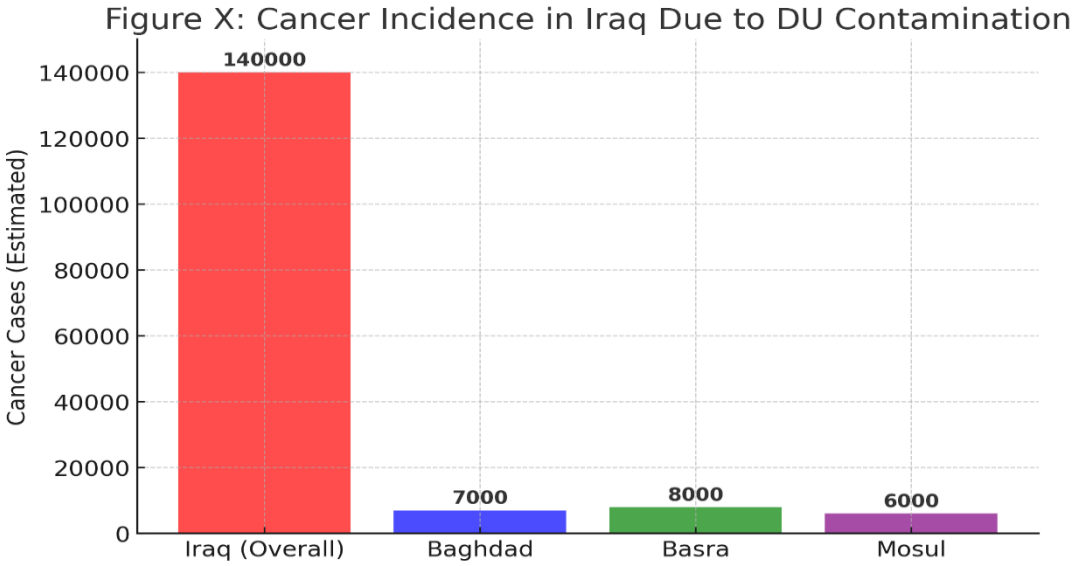

Figure 1: Cancer Incidence in Iraq Due to Du Contamination, 2013) (modified from (Fathi et al., 2013).

The governments of the USA and the United Kingdom claimed to have deployed at least 150 tons of depleted uranium (DU) ammunition in Iraq during the 2003 USA-Iraq War. Uranium, a naturally occurring radioactive element, is a byproduct of the atomic energy sector. DU is utilized by the military to produce strong projectiles, such as bullets. When a projectile penetrates a target, uranium oxides are released into the air, which can be inhaled or ingested, along with DU dust. Reports indicate that DU has been detected in various locations across Iraq. DU particles in soil can enter the food chain and ultimately be consumed by humans. For instance, uranium levels measured in sheep organs from several Iraqi cities suggest the presence of DU in the country's food supply, with the southern regions exhibiting the highest concentrations. A study conducted by Hazim Louis Mansour, Nada F. Tawfiq, and Mahmood Salim Kari in 2015 analysed twenty surface soil samples, revealing a maximum uranium concentration of 2.896 ppm in the bombed areas of Thi-Qar province, especially in the Al-Refai region, and a minimum of 0.779 ppm in Garmat Beni Saeed. The average uranium concentration across samples was 2.077±0.4 ppm, which is below the UNSCEAR-recommended limit of 11.7 ppm. Their results indicate that while uranium is present in the soil, the concentrations are within safe limits, suggesting limited immediate health risks from soil contamination in the studied areas, and they also demonstrated that long-term uranium consumption in drinking water produces toxicological harm to kidneys and bones. However, they emphasized that exposure to low uranium levels must still be monitored for groundwater and potential heavy metals associated with weapons. Regular monitoring of water and soil quality needs to be conducted to verify their safety levels. (Mansour et al., 2015). This is articulated in Figure 2, which was a study conducted by Hazim Louis Mansour, Nada F. Tawfiq, and Mahmood Salim Kari in 2015.

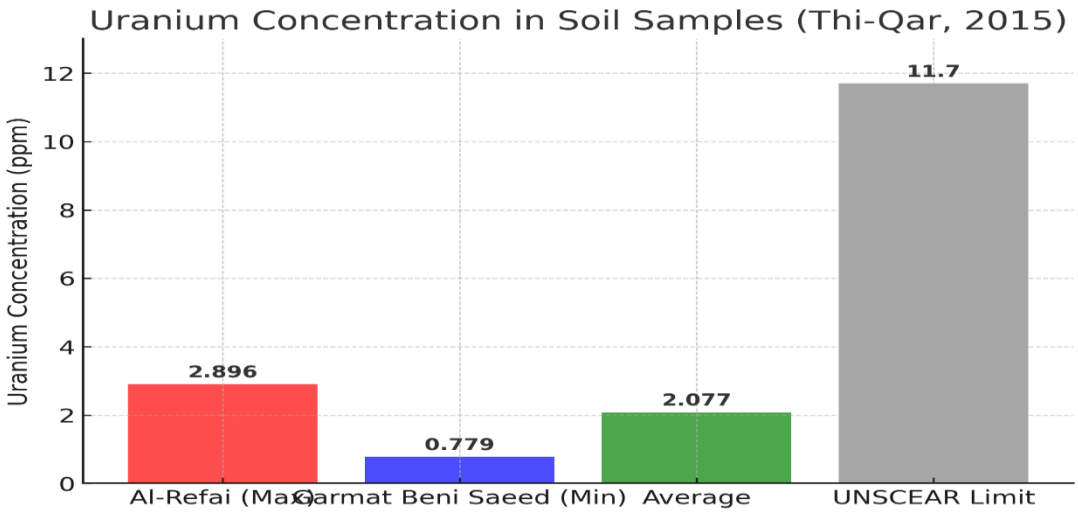

Figure 2: Uranium Concentration in Soil Samples (Thi-Qar, 2015) (modified from Mansour et al., 2015, p 1131).

It is clear that Iraq, always referred to as a 'country of many ethnicities, religions, and denominations,' is deeply fragmented among its three major groups: Shiite Arabs, Sunni Arabs, and Kurds. Historically, political and social relations between these groups have been unstable since the establishment of the Iraqi state in 1921. Following the liberation of Iraq in 2003, sectarian violence intensified, leading to heightened conflicts among the country's religious and ethnic groups, particularly between the Shiite Muslim majority and the Sunni Muslim minority. With the advent of the modern nation-state, sectarian tensions gradually escalated, culminating in violent conflicts such as the Iraqi Civil War (2006–2008) and the Iraq War (2013–2017 (Al-Qarawee, 2014). Consequently, violence after 2003 had detrimental effects on both the Iraqi environment and the ongoing political and economic transitions, as well as social and security procedures. Two-point-seven million people were relocated from their homes by 2008 because of conflict, which especially affected the farming sector (UNHCR, 2008). War contamination and desertification caused agricultural land to become unusable for cultivation because 22% of land, equal to 9.5 million

hectares, lost its productivity according to FAO (2010). Defense operations contaminated farmland with depleted uranium and other pollutants, which poisoned the ground, making it inadequate for farming in the future. The comprehensive damage to livestock and land infrastructure, coupled with war-related pollution, drove food self-sufficiency rates in Iraq to decrease to a point where the nation had to boost imports for sustenance (UNEP, 2005).

The new environmental challenges in Iraq were realized when the Islamic State (ISIS) attacked the country in 2014. In the social context, these reached multiple implications: For example, other than displacing people, ISIS used fire to destroy agriculture and, therefore, the livelihoods of many experienced farmers, through hostage-taking or forced cooperation. This devastation negatively impacted not only social security but also Iraq's environment. As reported by the Rudaw website in 2022, ISIS attacked farmers in villages around Salahaddin province, killing several experienced farmers (Rudaw, 2022).

On the other hand, the fight against the Islamic State (ISIS) in 2014 brought new environmental issues to Iraq. Intense conflicts have occurred in and around cities and industrial areas since the revolt, impacting the already unstable environmental situation. Throughout the war, environmental management infrastructure was weaponized, with ISIS taking control of riverbank structures and causing extensive damage, particularly in the environmental sector. For instance, large areas of farmland were destroyed, and the explosion of oil pipelines and refineries further polluted the air in the region (Zwijnenburg, 2015).

In this regard, the war against ISIS, according to ReliefWeb (2018), has ravaged Iraq's agricultural output, now an estimated 40% below 2014 levels. Around two-thirds of Iraq's farmers had access to irrigation before ISIS – by three years later, that dropped to 20%.' Loss of livestock was on a national scale, about 75%, and 95% in some areas.

Additionally, Qutaiba al-Jubury, the Environment Minister, claims that ISIS has been charged with contaminating water sources with hazardous chemicals and oil waste. Additionally, the gang is accused of destroying agricultural land, which raises concerns about food security, desertification, and economic losses. The use of environmental destruction as a weapon of war seems to have been embraced by ISIS through the "deliberate contamination of rivers, lakes, and streams with toxic waste and oil contaminants".

But on the regional conflict, the conflict between Iran and Israel has escalated, focusing on intensifying attacks on each other's industrial and energy facilities. This will lead to environmental consequences not only for their countries but also for the region. Attacks on oil infrastructure and rising tensions will drive up global oil prices, which can result in environmental complications. These include reduced demand and emissions, but also increased exploration and production, exacerbating environmental damage, particularly for Iraq, which is heavily dependent on oil revenues (Walsh et al., 2024).

Lastly, many different negative consequences have had to do with the destruction of fertile areas with vast farmlands, the utilization of depleted uranium ammunition, and damage caused by oil-related installation explosions. These occurrences have resulted in the polluting of land, air, and water resources, with negative environmental impacts. Sectarian tensions and the growth of extreme insurgencies like ISIS have also contributed to the deterioration of the environment. Thus, environmental restoration and sustainable management of that environment represent a critical avenue of humanitarian need and development for Iraq's future security, stability, and reconstruction at present and in the future.

Overall, the securitization theory of the Copenhagen School proposes an assessment of

environmental challenges to Iraqi state security, highlighting issues like water scarcity, climate change, air pollution, mismanagement, and post-2003 fighting as critical security concerns. Upstream damming and improper administration of the region's water resources, water supply insecurity, reduce Iraqi agriculture and other social issues, and climate change increase drought severity and extreme weather conditions. Outdoor air pollution, a result of increased industrialization and urbanization, affects people's health, economy, and society. Furthermore, Iraq faces poor governance and persistent warfare that reduces the country's capability to manage and eliminate societal risks. Such threats require a securitized approach to put the environment at the heart of Iraq's security agenda.

Moreover, the Copenhagen School of Security Studies deals primarily with the concept of securitization that concerns the way issues are constructed as threats requiring exceptional approaches. This applied to the environmental problems in Iraq since 2003, and the securitization of water and oil waste products, deteriorating air quality, and unresolved conflict, threatening the national economy, social order, and health in Iraq.

However, environmental deterioration has put much pressure on the country's economy, health, and society by retarding agriculture, oil sales, and facilities. On the social aspect, water scarcity and pollution increase conflict between communities, especially where social relations are based on access to water resources. Some of them are increased incidence of diseases such as respiratory and waterborne diseases that are likely to paralyze an already struggling health system.

Finally, this approach of raising these issues as security issues underscores the importance of coming up with sound policies that are beyond normal governance. Solving these challenges presupposes cooperation for the application of sustainable practices and conflict-solving experience for the population and partner countries, thus speaking not only of environmental management but also of the existence of Iraq's domestic and foreign economic, social, and health systems.

5. Conclusion and Recommendations

5.1 Conclusion

This study shows that Iraq's strategic location in the Fertile Crescent, supported by the Tigris-Euphrates water supply system, has confirmed Iraq's importance to the region's agriculture and economy. Nevertheless, this environmental asset is at risk of being lost due to climate change, water crisis, and leadership. Rising temperatures, a decrease in annual precipitation, and dust storms have only worsened Iraq's environment and increased pressure on its national security. Worse still, the effects of long-term conflict as well as poor environmental management are evident. Religious conflicts, rebellions, and foreign aggression led to severe impacts on the environment in its political aspect, but also left pollutants in the air, water, and soil. Alleviating these challenges has been made more difficult by conflicts that involve ISIS, among other fighters, as they led to the misuse of natural resources and the destruction of infrastructure. Also, corruption and poor governance, increased population densities, and dilapidated infrastructures are other barriers to effective management of the environment in Iraq.

The aforementioned environmental factors exert a profound impact on the vulnerabilities of Iraq's agricultural and rural areas. This is particularly significant given Iraq's heavy reliance on oil and agriculture, which makes its economy highly susceptible to the effects of climate change, desertification, and water scarcity. These environmental challenges undermine the agricultural sector's capacity for food production and contribute to the depopulation of rural areas, thereby intensifying urbanization and associated social problems.

Moreover, pollution and heat-related illnesses place additional pressure on Iraq's already strained healthcare system. Environmental issues such as water pollution and resource depletion further

exacerbate social tensions, serving as catalysts for regional conflicts. Addressing these threats requires the implementation of a securitization strategy that integrates environmentally sustainable policies and emphasizes international cooperation. Such an approach aims to safeguard lives while promoting stability and security within Iraq.

5.2 Recommendations

1. Iraq should keep improving its capacity to preserve the environment by putting in place comprehensive protection measures that lessen the strain on various social, development, and environmental systems.
2. The Iraqi government needs to act quickly and forcefully to stop environmental deterioration. This entails strengthening waste management procedures, investing in sustainable infrastructure, and imposing more stringent environmental laws on businesses. To create all-encompassing programs for environmental protection and restoration, government organizations should work with environmental specialists, academics, and internal and external organizations.
3. Raising public awareness and education is essential to fostering a deeper understanding of the importance of environmental preservation. To achieve this, educational programs should be implemented in local communities and schools to promote knowledge about energy conservation, waste management, and recycling practices. Media campaigns can serve as highly effective tools to inform the public about the dangers of environmental contamination and to encourage proactive measures for environmental protection.
4. The Iraqi government should carry out large-scale reforestation projects to restore the damaged environment. Planting trees and vegetation can help prevent soil erosion, improve air quality, and reduce dust intensity.
5. The Iraqi government should increase its investments in sustainable technologies and clean energy, particularly in clean energy sources like hydropower, wind, and solar. This is because Iraq has a lot of potential for solar energy, particularly in desert regions, and using this resource can help lessen the nation's reliance on gas and oil.

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کاریگەری فاکتەرە ژینگەییەکان لە سەر ئاسایشی نیشتیمانی: عێراق لە دوای ٢٠٠٣ وەک نموونە

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پوختە
ناونیشانی ئەم توێژینەوەیە بریتیە لە کاریگەری فاکتەرە ژینگەییەکانە لەسەر ئاسایشی نیشتیمانی عێراق لە دوای ساڵی 2003 ەوە، وەک یەکێک لە دیارترین هەڕەشە ناتەقلیدییەکان کە لە سەردەمی دوای گۆڕانکاری سیاسیدا سەریهەڵدا. توێژینەوەکە باس لەوە دەکات کە چۆن کێشە ژینگەییەکانی وەک پیسبوونی ژینگە، کەمی ئاو، تێکچوونی زەوی، گۆڕانی کەش و هەوا و لاوازی بەڕێوەبردنی ژینگە، کە کاریگەری ڕاستەوخۆیان لەسەر لایەنی کۆمەڵایەتی و ئابووری و تەندروستی گشتی هەیە، هەروەها کاریگەرییان لەسەر یەکێتی نەتەوەیی و سەقامگیریی سیاسی لە عێراقدا هەیە، کە بوونەتە گوشار لەسەر ئاسایشی نیشتیمانی. ئەم توێژینەوەیە پشت بە میتۆدێکی چۆنایەتی دەبەستێت کە پشت بە شیکردنەوەی ئەدەبیاتی زانستی پەیوەندیدار و ڕاپۆرتە فەرمییەکان و سەرچاوە لاوەکییەکان دەبەستێت، بە ئامانجی بنیاتنانی چوارچێوەیەکی شیکاری کە پەیوەندی نێوان تەحەداکانی ژینگە و ئاسایشی نیشتیمانی ڕوون بکاتەوە. هەروەها توێژینەوەکە بۆچوونی قوتابخانەی ئاسایشی کۆپنهاگن بەکاردەهێنێت، وەک باری بوزان، ئۆلی ویڤەر و جاپ دی وایلد (1998) داڕشتووە، بۆ لێکدانەوەی کێشە ژینگەییەکان و نیشاندانی ئەوەی کە چۆن دەتوانرێت وەک هەڕەشەی ئەمنی نیشان بدرێن کە پێویستی بە وەڵامدانەوەی دامەزراوەیی بەپەلە و سیاسەتی گشتی هەیە. توێژینەوەکە دەریدەخات کە تێکچوونی ژینگە یارمەتیدەرە بۆ زیادبوونی گرژی کۆمەڵایەتی و لاوازکردنی یەکڕیزی نەتەوەیی لەڕێگەی دانانی بارگرانی ئابووری لەسەر دەوڵەتی عێراق و لەناوچوونی سەرچاوە سروشتییە سنووردارەکان و ڕێگرتن لە هەوڵەکانی چاکسازی و گەشەپێدان و هەروەها دابەزینی کوالیتی ژیانی هاوڵاتیان. ئەنجامەکانیش ئەوەیان دەرخست کە پشتگوێخستنی ڕەهەندی ژینگەیی لە سیاسەتە گشتییەکاندا لاوازی بارودۆخی ئاسایشی عێراقی قوڵتر کردووەتەوە. لەبەر ڕۆشنایی ئەمە، توێژینەوەکە جەخت لەسەر گرنگی تێکەڵکردنی فاکتەرە ژینگەییەکان لە ستراتیجی پلاندانانی ئاسایش و سیاسەتە نیشتمانییەکاندا دەکاتەوە و بە پێداویستییەکی بنەڕەتی دادەنرێت بۆ بەدەستهێنانی ئاسایشی درێژخایەن و سەقامگیریی بەردەوام لە عێراقدا.

وشە سەرەکییەکان: ئاسایشی ژینگەیی، فاکتەرە ژینگەییەکان، ئاسایشی نیشتیمانی، ژینگەی جیوپۆلیتیکی عێراق.

تأثير العوامل البيئية على الأمن الوطني: عراق بعد عام 2003 أنموذجا

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الملخص
عنوان هذه الدراسة هو تأثير العوامل البيئية في الأمن القومي العراقي بعد عام 2003، بوصفها أحد أبرز التهديدات غير التقليدية التي برزت في مرحلة ما بعد التغيير السياسي. وتبحث الدراسة في كيفية تحوّل القضايا البيئية، مثل التلوث البيئي، وشحّ الموارد المائية، وتدهور الأراضي، وتغير المناخ، وضعف الحوكمة البيئية، إلى عوامل ضاغطة على الأمن القومي من خلال انعكاساتها المباشرة في القطاعات الاجتماعية والاقتصادية والصحة العامة، فضلًا عن تأثيرها في الوحدة الوطنية والاستقرار السياسي في العراق.
تعتمد الدراسة المنهج النوعي، مستندةً إلى تحليل الأدبيات العلمية ذات الصلة، والتقارير الرسمية، والمصادر الثانوية، بهدف بناء إطار تحليلي يوضح العلاقة بين التحديات البيئية والأمن القومي. كما توظف الدراسة مقاربة مدرسة كوبنهاغن للأمن، كما صاغها باري بوزان وأولي ويفر وجاب دي فايلد (1998)، لتفسير القضايا البيئية، وبيان كيفية تقديمها بوصفها تهديدات أمنية تستدعي استجابات مؤسسية وسياسات عامة عاجلة .وتخلص الدراسة إلى أن تدهور البيئة أسهم في تصاعد التوترات الاجتماعية، وتقويض التماسك الوطني، من خلال تحميل الدولة العراقية أعباءً اقتصادية متزايدة، واستنزاف الموارد الطبيعية المحدودة، وإعاقة جهود التعافي والتنمية، فضلًا عن تراجع مستوى جودة الحياة للمواطنين. كما أظهرت النتائج أن تجاهل البعد البيئي في السياسات العامة أسهم في تعميق هشاشة الوضع الأمني في العراق. وفي ضوء ذلك، تؤكد الدراسة على أهمية دمج العوامل البيئية ضمن استراتيجيات التخطيط الأمني والسياسات الوطنية، باعتبارها شرطًا أساسيًا لتحقيق الأمن طويل الأمد والاستقرار المستدام في العراق.

الكلمات المفتاحية: الأمن البيئي، العوامل البيئية، الأمن الوطني، البيئة الجيوبوليتيكية العراقية.