



The Overlooked Crisis

The Effects of Climate Change and Environmental Pollution on Women and Girls in Syria

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IMPACT Research*

* This paper was developed by members of IMPACT field teams as part of a strategy to support young researchers. Names are obscured for security and privacy reasons.

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Executive Summary

This study focuses on the challenges posed by climate change and environmental pollution in Syria and examines their disproportionate impact on women and girls across three different regions. By analyzing the consequences of climate change and pollution, the study also explores how the Syrian conflict has exacerbated these issues, leading to gender-specific vulnerabilities for women.

The findings of this study are based on a case study involving 18 women, with an equal representation of six women from each region (northeast, northwest, center, and south). Additionally, the research team conducted extensive desk research and reviewed numerous articles, papers, and studies published during the years of the Syrian conflict.

The study reveals that various practices contribute to climate change and environmental pollution in Syria, including primitive oil refineries, deforestation, forest fires, shrinking agricultural areas, air pollution, drought, water scarcity, inadequate waste management, and remnants of war. These factors collectively intensify the health and economic challenges faced by both men and women. Moreover, the study examines the specific factors affecting women and girls in terms of food security, safe employment, health, and gender-based violence.

Based on the findings, the study puts forward several essential recommendations to address the gender impacts of climate change and pollution in Syria. These recommendations prioritize sustainable development, resilience building, and gender equality. Given the urgency of the situation, immediate action is required to implement these recommendations effectively.

Introduction

Climate change stands as one of the most urgent and perilous global challenges demanding intervention, particularly due to its expanding and accelerating impact that affects all aspects of life. While climate change affects all societies, its consequences are particularly severe for the most impoverished and marginalized communities, especially those already burdened by conflicts. The intertwining of climate change, environmental pollution, and the violence faced by these societies compounds the difficulties of daily life. Moreover, these societies often lack preparedness to effectively manage recurring climate crises and pollution associated with conflicts.

Within the realm of climate change, the repercussions disproportionately affect the most vulnerable social groups, with women being particularly susceptible. Gender-based marginalization within societies renders women less equipped to adapt and withstand the impacts of climate change. This vulnerability stems from disparities in gender roles, responsibilities, decision-making power, and access to natural resources.

Recognizing that climate change transcends environmental boundaries, it becomes evident that it is intricately linked to issues of justice and gender equality. Climate change exacerbates existing crises while women face violence as a result of social, political, and economic phenomena. Therefore, a thorough examination and analysis are imperative to comprehend the complex interplay between climate change, gender, and the multifaceted challenges faced by Syrian women.

Methodology

The research methodology employed in this study encompasses an in-depth case study approach, examining a total of 18 women across the three areas of control in Syria: Northeast, Northwest, Central, and South. Each woman was treated as an independent case within her respective region. To capture a comprehensive understanding of each case and obtain a clear depiction of the regional situation, qualitative data collection techniques, primarily in-depth interviews, were utilized. This methodology allowed for a more nuanced comprehension of the impact of climate change, environmental pollution, and conflict within each region.

The case studies conducted were subsequently analyzed individually within their respective regions and then synthesized to form a cohesive context. Additionally, a thorough desk research was conducted, involving the analysis of relevant articles, studies, and research papers pertaining to climate change.

The field data collection phase commenced in early 2023, accompanied by a well-defined research plan to ensure data quality. Regular review of all interviews was conducted as part of this quality control process.

A team of experienced researchers based in the three geographical regions of Syria actively participated in the data collection process. Prior to data collection, the research team underwent a series of sessions and meetings to ensure a clear understanding of the research methodology, including the implementation of research tools and techniques, both individually and collaboratively.

Sample Selection Criteria

The sample selection process involved identifying and selecting 18 women as research participants. The selection criteria were based on a database that consisted of women engaged in the Women-Led Spaces for Change project, including activists and organizations led by women. Additionally, proposals submitted by the research team, who have an active presence in the research target areas, were considered.

The selection criteria for the research participants were as follows:

- Experience in working with women in their respective regions, demonstrated through active participation in projects and initiatives primarily focused on women.
- Active presence on the ground within their regions, as evidenced by their engagement in various activities. This criterion aimed to ensure their ability to provide insightful assessments of the realities and dynamics of their areas, drawing from their involvement in relevant activities.
- Continuous presence in the region for several consecutive years prior to the research. This criterion was implemented to ensure that the selected participants possessed an in-depth understanding of the local context, gained through their sustained engagement over time.

Context Overview

The environmental situation in Syria prior to the conflict was characterized by numerous pollution-related challenges, offering little cause for optimism. Several studies and articles have highlighted the role of climate change as a contributing factor to the conflict. Notably, Syria experienced a severe drought in 2007, believed to be the most severe in 900 years, leading to the displacement of over 1.5 million people to urban areas.¹ Environmental conditions in agricultural areas further deteriorated due to water scarcity and desertification. Weak governance, marked by corruption and institutional incompetence, hindered the Syrian state from meeting international environmental standards.

The outbreak of the conflict resulted in significant humanitarian and economic devastation. The Syrian Observatory for Human Rights has documented the names of over half a million individuals killed since 2011, out of more than 600,000 confirmed deaths over the span of 12 years. According to the United Nations High Commissioner for Refugees, the number of officially registered Syrian refugees surpassed 5.5 million,² while the World Food Programme reports that over 12.1 million people in Syria, representing more than half of the population, suffer from food insecurity.³ The country also experienced extensive economic losses, the devaluation of the Syrian pound, soaring unemployment rates, and widespread destruction of vital assets such as homes, infrastructure, hospitals, and schools.

The conflict led to the emergence of three distinct zones within Syria, largely segregated by military and political control. Northeast Syria, constituting approximately one-third of the country, is under the administration of the Autonomous Administration. Major cities in this region include Qamishli, al-Hassakeh, and Raqqa, with an estimated population of three million. Northwest Syria, encompassing parts of the north and northwest, is divided between

¹ Wim Zwijnenburg, Bitter Tales from the Crescent Conflict, Pollution, and Climate Challenges for War-Torn Syria, Heinrich Boell Stiftung, 2016 (reviewed in Arabic) <https://shorturl.at/fioHU>

² <https://data.unhcr.org/en/situations/syria>

³ UN news blog, reviewed in Arabic <https://news.un.org/ar/story/2023/03/1118857>

two local governments: The Salvation Government affiliated with Hayat Tahrir al-Sham (HTS), controlling Idlib, and the Syrian Interim Government associated with the Coalition of Revolutionary and Opposition Forces (SOC), governing areas north of Aleppo from Afrin to Jarabulus, along with border regions of Raqqa and al-Hassakeh which are under Turkish influence. Although there are notable differences between the areas controlled by these two governments, they can be considered a single region due to shared characteristics. Population in Northwest Syria is estimated at around four and a half millions. The central government controls 60% of Syrian territories, in the regions of West, Central and South Syria, including major cities such as Damascus and Aleppo, with the largest share of the population, estimated at approximately nine million residing in these regions.⁴

As the Syrian conflict prolonged and its ramifications expanded, inadequate attention was devoted to understanding the interconnectedness of the conflict and its environmental implications. Concerns pertaining to the consequences of climate change and environmental pollution gradually waned in priority compared to pressing economic and humanitarian relief needs. The ongoing conflict has given rise to environmental crisis zones that will endure long-term damage due to various factors. One contributing factor is the frequent use of explosive weaponry, leading to the destruction of oil refineries, particularly makeshift ones, and subsequent soil and general environmental pollution. Additionally, inadequate waste and water management practices, particularly in densely populated areas, including rural regions and internally displaced persons (IDP) camps, exacerbate the environmental challenges.

These environmental detriments disproportionately affect women and girls, who experience climate change impacts differently than men. The gender disparity in adaptive capacities and varying levels of resilience to climate change and long-term environmental degradation further amplify the harm inflicted on women and girls.

Research Findings

The results of this study are presented in three sections, each of relating to one or more aspects of the data collected, namely:

- ◆ The first section is a comparative analysis between the three geographical regions, focusing on climate change and environmental pollution in each region.
- ◆ Section two discusses the harm resulting from climate change on women and men
- ◆ Section three discusses the environmental harm specifically to the women and girls affected.

⁴ Jusoor for Studies, Map of Syrian population, April 2023 (reviewed in Arabic), <https://shorturl.at/aguvF>

First: Overview of Climate Change, Environmental Pollution, and the Impact of Conflict

This section relies on in-depth interviews conducted with women within the study sample in the three regions, as well as available secondary sources, prior studies, articles and media reports.

1. Proliferation of makeshift oil refineries:

In the aftermath of sustained conflict, the regular oil refineries in Northeast and Northwest Syria have ceased operations, giving rise to the emergence of makeshift oil refineries colloquially known as 'burners.' These makeshift facilities employ rudimentary methods to extract diesel fuel. Crude oil is contained within a tank with branching pipes, and a fire is ignited underneath to bring the oil to a boiling point. The heated oil then evaporates in the pipes and condenses back into liquid form at the end of the tube. However, this primitive process not only poses risks to the workers involved but also produces "highly hazardous" derivatives for end users. The diesel fuel obtained from these makeshift refineries contains a significant amount of gas, making it difficult to completely separate gasoline from the final product. Consequently, this leads to potential explosions or fires in heaters or machinery engines.⁵ A woman from Northeast Syria provides insight, stating, "In general, the fuels in the region are used incorrectly and pose significant dangers. The oil contains a high percentage of gasoline as it is inadequately refined, alongside diesel fuel. We purchase it as raw material, and during winter, it freezes, forcing some families to melt it over open flames, which has resulted in numerous deaths and burn injuries. Despite these risks, it is challenging to forgo these materials due to the deteriorating conditions."

2. Poor waste management:

The conflict has precipitated a dire waste disposal problem that plagues all three regions, contributing to the generation of increasingly hazardous waste through unregulated landfill operations. Although accurate measurements of waste disposal levels in Syria are currently unavailable, it is evident that the volume has doubled compared to pre-war quantities that were directed to landfills. Many residents across the three regions endure the detrimental consequences of waste accumulation on the outskirts of towns and villages, as well as within their residential streets. This situation poses a threat to their lives and renders them susceptible to disease transmission through the proliferation of microbes, rodents, and insects attracted to the uncollected waste. The mounting waste accumulation is exacerbated by the absence of

⁵ Ammar Hammo & Liz Moufa, poisonous job: refineries in northwest Syria, Syriadirect, 2022 reviewed in Arabic, <https://shorturl.at/opwIO>

designated waste disposal sites, mismanagement of waste, failure to enforce control measures, and the dearth of suitable transportation mechanisms and workers in the waste management sector. Consequently, locals often resort to burning piles of waste, often unaware of the extent of danger this poses to civilian health, particularly that of children. This practice has led to an increase in respiratory and skin diseases among the population, soil and water pollution, and subsequent health risks and economic burdens, particularly impacting the agricultural sector. A woman from Northeast Syria sheds light on this issue, stating, "Before the war, there were designated garbage disposal sites, some of which are still utilized to this day. Despite the challenging circumstances in the past, greater attention was given to this issue. However, the current situation has changed significantly. Garbage now remains on the streets, sometimes for over a week, due to the lack of diesel fuel for waste collection vehicles. The accumulated garbage attracts insects and spreads diseases, including leishmaniasis."

3. Pollution resulting from war remnants:

The presence of war remnants, including chemicals, mines, and unexploded ordnances, poses a significant threat to the lives of the population, particularly in the regions of Northwest Syria. This directly impacts the stability and well-being of civilians, especially children and women, who often lack awareness of the nature and dangers of these munitions. Some war remnants are visible on the ground surface, while others, such as aircraft-dropped ordnances, may be buried several meters below, making their disposal challenging. These explosives represent failed tools that may remain dormant or detonate unpredictably, making it impossible to determine the extent of their impact and the dangers they pose to the surrounding environment.

Landmines and unexploded war remnants deny entire populations access to vital resources such as water, agricultural lands, healthcare, and education facilities. They also cause significant environmental damage, as explosive remnants of war contaminate soil and water sources with hazardous substances, leading to drought conditions due to restricted access to and cultivation of agricultural lands. The scarcity of water resources for irrigation purposes further exacerbates the long-term ecological impacts. A woman from Northwest Syria highlights the gravity of the situation, stating, "The impact of war remnants on our region is immense. Numerous deaths and injuries resulting from mine explosions or chemical inhalation have inflicted severe psychological trauma on residents, especially women. Many families have been compelled to relocate to safer and more secure areas for residential purposes."

4. Water scarcity and drought:

In 2021, Syria experienced the most severe drought in seventy years,⁶ significantly exacerbating the situation, particularly in the northeastern regions where the water level entering the Euphrates Dam reached unprecedentedly low levels. Previous agreements between the Syrian and Turkish governments stipulated that Turkey would release 500 cubic meters of water per second from its territories into Syria through the Euphrates River, and 400 cubic meters per second through the Tigris River. However, due to the construction of dams by Turkey along these rivers and its use of water as a political tool against the Autonomous Administration in Northeast Syria (AANES), only one-third of the agreed-upon water share reaches Syria, with a significant portion being lost through ground leaks.⁷

Throughout the ongoing conflict, internal displacement and migration to urban areas in the central and southern regions have exerted tremendous pressure on the availability of potable water, particularly in the outskirts of cities. Many households have access to drinking water for only a limited period of about four hours per day. In the northwest regions, especially in both regular and informal IDP camps, a genuine water crisis exists. Displaced individuals suffer from a scarcity of clean water and inadequate sanitation networks. Water is accessible only once every four to five days, and in meager quantities that are insufficient for more than two or three families. The population in the three regions faces the dire consequences of water scarcity, resorting to unsafe water sources such as private wells that are seldom tested for safety, or purchasing water from tanks that residents must then boil, cool, or treat with chlorine tablets and household filters to ensure its sterility. The absence of reliable access to sterilized water poses significant health risks. As one individual explained, "Due to the water pollution from the tanks, many families rely on chlorine tablets to purify the water for safe drinking and cooking."

The scarcity of water also adversely affects food security, leading to decreased crop yields compared to previous years. Livestock owners are particularly affected as they are forced to sell their animals and abandon their areas due to the challenges posed by water scarcity and drought.

5. Deforestation and fires:

Between 2012 and 2019, Syria experienced a significant loss of 20.4% of its vegetation.⁸ The depletion of forests can be attributed to various social and economic factors associated with the conflict, including illegal logging, expansion of agriculture, charcoal production, and insufficient management of natural resources and environmental development by official institutions. Additionally, the population's heavy reliance on timber for heat and shelter has

⁶ Norwegian Refugee Council, 2021, reviewed in Arabic <https://shorturl.at/uFV03>

⁷ Skynews Arabic, Drought invades northeast Syria, 2021, reviewed in Arabic, <https://shorturl.at/uxBS1>

⁸ We Fear more war, we fear more drought, PAX for Peace, 2022, <https://shorturl.at/dksYZ>

contributed to deforestation. Several areas have witnessed extensive logging, such as Tal Kalakh and Al-Hameh, including the Balaas Reserve, where centuries-old trees were lost, as well as Al-Hassakeh, particularly the Jabal Abdul Aziz Reserve, where 7,500 trees were cut down. Entire forests were also cleared in the Jabata Reserve in Quneitra, estimated to contain 100 to 300 trees, and 100 wild pine trees were felled in Al-Shahar, south of Jabata.⁹

Forest fires have also played a significant role in deforestation, with their frequency and intensity increasing drastically during the years of the Syrian conflict. In 2020 alone, fires destroyed over 9,000 hectares of agricultural land and forests, affecting approximately 140,000 people. These fires resulted in the destruction and damage of homes and properties, loss of energy and water supplies, and limited access to services such as healthcare in hospitals. Notably, one of the primary causes of these fires is the bombing campaigns conducted by various parties to the conflict, who seek shelter within dense forest areas to evade detection by drones and combat aircraft. Deforestation not only leads to economic harm but also results in the destruction of natural reserves, as witnessed in the Dhamna Reserve in southern Syria. The losses include perennial and seasonal trees such as oak, Atlas pistachio, mulberry, raspberry bushes, wild pine, and mahleb cherries, as well as numerous species of medicinal plants like chamomile, nettle, and wild thyme, which are vital for the pharmaceutical industry. Additionally, rare aromatic herbs like lavender, coriander, and mushrooms have also suffered. Reflecting on the situation, a woman from northwest Syria shared, "Our region faces extensive tree cutting, particularly olive trees, which has led to respiratory diseases, especially with the increased humidity. As a result, many residents in our region have sought specialized medical care for respiratory illnesses."

6. Declining cultivated areas:

The agricultural sector has suffered significant damage as a result of the armed conflict, leading to a decline in agricultural crop yields. This decline can be attributed to several factors, including the high prices of farming inputs, the reduction of cultivated areas due to military actions in agriculturally dependent regions, and the displacement of farmers who have left their properties and abandoned uncultivated lands. Additionally, many agricultural areas have become inaccessible due to their proximity to conflict zones, the presence of landmines, and the displacement of residents, causing farmers to hesitate in cultivating their lands.

Furthermore, extensive bulldozing and burning of agricultural and wooded lands have occurred, while irrigation projects have been destroyed or water supply has been cut off. As a result, many irrigated lands have transformed into rainfed lands. The extraction of groundwater for irrigation has become costly due to soaring fuel prices, which adds to the challenges faced by farmers. Moreover, there has been a substantial increase in the prices and scarcity of agricultural production requirements such as fuel, pesticides, fertilizers, and agricultural

⁹ Roba Gaafar, The environmental impact of Syrian conflict, Arab Reform Initiative, 2021, reviewed in Arabic, <https://shorturl.at/gptxX>

equipment. Farmers are also struggling to sell their produce, and storage costs have risen. Inadequate rainfall, frequent windstorms, and frost waves have further impacted agricultural crops, particularly in greenhouses where windstorms can damage their structures and leave vulnerable seedlings exposed to low temperatures.

Additionally, farmers face significant difficulties in accessing groundwater for irrigation due to the expensive nature of extracting water, primarily driven by high fuel prices, particularly diesel, which powers the generators used to extract water from the ground. The ongoing displacement of people has caused farmers to neglect the care of their trees, including watering, pruning, and monitoring, rendering them susceptible to diseases and pests. Consequently, this neglect has resulted in reduced annual yields and decreased production levels.

7. Air pollution:

Prior to the outbreak of the conflict, Syria already faced significant challenges with high levels of air pollution. In 2010, approximately 69% of the population was exposed to harmful airborne particulates. The sources of this pollution included industrial emissions, vehicle emissions, waste burning, and seasonal factors such as dust and sandstorms. However, with the onset of the conflict, there was a temporary decrease in the percentage of the population exposed to particulate pollution as people fled cities and industrial activity decreased, resulting in a 7% reduction in 2011.

Unfortunately, this trend reversed starting in 2012, leading to a significant increase in air pollution levels. In 2015, the exposure to particulate pollution experienced a staggering 72% rise. The estimated number of deaths attributed to diseases related to air pollution also increased by 17% between 2010 and 2017, reaching a total of 7,684 people.¹ Several factors contributed to this worsening situation, including the deterioration of agricultural activity, forest fires, and aerial bombardment during military operations.

One specific concern is the presence of cement dust in the air due to crumbling buildings, posing a threat to residents and rescue workers. Inhaling the airborne cement particles can lead to respiratory problems and lung damage. Particulate-related disabilities affect a rate of 1,625 per 100,000 people in Syria.

Second: The Impact of Climate Change and Environmental Pollution on Women and Men

This section presents an analysis of the most prominent forms of harm from climate change and environmental pollution, as revealed by the interviews in the different regions. The

¹ Mohammad Dibo, Environmental damage in Syria during the war, Syria untold, 2023, reviewed in Arabic, <https://shorturl.at/hFOW1>

following passages delineate each of these forms of harm, their prevalence within each region, and the extent of their impact on women and men.

1. Economic harm:

The impact of climate change and environmental pollution on the lives of individuals in Syria is accompanied by significant economic repercussions. Many Syrian families engaged in agriculture have faced harsh economic conditions and insecurity, which can be attributed to various factors, including the ongoing conflict and the effects of climate change, particularly drought caused by insufficient rainfall and rising temperatures.

The region of Northeast Syria is currently experiencing one of its most severe droughts, exacerbated by political tensions and water disputes with Turkey, which has been accused of weaponizing water resources. This drought is anticipated to lead to desertification in the coming years, resulting in the loss of arable lands and vegetation in a region that comprises approximately one-third of Syria's surface area. This is particularly devastating as this region has long been considered Syria's food basket, with significant agricultural production.

The cotton crop, which relies on river irrigation, has been disrupted, and the Food and Agriculture Organization of the United Nations (FAO) has highlighted the combination of climate change, economic collapse, and pending security issues as factors seriously impacting Syria's grain production in 2022. Wheat production, which previously ensured food security and allowed for exports to neighboring countries, has declined in yield. Barley crops have been severely affected, leading some shepherds to sell their animals due to the inability to feed them. Syria used to produce between four and five million tons of barley feed annually for livestock, but its production has become almost non-existent.¹

Northwest Syria faces similar challenges related to climate change and water scarcity. However, families working in agriculture in this region experience additional hardships due to being essentially besieged and cut off from the outside world. Governance actors in the area are unable to provide incentives for farmers to continue cultivating their lands. In the South-Central region, which is under the control of the Syrian government, meager crops create additional pressure, exacerbated by sanctions, difficulties in obtaining food products, high inflation rates, electricity shortages, and limited access to quality production inputs. Some areas also continue to face security concerns.

Overall, climate change, irregular and insufficient rainfall, and rising costs of fertilizers, shipping produce, and labor shortages have caused significant damage to agricultural lands. These factors have altered the soil and agricultural environment in different regions, leading to mass unemployment and rendering many areas economically unviable. As a result, numerous

¹ As reported by Euronews, Maha¹ AIDahhan, 2022, reviewed in Arabic, <https://shorturl.at/mzBW0>

Syrian families working in agriculture have been forced to migrate or displace in search of alternative livelihoods.

Additionally, low rainfall rates have hindered the germination of herbs and crops and forced livestock owners to travel long distances in search of food. Former pastures have transformed into drylands due to extended drought periods, rising summer temperatures, and sharp winter temperature drops below freezing. Many herders and breeders have had to sell their livestock due to the inability to provide sufficient feed. The drought and lack of agricultural productivity have compelled farmers to abandon their lands and seek cultivation opportunities in other areas or migrate outside the country.

Conversely, the increase in urban population indicates a shift from latent to generalized internal migration. For instance, the city of Hama, a medium-sized city in central Syria, experienced a significant population increase according to recent local administration election statements. This rise cannot be solely attributed to natural population growth. Although the city had previously lost residents due to the war, it compensated for the loss through migration and displacement.¹

2. Health harm:

In the three regions, a large part of the burden of climatic changes, environmental pollution, and weather changes due to rain, cold, and extreme heat have affected health, whether indirectly (malnutrition resulting from lack of agricultural production, diarrheal diseases due to water scarcity and the decrease in the per capita share of potable water) or direct (climate-related diseases such as heat exhaustion, sunstrokes, and eye infections, waves of severe respiratory infections caused by air pollution, and strong colds). Allergic infections have also increased at different times throughout the year as a result of pollution, while there is seasonal inflammation that lasts for a long period, and it is linked to the immunity of every person. This arises in the spring season due to pollen, and at the beginning of the summer due to harvest, and fodder fever resulting from wheat and barley in the northeastern region, as well as humidity in the autumn. The three regions also suffer from the deterioration of public health due to general livelihood conditions, the spread of unmanaged waste, and the fragility of water infrastructure and wastewater treatment facilities, many of which were destroyed or damaged during the conflict, particularly in rural areas, lower-income neighborhoods and suburbs, IDP camps and shelters in which hygiene services and environmental safety decline. All of this has contributed to the spread of epidemic and infectious diseases, which multiply during the summer season, such as dysentery, hepatitis, and skin allergies, and has caused outbreaks of diseases such as cholera and leishmaniosis carried by sandflies, which provides a suitable

¹ Kamal Shahin, Syria: any other survivors?, Assafir AlAraby, 2022, reviewed in Arabic, <https://shorturl.at/qxFJV>

environment for it to multiply and spread in these areas, in the midst of the formation of stagnant water pools that do not have places designated for refining or drainage.

Low rainfall and its impact on drinking water has pushed the population to rely on alternative and often unsafe water sources to meet their needs. This includes water from rivers, springs, and cisterns filled from wells that are not subject to health control, causing cases of poisoning due to contamination of drinking water. A woman in northwestern Syria tells us, "In the Jabal Al-Zawiya region, there is a shortage of water, and people in that region depend on domestic wells, which are calcareous and completely unhealthy for consumption, and cause diseases for the population (urinary tract infections, kidney stones, etc). Since there is no alternative, the solution was to boil the water." Water is placed over the stove in the winter, and then awaited to cool, after which it is poured into the jugs designated for drinking.

Furthermore, makeshift oil refineries have exacerbated air pollution in northeast and northwest Syria, causing damage to its workers and to residents in the vicinity. As a result of the emission of toxic gases, some of which are very dangerous and highly toxic (sulfur gasses and carbon monoxide), which may lead to deaths in case of inhalation. These facilities also emit methane, carbon dioxide, and hydrogen gasses that pollute the air, and fluorine and chlorine gasses that cause diseases and skin and respiratory infections for those who inhale them. They also emit unsafe quantities of lead, nickel, and mercury that cause infections and poisoning that may lead to nervous system paralysis and kidney and lung problems. In addition to the emergence of some leukemia (leukemia) or glioblastoma (neuronal glioma) cancers, in clear and unusual proportions, which increased significantly during the conflict, especially in the region of Northeast Syria.¹ One of the speakers said, "Many families in our region go to Al-Bayrouni Hospital's cancer unit in the capital, Damascus, seeking treatment for women and children." The massive pollution left by the use of 'burners' in refining also contributed to the spread of diseases that had previously died out in eastern Syria, such as tuberculosis and scabies.

Third: The Impact of Climate Change on Women and Girls in Syria

The aim of this section is to explore the direct impact of climate changes on women and girls, in order to understand the extent to which sex and gender play a role in being affected by environmental and climatic changes in each region. This effect represents one of the most important challenges for Syrian girls during the coming period.

1. Impact on health:

Women and girls bear the brunt of the health consequences resulting from climate change, environmental pollution, and conflict. They experience the same health harms as men, but face additional challenges due to limited access to adequate healthcare services, including sexual

¹ Rami Swaid, pollution of Arabi³ environment 1/7: refineries toxins killing Syrians, AlAraby AlJadeed, 2015, reviewed in Arabic, <https://shorturl.at/jPQR3>

and reproductive health and family planning. The rising temperatures have a detrimental impact on women's skin and hair, leading to increased hair breakage and dryness. Moreover, the toxic gasses emitted from makeshift refining processes pose a carcinogenic risk specifically to women. The presence of war remnants, including unexploded ordnances, puts women and children at a higher risk as they may be unaware of the danger compared to men who have undergone military training. Injuries caused by war remnants can result in severe disabilities, internal organ damage, limb amputations, and sensory impairments such as hearing and vision loss. Additionally, these remnants contribute to psychological trauma, including anxiety, depression, and post-traumatic stress disorder.

Water scarcity, pollution, and lack of hygiene products have further undermined health and hygiene standards, particularly impacting feminine hygiene. Adolescent girls are particularly affected, facing limitations in their personal choices, restricted movement, and barriers to attending school and participating in community life. These challenges also pose threats to their safety and cause stress and anxiety. One woman shared her experience, stating, "The landmines caused many injuries in my area, and the release of chemicals caused fetal deformities. Some women suffered from asthma due to the presence of burners and makeshift refineries. As for the use of unrefined fuel, it caused burns, suffocation, and even deaths as a result of combustion."

2. Food insecurity:

The high levels of unemployment among families engaged in agriculture, particularly those headed by women, have exacerbated their suffering, especially considering the increased poverty rates, expensive healthcare, and soaring energy costs. This situation has severely impacted their livelihoods and exposed them to the threat of starvation, particularly due to the rising prices of essential food items such as grains, legumes, meat, and dairy. The conflict has significantly affected agricultural and livestock activities, further exacerbating the challenges of food security.

The consequences of food insecurity are particularly pronounced for pregnant and nursing women. The lack of access to an adequate and nutritious diet has resulted in malnutrition, leading to an increased risk of premature births and maternal and newborn mortality. The inadequate availability of nutritious food poses a significant threat to the health and well-being of women and their infants.

3. Loss of job security:

The impact of climate change and environmental degradation has led to resource depletion and infrastructure destruction, resulting in a higher unemployment rate. Consequently, the gender gap in employment has widened, as women face numerous obstacles in securing safe and stable jobs with fair wages. Some women are compelled to engage in hazardous work, such as scavenging waste in dumps and landfills, in order to find materials to collect and sell, including

plastic, clothing, or even leftover items to alleviate hunger. Unfortunately, the risks to their health posed by these waste-related activities are often overlooked due to the harsh living conditions they endure.

Women who scavenge waste are exposed to infectious diseases due to their daily contact with decomposing waste, which can have detrimental effects on their respiratory, immune, and liver systems. Furthermore, they are at risk of sustaining severe injuries from contaminated pieces of iron and glass, as waste containers sometimes contain medical and chemical waste. Despite being aware of the hazards involved, some women are compelled to work in makeshift oil refineries or "burners" due to the limited job opportunities available to them. In such circumstances, the women working in these refineries prioritize their livelihood over their health and safety, often disregarding the potential repercussions of their work.

4. Gender-based violence:

The worsening economic and livelihood conditions in the three regions have contributed to an alarming increase in violence against women. This violence manifests in various forms, including the marriage of underage girls as families resort to such measures for economic support. Additionally, the growing number of women and girls compelled to work in unsafe environments has exposed them to higher risks of harassment and abuse.

The effects of drought and deteriorating economic conditions have also hindered young women and girls' access to education. Some families have been forced to interrupt their daughters' education due to concerns about harassment and violence, as well as limited access to water for maintaining personal hygiene. A woman from the northeast region shared her experience, stating, "The deteriorating living conditions in our region have led many families to prevent their children, especially girls, from attending school in order to save expenses and redirect them to work and contribute to the family income. There has been a rise in cases of underage girls getting married, which has become increasingly prevalent."

The intersection of economic hardships, limited educational opportunities, and gender-based violence creates a challenging environment for women and girls, undermining their safety, well-being, and future prospects.

Conclusion and Recommendations

In this study, our aim was to examine the implications of climatic changes and environmental pollution in the three primary regions of Syria, with a specific focus on the detrimental effects experienced by the local communities, particularly women and girls. The primary research objectives were to analyze the nature of climatic changes and pollution in these regions, identify the various forms of harm arising from these phenomena, explore their

specific impacts on women, and propose potential strategies for mitigating these adversities. Additionally, we sought to highlight the disproportionate impact on women compared to men and emphasize the significance of comprehensively addressing these challenges during the post-conflict phase.

Recommendations from this research study can be summarized as follows:

1. Incorporate climate change and pollution, along with their impact on gender, as crucial topics in all conferences and meetings pertaining to the Syrian crisis, including future political agreements.
2. Conduct comprehensive assessments to monitor environmental threats in the three regions of Syria, examining the specific effects of the conflict on the environment. This should include analyzing the consequences of hazardous climatic phenomena, collecting gender-disaggregated data on environmental and climate-related aspects. It is important to focus on areas such as water scarcity, high temperatures, food insecurity, drought, public health risks, and other pertinent factors.
3. Provide training and mentorship opportunities for women in the field of environment and climate change, empowering them to actively participate in adaptation and mitigation efforts. Foster collaboration with organizations and platforms dedicated to promoting women's and girls' involvement in matters related to gender, climate change, and environmental impacts.
4. Support vocational training and income-generating programs while advocating for labor law and policy reforms that create an enabling environment for women to access safe and secure employment opportunities.
5. Enhance the resilience of the agricultural sector and promote its revitalization, specifically by developing women-led private agricultural projects and facilitating their access to agricultural resources. Research and implement agricultural practices suitable for each region, considering factors such as weather patterns, rising temperatures, and fluctuating rainfall. This will contribute to increased agricultural production and food security.
6. Integrate climate resilience skills into educational curricula, equipping individuals with critical thinking capabilities to effectively respond to and address climate-related shocks such as weather changes, drought, and emergencies. Establish mechanisms for early warning, preparedness, and prompt action against climate-related gender-based violence, particularly in response to seasonal and recurring crises.
7. Support the transition towards renewable energy sources, starting with the expansion of clean energy utilization such as solar and wind power.

8. Address the water challenges faced by families, with a particular focus on women, by ensuring access to safer water purification methods, organizing efficient water distribution operations, supporting civil society organizations in presenting water projects, and emphasizing collective water management approaches in villages and neighborhoods.
9. Adopt a participatory approach involving local councils and civil society in waste management initiatives. Provide support for waste collection services through appropriate equipment, vehicles, worker training, and the implementation of effective landfill management practices.
10. Establish comprehensive health and psychological care programs for women and girls, encompassing preventive measures and treatment options. These programs should address the physical and emotional challenges resulting from the impacts of climate change and environmental pollution, ensuring the well-being of affected women and girls.