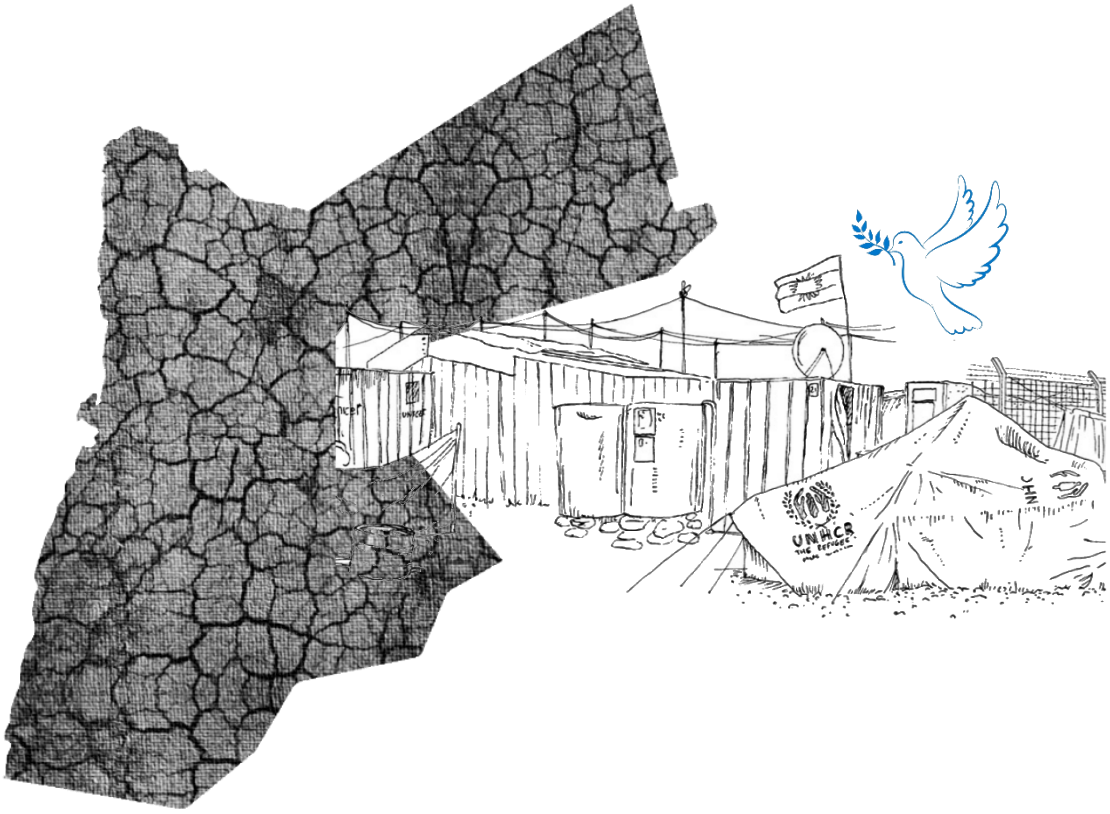
Climate Resilience of Refugees in Jordan

THESIS MEEM: FINAL VERSION



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Dedication

To my grandmother Badria, a first-generation refugee, who passed away in the midst of my research, but always continuous to be my source of light, inspiration and motivation,

To my dearest mother Maria, the bravest soul I know, always providing me with her unwavering encouragement and support, and my sweet brothers Shadi, Nejim and Amier who have supported me and believed in me every step of the way,

Finally, to all asylum seekers and refugees, and those who come to their aid, who continuously face daunting difficulties across the globe, but especially in Jordan,

I dedicate my work…

Acknowledgement

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Finally, I want to express my gratitude to my colleagues at NWP, their constant support and patience with me throughout this process has helped me come closer to realizing my full potential.

I express my heartfelt gratitude to each one of you.

Hanadi Al-Baz

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List of Abbreviations

DLDD	Desertification, Land Degradation and Drought
GHGs	Green House Gases
INDC	Intended Nationally Determined Contribution
MEDECC	Mediterranean Experts on Climate and Environmental Change
MENA	Middle East and North Africa
MOA	Ministries of Agriculture
MOE	Ministry of Environment
MOH	Ministry of Health
MWI	Ministry of Water and Irrigation
NAP	National Action Plan
NCCAP	National Climate Change Adaptation Plan
NCCC	The National Committee on Climate Change
NDC	Nationally Determined Contribution
NGGP	National Green Growth Plan
NGOs	Non-Governmental Organizations
NWS	National Water Strategy
SLM	Sustainable Land Management
TNC	Third National Communication
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
UNHCR	United Nations High Commissioner for Refugees
UNRWA	United Nations Relief and Works Agency

Abstract

Climate change is affecting more and more people, impeding global economies and reshaping ecosystems. Climate change is a long-term challenge and brings along a wide range of other challenges. To respond to these challenges society must become more resilient. In this regard, climate resilience refers to the capability to anticipate, recover and adapt to these effects. Resilience is a crucial part of any ambitious climate action programme, especially because climate change is both a global and local issue. The concept of urban resilience allows for addressing the risks of climate change on the various affected dimensions of an urban area, allowing planners and policy makers to identify strong and weak elements of the urban system.

Jordan is a country that is especially affected by climate change. Considering its total state of food, water, environment, health, and infrastructure, its vulnerability to climate-related threats has increased while its capacity to cope with those threats is questionable. Despite that the triggers and wide-ranging impacts affect Jordan's entire population, resilience measures must be made at the asset, community, or individual level. A group which is especially vulnerable to climate change is refugees. Due to their overall position, refugees have limited adaptation ability, rendering them more susceptible than other members of society. Jordan has the largest proportion of refugees in its population, rendering its population even more vulnerable to climate change.

This research assessed the climate resilience of vulnerable groups in Jordan, with a focus on refugees. This was done using urban climate resilience assessment Indicators, which were developed based on desk research of grey and scientific literature depicting urban climate resilience assessment. The dimensions of assessment are institutional, physical, economic, social, and environmental. The assessment framework allowed for the resilience to be qualitatively elaborated. Moreover, a gap analysis was conducted between the current climate actions addressing the climate resilience of vulnerable groups and the measured resilience of these groups in Jordan. The vulnerable refugee group in this has been divided in Syrian and Palestinian refugees. As it already is, both populations live in poor housing conditions, are mostly living in poverty and suffer from lack of access to sufficient water resources, food, and health care. Especially the Syrian refugees consist for a large segment out of more vulnerable sub segments such as women and children. Moreover, Jordan already lacks natural resources and now with the immense population growth the hardships are greatly enhanced. This growing population also has growing demands of an ecosystem unable of meet those needs. Experts believe this problem in Jordan might lead to political instability, enhanced by climate change, questioning what would happen to the country's stability if the drought conditions got any worse than they already are.

The gap analysis highlights that Jordan has prepared elaborate climate actions. The reviewed climate actions from the government of Jordan all included vulnerable groups but proportionally little mention of refugees was made. Despite Jordan's policies and attempts to address climate change, the country's climate governance structure is insufficient to react effectively to climate problems. Recommendations for decision makers include stakeholder inclusion, research into current conditions of refugees, monitoring the effectiveness and progress of climate plans, raising awareness, and educating on climate change, and empowering refugees to contribute to their resilience. Moreover, from this research it is evident that refugees do not intrinsically lack resilience or agency. Rather, numerous and overlapping kinds of discrimination, injustice, and economic and institutional dynamics lead to reduced and uneven levels of authority and enjoyment of rights, making more vulnerable to any threats such as climate change.

Keywords: *Climate change, refugee climate resilience, climate resilience assessment, politically displaced and climate change, climate resilience, climate vulnerability*

1. Introduction

1.1 Background

Climate change is affecting more and more people, impeding global economies and reshaping ecosystems (IPCC, 2018a). There has never been a more compelling time to act urgently, strongly, and collectively than right now. Planet earth is said to be facing a 'climate emergency' while scientists are warning of insufficient progress (Ripple et al., 2020). At the First World Climate Conference in 1979, scientists representing 50 countries concluded that climate change demanded urgent action. Similar warnings have since been expressed in the Rio Summit in 1992, the Kyoto Protocol of 1997 and the Paris Agreement of 2015, and in the clear caution of several other global associations and scholars about insufficient progress (Ripple et al., 2020).

Within the overwhelming scientific evidence on the changing climate, the effect of human activities is highlighted as a main driver. Despite the efforts to reduce global warming, society is being confronted with major impacts. Increasingly suffering from extreme weather conditions, ocean warming and acidification, prolonged periods of drought, flash floods, increasing temperatures, and other harmful climate change consequences. Climate change is a long-term challenge and brings along a wide range of other challenges. To respond to these challenges society has to become more resilient to the effects of climate change (Cop23, 2017). In this regard, climate resilience refers to the capability to anticipate, recover and adapt to these effects (C2ES, n.d.). Extreme weather conditions demonstrate that resilience is a crucial part of any ambitious climate action programme, especially because climate change is both a global and local issue. The triggers and wide-ranging impacts affect everyone, but resilience measures have to be made at the asset, community, or individual level (Denton et al., n.d.).

Climate change effects are noticeable globally. In particular, the Middle East and North Africa (MENA) region is regarded a climate hotspot. The region naturally suffers from water scarcity and has poor levels of socio-ecological resilience. Moreover, the range of political conflicts and social tension result in a continued immigration crisis. Jordan is especially affected by the changing climate in this region. Despite Jordan's low greenhouse gas emissions, the changing climate poses a significant danger to the country's ecosystem productivity and water supplies, which are heavily reliant on the hydrological cycle. Changes in climate have a colossal effect on irrigation needs as well (Matouq, 2008). Within the 21st century, Jordan is expected to experience an average rise in temperature of ~1.4C to ~4C. Moreover, It is also expected to see a 25 percent overall fall in precipitation and up to 40 percent locally, as well as a shift in rainy seasons from winter and spring to fall (Carry, 2019). Considering the total state of food, water, environment, health, and infrastructure in Jordan, its vulnerability to cope climate-related threats have increased while its capacity to cope with those threats is questionable. As a result, Jordan is becoming more vulnerable to climate change (Ministry of Foreign Affairs of the Netherlands, 2018).

1.2 Problem Statement

Jordan is expected to see a rise in the frequency and severity of extreme weather events such as droughts, flash floods, and forest fires, as well as a faster pace of desertification, as a consequence of the rapidly changing climate (Carry, 2019). To tackle the challenges of the changing climate in Jordan, the Ministry of Environment (MOE) is in charge of overseeing the policy and legal mechanisms that govern the country's climate change mitigation and adaptation activities. This includes the implementation of the Third National Communication (TNC) to the UN Framework Convention on Climate Change (UNFCCC). MOE works in close collaboration with the Ministries of Agriculture (MOA), Health (MOH), and Water and Irrigation (MWI), which is in charge of controlling water supplies by enforcing irrigation policies, allocating water, building water systems, and implementing water management programs (Ministry of Foreign Affairs of the Netherlands, 2018).

In 2013, Jordan released a Climate Change Policy and Sector Strategic Guidance Framework. The framework outlines national climate change policies across different sectors and the proactive steps to take in the coming years, with a focus on the target sectors that are closely related to Jordan's key developmental issues and posing the greatest exposure threats (for example, water and agriculture).The framework is intended to contribute to the development of a proactive, climate resilient Jordan, with sustainable and healthy communities that can rely on water and agricultural resources and flourishing and productive ecosystems. Simultaneously, it aims to improve the adaptive capacity of Jordanian society, taking gender into account and responding to the needs of vulnerable groups, gradually improving the mitigation potential (Ministry of Foreign Affairs of the Netherlands, 2018). In the framework, special emphasis is paid to "vulnerable groups" who would be adversely affected by climate change. It also includes measures to counter gender imbalances, making Jordan the first Arab country to incorporate gender issues in its national climate change policy. Vulnerable populations are individuals and groups who are more likely to suffer from poor health as a consequence of obstacles to social, economic, political, and environmental resources, as well as restrictions imposed by disease or disability (NCCDH, n.d.). These people may find it difficult to exercise their human rights, such as access to healthcare and social services. They live in inequitable settings wherein they are unable to prosper, feel secure, or engage fully unjust society (United Nations Development Programme, n.d.). The vulnerable group of refugees is especially adversely affected by the changing climate due to their already existing exposure to several hazards which in return affects their socio-economic conditions, making them less equipped to withstand and adapt to the impacts of climate change. Moreover, the camps they reside in were once intended as temporary status and over the years have extended into long-term settlements. Refugees in such camps face enormous difficulties and have critical humanitarian needs. However, host countries shoulder the burden of the crises and require assistance, especially in circumstances where the catastrophe is prolonged and refugees are staying among local residents, as is the case in Jordan (UNDP, 2015). Therefore, the refugees in Jordan are inherently vulnerable to the changing climate as they are less equipped to adapt to its impacts.

Beside the climate policy framework, Jordan has responded to climate change through various climate strategies, communications to the UNFCCC, and action plans (Ministry of Foreign Affairs of the Netherlands, 2018). Despite Jordan's policies and attempts to address climate change, the country's climate governance structure is insufficient to react effectively to climate problems. It lacks an institutional framework that incorporates the private sector, NGOs, and civil society in addition to conventional government authorities. Decentralized decision-making, increased budget allocation, stakeholder participation, and improved coordination are all required and highly encouraged (Al-Zu'bi, 2016; Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), 2015; IPI Global Observatory, 2013).

Resilience is eminent to cope with the challenges brought upon by climate change in Jordan. The concept of urban resilience allows for addressing the risks of climate change on the various affected dimensions of an urban area, allowing planners and policy makers to identify strong and weak elements of the urban system. Presently, there are few metrics that evaluate urban resilience against non-specific hazards. However, current frameworks usually emphasize resilience to specific natural disasters. Furthermore, most current frameworks concentrate on a specific facet of the urban system, such as electricity, water supply, or urban drainage systems, and there is little understanding about the total urban resilience. Resilience assessments still confront three problems. First, assessing urban resilience must be done comprehensively rather just only one hazard. Assessing general resilience, however, is a very tough endeavour. Second, measuring the assessment findings quantitatively may be difficult. Most resilience assessments are qualitative, which prevents acceptance of results. Lastly, gauging urban resilience necessitates the use of many indicators which results in substantial amounts

of data and costly data collecting costs. Resilience is multidimensional, and consists of several facets, all of which must be taken into consideration.

To date, there have been few scientific studies on enhancing the climate resilience of certain dimensions in Jordan (Food and agriculture organization of the united nations, 2020; OCHA, n.d.-a, n.d.-b). In particular, knowledge on the current status of the climate resilience of refugees is lacking. Therefore, there is a clear need for a climate resilience assessment of vulnerable groups in Jordan, with a focus on refugees. Addressing the climate resilience of refugees can contribute to their ability to survive the burdens and stress resulting from climate change (International Conference Centre Geneva, 2019).

1.3 Research Objectives

In this research, the climate resilience of vulnerable groups in Jordan is assessed to contribute to closing the knowledge gap described above. The specific objectives of the research are twofold:

1. To assess the climate resilience of refugees in the context of Jordan by developing and applying urban climate resilience assessment indicators.
2. To contribute to improving the climate resilience of refugees in Jordan by:
    a. Identifying the gap between the existing climate actions and the climate resilience of vulnerable groups, with a focus on refugees.
    b. Identifying opportunities and barriers regarding climate resilience in urban areas, with a focus on refugees.

1.4 Research Questions

To achieve the objectives of this research, the main research question is formulated as follows:

"How can the climate resilience of refugees be enhanced in the context of Jordan?"

To allow for answering the main research question, the following sub-questions have been formulated:

1. Which indicators are appropriate to assess urban climate resilience within the context of Jordan?
2. How do current climate actions in Jordan address the climate resilience of vulnerable groups, particularly refugees?
3. What is the level of the climate resilience of vulnerable groups in Jordan, with a focus on refugees?
4. What is the gap between existing climate actions and the climate resilience of vulnerable groups in Jordan, with a focus on refugees?

1.5 Thesis Outline

The first chapter of this thesis elaborates on the research motivation and problem statement and highlights the main objectives and research questions of this thesis. The second chapter describes the employed methodology to conduct this research. The third chapter provides a theoretical background on the impacts of climate change, vulnerable groups, and climate resilience assessment . The fourth chapter presents the empirical background about Jordan, climate change impacts, climate change adaptation, and a description of vulnerable groups. Chapter five presents the results of this research. And finally, chapter six presents the conclusions, recommendations, and directions for further research.

2. Research Design

This chapter describes the strategy employed to answer the research questions. The sub-chapters depict the activities which allow for answering each of the research questions, with the ultimate purpose to contribute to an improved climate resilience of vulnerable groups in Jordan.

2.1 Research Framework

According to (Verschuren & Doorewaard, 2010), a research framework is a graphical representation of the research objective. It consists out of step-by-step instructions for achieving the research objective. The research framework contains seven steps as described below:

Step 1: Describe the research objective

Chapter 1.2 has provided the research objective based on the problem description.

Step 2: Define the research object

This research focusses on assessment of the climate resilience of refugees using a case appropriate set of qualitative indicators.

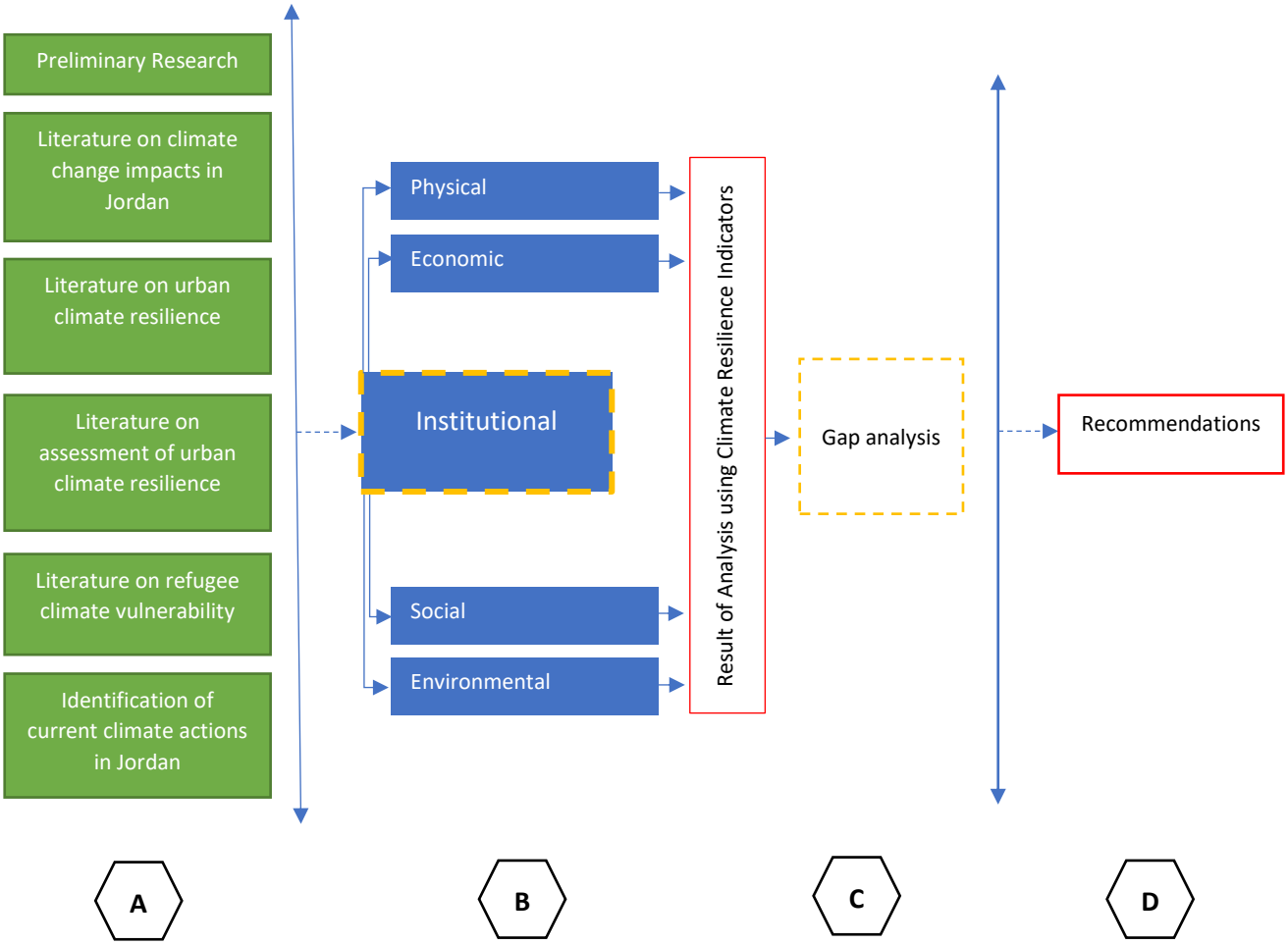
Step 3: Establish the research perspective

This research assesses the climate resilience of vulnerable groups in Jordan, with a focus on refugees. This is done using urban climate resilience assessment Indicators, which were developed based on desk research of grey and scientific literatures depicting urban climate resilience assessment. Reviewed literature divides urban systems into five dimensions for assessment: economic, social, ecological, institutional, and infrastructure. The resilience of these dimensions affects the refugee's capacity to respond to climate change impacts and transformations. To contribute to the climate resilience of vulnerable groups in Jordan, the research identifies opportunities and barriers regarding climate resilience actions in urban areas, addressing the inclusion of vulnerable groups. For this purpose, a gap analysis was conducted between the current climate actions to address climate resilience of vulnerable groups and the measured resilience of these groups in Jordan.

Step 4: Determine the sources of the research perspective

The sources of the research perspective consist out of scientific and grey literature which are utilized to gain a basic understanding of the relevant topics. The selected scientific literature focusses on the concepts of climate change, climate vulnerability, urban climate resilience, assessment of urban climate resilience, assessment of climate vulnerability, and refugee climate resilience. This scientific literature is acquired from Scopus, Web of Science, and Google Scholar. The grey literature, which is mostly accessed using Google Scholar, consists of governmental publications describing the climate change impacts and disasters in the region, policy institutions, infrastructure, ecological environment, social structure, and economy.

Step 5: Make a schematic presentation of the research framework



Step 6: Formulate the research framework

The conducted steps in this research project are defined as follow:

- **A.** Preliminary research and review of relevant scientific and grey literature on climate change impacts and urban climate resilience assessment with a focus on vulnerable groups and refugees, this yields indicators for assessing refugee climate resilience, as well as the identification of the current climate actions in Jordan to allow for a gap analysis in step C.
- **B.** By means of the indicators identified in step A, the five dimensions will be evaluated.
- **C.** A confrontation between the measured resilience vulnerable groups and the identified current climate actions to identify potential gaps, barriers, and opportunities.
- **D.** Recommendations for responsible authorities to enhance climate resilience of vulnerable groups in Jordan, contributing to an enhanced overall refugee climate resilience.

2.2 Research Strategy

The strategy of this research is a single case study approach. Meaning the case of Jordan, the vulnerable group of refugees based in Jordan. This group mainly resides in the heights of Jordan which expands from north to south of Jordan. The vulnerable populations are residing in either refugee camps or the urban area surrounding those. This comprehensive case study is conducted using various methods for data generation to allow for achieving the two-fold objective.

2.2.1 Research Unit

The refugee camps with their surrounding urban area in Jordan have been selected as the research unit. The climate resilience of the vulnerable groups residing in these camps, or their direct surroundings will be assessed according to the developed urban climate resilience indicators.

2.2.2 Selection of Research Unit

The research unit has been selected through purposive sampling. This is done based on the through literature identified climate vulnerability of refugees.

2.2.3 Research Boundaries

In order to ensure that the research complies with the defined timeframe, the following boundaries have been set:

- Research area is Jordan, while the refugee camps with their surrounding urban areas are identified as the research unit.
- The urban climate resilience indicators are developed based on existing literature and applied to the case of refugees in Jordan.

2.3 Data Sources and Collection Methods

Primary and secondary data is used to answer the research questions and achieve the research objective. The primary data is gathered through interviews, and the secondary data is gathered using desk research based on grey and scientific literatures.

Table 1: Research Matrix

#	Sub-question	Required information to answer sub-question	Data Source	Collection method
1	***Which indicators are appropriate to assess urban climate resilience within the context of Jordan?***	- Dimensions for resilience assessment - Translation of dimensions into indicators tailored to the specific context of Jordan	- Secondary data: Publicly available documents, articles, and reports.	• Desk research based on grey and scientific literature on urban climate resilience assessment from:
2	***How do current climate actions in Jordan address the climate resilience of vulnerable groups, particularly refugees?***	- Existing climate actions for the selected resilience dimensions - Policies specific to refugee camps	- Primary data: NGO, governmental representatives, refugees from different camps and backgrounds, urban citizens. - Secondary data: Governmental documents and publications.	• Interviews with experts • Interviews with stakeholders of refugee camps in Jordan • Desk research based on grey literature
3	***What is the level of the climate resilience of***	- Indicator levels - Data for assessment	- Primary data: NGO, Governmental representatives, refugees from different camps	• Interviews with experts • Desk research based on grey literature

	vulnerable groups in Jordan, with a focus on refugees?	using indicators	and backgrounds, urban citizens. - Secondary data: Publicly available governmental documents and publications.	
4	***What is the gap between existing climate actions and the climate resilience of vulnerable groups in Jordan, with a focus on refugees?***	- Resilience assessment of refugees in Jordan - Climate actions in Jordan	- Primary data: NGO, Governmental representatives, refugees from different camps and backgrounds, urban citizens. - Secondary data: Publicly available governmental documents and publications.	• Desk research based on grey literature • Interviews with experts • Interviews with stakeholders of refugee camps in Jordan

2.3.1 Interviews

Initially, the interview plan was intended to allow for semi-structured interviews. However, due to the multiple identities of the respondents and the emerging topic of climate change and vulnerability the interviews shifted more towards an unstructured/ open interview design. Doing this contributed to an improved validity since it enabled the interviewer to dig for a deeper understanding, ask for clarification, and allow the interviewee to influence the course of the interview based on their various identities. An interview guide (Appendix 1) was created to demarcate the study and ease data collection and analysis based on the dimensions for climate change resilience assessment of vulnerable groups. The interview questions were customized to the respondents' position as a stakeholder in Jordan's climate change, enabling for the gathering of pertinent data to address the study questions.

A total of 10 interviews have been conducted with key stakeholders of climate change in Jordan. The overview of the respondents, including their (often intersecting) roles is shown in table 4. The interview sample was purposefully selected in order to create a representative sample, one which is not biased to a single sub-group or a specific identity. The diversification was sought in terms of sex, education level, age group, and ethnicity.

Table 2: Overview of interview respondents

Respondent ⟶	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Role ↓										
Refugee residing in refugee camp	✖	✖			✖	✖				
Refugee residing in urban area			✖						✖	
Local urban citizen							✖	✖		✖
*Expert**				✖					✖	✖
*Governmental representative***			✖		✖				✖	
*NGO****			✖	✖	✖				✖	

***Experts:** Climate Policy expert Jordan; Climate Change & Water expert MENA; Sustainable development MENA expert.

****Governments:** Municipality of Madaba, specifically from the department of Refugee-camp Improvement; Ministry of Youth in Jordan; Ministry of Water and Irrigation in Jordan.

*****NGOs**: NGOs with a focus on Environment, Youth, and Sustainability; NGO working on social development within refugee camps.

The interviews were conducted by the researcher remotely utilizing Zoom, Teams, or WhatsApp to make audio or video calls in June 2021. The initial plan was to conduct the interviews in person. However, due to the limitations that resulted from the pandemic Covid-19, online interviews had to be utilized. In-person interviews would have allowed for more elaborate research on this topic as discussed under research boundaries in chapter 3.2.3. Each interview lasted approximately 60 to 90 minutes. The respondents were given a thorough understanding of the study and its purpose prior to the interview. After the participants gave their consent, all the interviews were recorded electronically and stored in a private manner to guarantee privacy.

2.3.2 Document Reviews

Qualitative data was gathered throughout the literature review process from relevant policy papers, academic publications, and reports. The key governmental publications are shown in table 4:

Table 3: Reviewed documents

Document title	Organization	Publication year
▪ National Climate Change Policy and Sector Strategic Guidance Framework	Ministry of Environment	(2013)
▪ Third National Communication	Ministry of Environment	(2014)
▪ Intended Nationally Determined Contribution	Government of Jordan	(2015)
▪ National Strategy and Action Plan to Combat Desertification	Ministry of Environment	(2015)
▪ National Water Strategy	Ministry of Water & Irrigation Jordan	(2016)
▪ A National Green Growth Plan for Jordan	Ministry of Environment	(2017)
▪ National Climate Change Adaptation Plan of Jordan	Ministry of Environment	(2021)

Furthermore, worldwide, regional, and national scientific papers, reports, and books on climate change adaptation and resilience evaluation were reviewed.

2.4 Data Analysis

The data analysis phase comes after data gathering. Given the complex dynamic settings of urbanized areas with vast numbers of refugees, the data analysis technique used in this study is mainly qualitative. As a result, the research strategy is contextualized and interpretive. For sub-question 2 (‘*How do current climate actions in Jordan address the climate resilience of vulnerable groups, particularly refugees?’)* quantitative analysis was used to highlight the inclusion of refugees as a specific vulnerable group in current climate actions.

2.4.1 Method of Data Analysis

The goal of data analysis is to obtain useable and valuable information. A qualitative analysis was carried out in this study as presented in Figure 4. To allow for analysis of the interview data the interviews were first transcribed. The transcription was then manually coded using an inductive method which depends on the interviewee’s responses. Coding the interviews allowed the identification of distinct themes and the connections between them through the categorizing and arranging of the data. For the reviewed documents, deductive coding was applied guided by a set of predefined codes for each corresponding sub-question. This deductive method is time efficient, which is especially useful given the wide range of documents reviewed for the sub-questions.

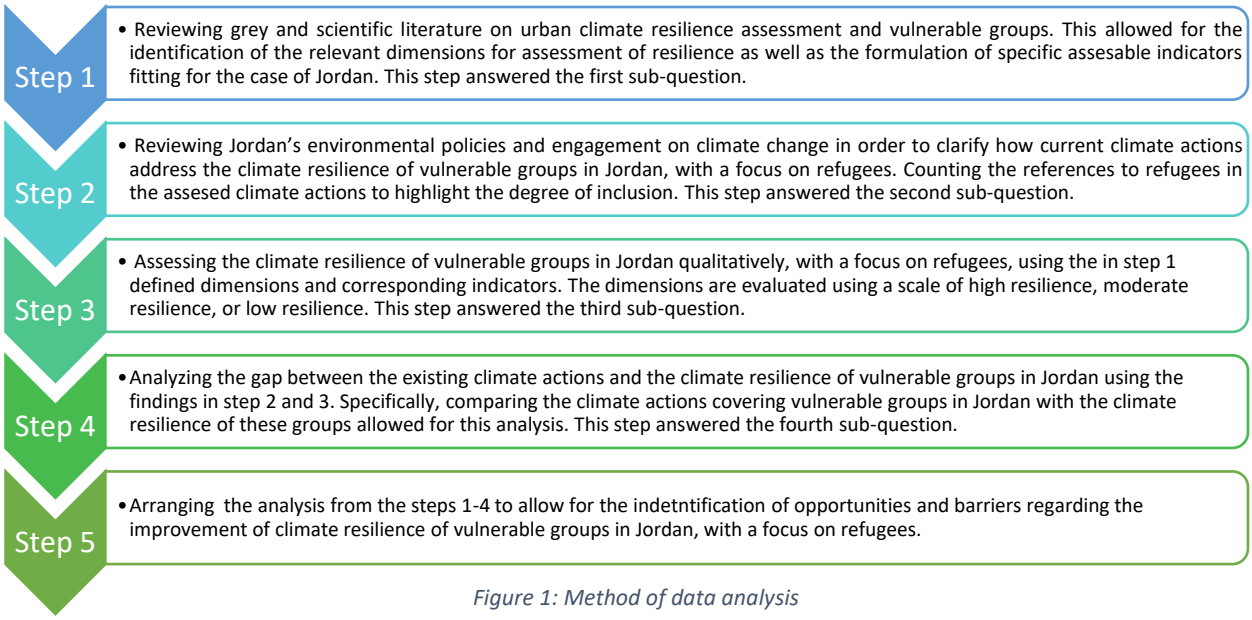


Figure 1: Method of data analysis

2.4.2 Validation of Data Analysis

To ensure the reliability of the collected data, several and diverse sources of data were utilized. Therefore, cross verification was utilized to examine the same topic. This meant verification from two or more sources by combining the data acquired from interviews, document reviews, and worldwide, regional, and national scientific papers, reports, and books on climate change adaptation and resilience evaluation. This resulted in the triangulation of sources to prevent a one-sided perspective about any aspect.

Because the interviews of this research covered a varying population with intersecting roles (to ensure it is representative), varying data was collected with regards to one topic. This sometimes resulted in discrepancies between data collected from sources and different types of stakeholders. To ensure the reliability of this data, triangulation was used. Shifting the interviews towards a unstructured/ open interview design allowed for elaborate conversations on the relevant topics since it enabled the interviewer to dig for a deeper understanding, ask for clarification, and allow the interviewee to influence the course of the interview based on their various identities.

2.5 Ethical Considerations

The goal of this study is to assess the climate resilience of refugees in the context of Jordan by developing and applying urban resilience assessment indicators. As well as to contribute to improving the climate resilience of refugees in the context of Jordan through identification of the gap between the existing climate actions and the climate resilience of vulnerable groups and an identification of the opportunities and barriers about climate adaptation in urban areas and refugee camps. Interviews with stakeholders of the 'climate resilience of vulnerable groups in Jordan research' provided crucial insights for this thesis. For the interviews, an informed consent form was utilized (template shown in Appendix 2) to guarantee that the data collection was done without coercion of the informants in this study. Moreover, as described in the consent form (template shown in appendix 2), the researcher is dedicated to guarantee the privacy and confidentiality of interviewees. Especially because the collected data may contain personal identifiable information that can be traced back to specific individuals or organizations. To ensure the confidentiality of the interviewees this data was anonymized before they were stored and analysed. Ultimately, the information gathered during the interviews was utilized strictly to complete the thesis.

3. Theoretical Background

In this chapter, the relevant scientific and grey literature are examined for their relevance to the topics of climate change impacts, vulnerable groups to climate change, climate resilience, climate resilience assessment. Lastly, this chapter provides the utilized assessment framework for refugee climate resilience in Jordan.

3.1 Impacts of Climate Change

The Intergovernmental Panel on Climate Change (IPCC) defines climate change as a change in the state of the climate that may be detected by changes in the average and/or variation of its parameters over time (IPCC, 2018b). Any change in climate over time, whether caused by natural fluctuation or human action, is referred to as climate change. However, according to the UNFCCC, climate change refers to a change in climate that is ascribed directly or indirectly to human activity that modifies the global atmosphere composition, additional to natural climatic changes seen over similar time periods (UNFCCC, 2011). Both definitions refer to the changing climate, which poses threats to the global population. The significant increase in weather-related fatalities over the previous decade is indicative of the impacts of rising average temperature, rising climate variability, and more frequent extreme weather events, putting extra strain on disadvantaged systems, people, and localities. Furthermore, the perceived effects of climate change may not occur in a vacuum. Severe storms may have consequences for different dimensions, such as increased soil erosion, floods, and landslides (Cradock-Henry et al., 2020). Therefore, it is essential to consider the nature of those threats, where natural and human systems are most susceptible, and what adaptive responses may accomplish.

The Fifth Assessment Report of the IPCC mentions the observed impacts of climate change on physical, ecological and social systems (IPCC, 2014). Changes in precipitation or the melting of snow and ice influence hydrological systems, impacting water resources in quantity and quality. In response, numerous terrestrial, aquatic, and marine organisms have modified their natural habitat, seasonal activities, migratory patterns, relative abundance, and species interactions. Furthermore, negative consequences of climate change on agricultural yields have been more prevalent than favourable benefits. The IPCC also highlights the differences in exposure and vulnerability to climate change, mentioning that non-climatic variables and multidimensional disparities, which are often caused by unequal development processes, contribute to differences in susceptibility and exposure. Recently, climate-related anomalies, such as heat waves, drought, flooding, cyclones, and wildfires, have shown that certain environments and many human systems are vulnerable to present climatic change. These climate-related anomalies intensify other stresses, resulting in severe consequences for livelihoods, particularly for the vulnerable groups of society (IPCC, 2014).

Climate change will affect several aspects of the environment, with substantial consequences for all sectors that are dependent on the environment, such as water resources, agriculture, food security and human health. Severe water shortages and/or floods is a distinct possibility as a result of changes in rainfall patterns. Warming temperatures might cause glaciers to melt, and that might lead to floods and soil erosion. Global warming is going to lead to longer growing seasons and variations in the time of year when certain crops are cultivated, which has the effect of decreasing food security and increasing the incidence of vectors such as malaria and dengue fever (UNFCCC, 2007). Biodiversity, especially marine life, rainforests, and Mediterranean and mountain ecosystems will be heavily impacted. There will be consequences on health and life, as well as environmental and economic ramifications due to increased number of severe occurrences. In order to thrive in the face of uncertainty, a society has to be better equipped to adapt (UNFCCC, 2007).

3.1.1 Regional Differences in Climate Change Impacts

The consequences of climate change on various regions of the world vary. In some locations, the temperature will rise significantly; in others, the amount of rainfall will increase. For locations where the likelihood of drought is high, water stress may be a concern. People and ecosystems are being affected by global warming and climate change. While the planet as a whole is getting warmer, global warming does not occur at the same rate everywhere. This is because the ocean requires greater heat to warm than air and land. Surface water near the coast may not warm as quickly as land locations. Warming generally happens in mid-continent regions rather than coastal regions. It will also be influenced by geographic features like mountain ranges (UCAR Center for Science Education, n.d.).

3.1.2 Climate Change Impacts in the Middle East and North Africa Region

In 2019, the Mediterranean Experts on Climate and Environmental Change (MEDECC) released a study on the hazards posed by climate change in the Mediterranean area, which includes most of the MENA region. According to the analysis, the average yearly temperature has risen by 1.5°C since the pre-industrial period. The Mediterranean is warming faster than the rest of the world (+1.1°C). Reduced precipitation, increasing sea levels, ocean acidification, increasing sea temperatures, and increased risks of soil deterioration, quality, and erosion are some of the other consequences of climate change in the region. Extreme weather events including droughts, floods, and fires are just a few of the climate-related risks that might be exacerbated by these changes (MedECC, 2019).

Social and economic considerations have a significant impact as well. From East to West and South to North, the MENA region is noted for its environmental diversity and huge disparities in the availability of natural resources and accessible water. The region's food and water stability are threatened by the current shortage of accessible water resources as well as the potential of further precipitation declines. MENA countries are distinguished by major variances in their geopolitical, economic, sociological, intellectual, and religious environments, despite certain parallels. Due to the extreme different extents of natural resource availability, certain countries, especially those around the Persian Gulf, offer adequate economic opportunities to their residents, while others see a huge portion of their population suffer from severe socioeconomic struggle. This is reflected in differences in energy and water availability and cost for MENA populations, which may be bigger than in other parts of the globe. The Arab Spring upheavals, which have resulted in massive geopolitical, economic, and sociological transformations since 2010, have added to such issues. The deconstruction of large infrastructure facilities required for the safe supply of essential commodities such as water and electricity has resulted from these changes, enhanced by the continuous violent conflicts between and within MENA nations. This might be seen as a way of separating the MENA area from the rest of the globe (Lange, 2019).

Lange (2019) also highlights that multiple climate modelling studies demonstrate that the Mediterranean Basin and the MENA region would see more extreme climate changes than other regions of the world observe. According to the findings of regional climate modelling, nations in the area would see considerable rises in summer temperatures and an increased frequency of heat waves, as well as prolonged drought conditions as well as a substantial reduction in precipitation levels. The effects of climate change will be amplified in the MENA region's major cities. The temperatures throughout the urban areas will then be 2 to 3° higher than those in the adjacent rural regions due to the urban heat island effect. Furthermore, projected average summer temperatures in MENA cities are expected to be much higher than present levels. This, along with poor air quality, will have negative impacts for urban residents' health (Lange, 2019).

Moreover, over the last century, the MENA region has had the fastest population expansion of any area on the planet (PRB, n.d.). The region's anticipated population growth, which is expected to

quadruple by 2070, will threaten food, energy and water security. As a result, the region's high reliance on imports would rise, exposing it to agrarian repercussions beyond the boundaries of the region. The persistent and significant scarcity of resources might exacerbate civil instability in an already tumultuous political context that persists in parts of the region. While it is difficult to predict how society will react to such changes, catastrophic consequences can pose unprecedented challenges to the social institutions. These challenges represent a danger multiplier in the MENA region, putting extra strain on limited resources and increasing the risks from political instability, poverty, and unemployment. Coupled with water, food and energy insecurity, this may lead to societal unrest and violent conflict. Many countries are currently witnessing climate change without unrest, conflict, or crisis. Well-established and efficient institutions are critical for increasing resilience and responding and adapting to changes or shocks, such as increases in food prices due to climate variability. Institutions that have previously been damaged by wars or crises are less able to adapt to climate changes and severe occurrences. More studies are needed to understand the connection between climate change and conflicts, as well as to link long-term climate change to migration and conflicts rather than specific climatologic risks (Waha et al., 2017). Overall, the rapid population increase occurring in the MENA region results in a lack of critical resources enhanced by the challenge arising from climate change, threatening water and food security (MedECC, 2019).

3.2 Climate Change Adaptation and Mitigation

The two primary reactions to climate change are adaptation and mitigation. Mitigation and adaptation are two sides of the same coin: mitigation deals with the causes of climate change, while adaptation deals with the consequences (UNCClearn, 2014).

A change in the environment, society, or economy due to climatic changes is referred to as adaptation. It refers to modifications in procedures, policies, and institutions to minimize possible harm or to reap benefits from climate change. Essentially, governments and communities need to plan for and deal with the repercussions of the changing climate that are occurring, as well as look to future repercussions. Approach varies by community, company, organization, nation, or location. No "one-size-fits-all solution" exists; instead, adaptation may take several forms, such as constructing flood defences, putting up early warning systems for cyclones, and converting to drought-resistant crops. To properly manage the dangers today and in the future, many countries and communities will need to make bigger efforts. Adaptation is a global problem having local, subnational, national, regional, and international elements, as recognized by the UNFCCC and its Paris Agreement. It is an important part of the broader international response to climate change that aims to safeguard people, livelihoods, and ecosystems. The Paris Agreement states that adaptation actions should be country-driven, gender-responsive, participatory and transparent, taking into account vulnerable groups, communities, and the ecosystem, and must be founded on and guided by the latest research, as well as local knowledge systems (UNFCCC, n.d.-c). Adapting to climate change requires proper methods to overcome the negative impacts of climate change or making use of the benefits of climate change. There are several alternatives and pathways to take (UNFCCC, 2007).

Mitigation refers to measures to decrease or completely prevent greenhouse gas (GHG) emissions. Mitigation might take the form of adopting innovative technology and renewable energy sources, upgrading aging equipment for a higher energy efficiency, or altering management or customer behaviour. It might be as big as a new city plan or as basic as adjustments to the design of a cook stove. Varying from innovative public transport systems to biking pathways and sidewalks, all efforts to mitigate the changing climate (UNFCCC, n.d.-a). Regarding mitigation efforts, developed nations have established limits for their GHG emissions under the UNFCCC, and primarily under the Kyoto Protocol, while developing countries have concentrated on individual programs and initiatives. Developed

nations have announced quantifiable carbon goals for 2020 as a result of the 2009 Copenhagen Accord and the 2010 Cancun Agreements, while developing countries have committed to undertake nationally adequate mitigation measures with assistance from developed countries (UNFCCC, n.d.-b). Many nations are taking steps to mitigate climate change across the globe in order to meet their obligations under the Convention, the Kyoto Protocol, and the Paris Agreement. Parties must take into account the particular requirements and sensitivities of developing country Parties resulting from the effects of response measures, as per the Convention as well as the Paris Agreement. Participants to the Kyoto Protocol agree to focus on reducing negative economic, social, and environmental effects on other parties, particularly developing nation Parties. The COP has created a forum on the effect of the execution of mitigation actions under the Convention, which will further serve the Paris Agreement, in order to enable evaluation and analysis of such consequences and to propose particular actions (UNFCCC, n.d.-b).

3.3 Climate Resilience

Climate resilience refers to the capacity to foresee, prepare for, and react to climate-related hazards, trends, or disruptions (Center for Climate and Energy Solutions, n.d.). Assessing how climate change may generate new hazards or modify the existing ones, and adopting measures to effectively deal with these risks, contributes to climate resilience. Climate resilience is frequently linked to extreme weather events such as rainstorms, hurricanes, and wildfires, which are becoming more frequent or severe as the climate changes. Resilience planning, on the other hand, takes into consideration chronic occurrences such as rising sea levels, deteriorating quality of air, and population movement. Businesses and governments alike are making preparations today for the future environment and economy (Center for Climate and Energy Solutions, n.d.). The ability of a system, as well as an area or community, to adjust to the consequences or repercussions of climate change is referred to as adaptive capacity. Increasing adaptive capacity is a realistic way to deal with climate change and uncertainty, such as unpredictability and extremes. Adaptive capacity is a function of Resilience as increasing it enables an individual's ability to adapt to climate change impacts and continue to flourish (IGI Global, n.d.).

3.3.1 Vulnerability and Vulnerable Groups

Vulnerability refers to a person's susceptibility to damage as a result of exposure to stressors connected with environmental and societal change, as well as a lack of adaptability. Theories of vulnerability such as entitlements failures and concepts of hazard are examples of preceding practices. Each of these domains has led to current conceptions of environmental change vulnerability as a feature of social-ecological systems related to resilience. Vulnerability research faces a number of challenges, including developing robust and reliable indicators, incorporating different methodologies on vulnerability and risk notions, and incorporating governance research on the strategies that arbitrate vulnerability but also promote adaptive measures or even resilience. These difficulties are shared by the areas of vulnerability, adaptation, and resilience, and they provide a common basis for coherence and synergy (Adger, 2006).

Vulnerable groups are the people who live in poverty, lacking access to safe accommodation, water, sanitation, or nutrition, and also individuals who might be stigmatized, discriminated against, ostracized by society, and sometimes even criminalized in law, policy, and practice. These people may find it difficult to exercise their human rights, such as the right to social and health assistance (United Nations Development Programme, n.d.). According to the Icelandic Human Rights Centre (n.d.) vulnerable groups include 13 categories that overlap in several ways: 1) girls and women; 2) adolescents; 3) refugees; 4) internally displaced people; 5) stateless people; 6) minority populations;

and 7) indigenous peoples. 8) migrant workers; 9) disabled individuals; 10) the elderly; 11) HIV positive individuals and AIDS victims; 12) Roma/Gypsies/Sinti; and 13) lesbian, gay, and transgender people.

Residents of urban areas have varying degrees of service accessibility. This division results from rapid urbanization, increasing demand for services, as well as a lack of resources, poor planning, and previous socioeconomic marginalization tendencies. A growing number of people live in slums, and large sectors of the metropolitan population lack financial power and political influence. Simultaneously, these communities will continue to make important development, land-use, and big investment choices. The changing climate must be considered during choices for urban development. This form of decision-making will aid in addressing present development difficulties while also taking into account future climate change scenarios (Asian Development Bank, 2014).

Urban regions with frail systems and dense populations of the socio-economically disadvantaged, such as refugees, are the most vulnerable to external shocks and pressures, including climate change. Vulnerable individuals suffer the most as a consequence of their increased exposure to risks or their reduced capacity to adjust and react (due to physical limits or financial capability). Climate change has two types of direct effects: shocks and abrupt impacts like hurricanes, typhoons, and heat waves, and stressors or long-term impacts like rising sea levels, increasing temperatures, and lengthy changes in precipitation patterns. Floods (stopping port or train operations, disrupting transportation, and prohibiting goods from reaching markets); outages (as electricity production is affected by weather); increase in the risk of water- or vector-borne illnesses (due to rainfall and temperature fluctuations); and extreme heat are all consequences of these shocks and stresses on urban areas (enhanced by increasing temperatures). During climatic events, a rise in illness frequency and extreme heat may impose strain on the health system and infrastructure (Asian Development Bank, 2014). According to (Benevolenza & DeRigne, 2019), climate vulnerable groups suffer increased mental, emotional, and physical stress as a result of exposure to natural hazards. Researchers from a range of disciplines, including sociology, public health, and environmental studies, are looking at how natural catastrophes affect the health and wellbeing, as well as the demographic characteristics that make some populations more vulnerable to the effects of the changing climate. Both direct effects of climate change, shocks, and abrupt impacts, further exacerbate the vulnerability of these groups.

3.3.2 Urban Climate Resilience

Urban climate resilience refers to a city's ability to operate so that its residents and workers, mainly the poor and marginalized, can survive and prosper regardless of the stresses or shocks they face brought upon by climate change (Asian Development Bank, 2014). Resiliency practices have shown to be effective in dealing with climate risks and unexpected occurrences, as well as in tackling the impacts of climate change. While acknowledging the complexities of rapidly increasing urban regions and the uncertainties associated with climate change, urban climate resilience encompasses climate change adaptation and mitigation efforts, and the reduction of catastrophe risk. This approach emphasizes the need of seeing urban areas as dynamic structures that can develop and adapt to survive and even flourish in the event of shocks or stressors. A climate resilient city is robust on three levels: the city's systems survive shocks and stresses; individuals and organizations can incorporate these stressors into their daily choices; and the city governments implement institutional frameworks to support individuals and organizations in achieving their goals. There is no single step that can make a city climate resilient. Instead, resilience is built via a series of activities that build one another over time. People and organizations would learn from prior experiences and apply what they have learned to future choices, enhancing, and progressing these activities (Asian Development Bank, 2014). Building climate resilience requires both adaptation and mitigation efforts, which can also intersect as

shown in Figure 1 (Calgary, 2018). For the creation of adaptive actions it is necessary to decrease the vulnerability to the climate change impacts, creating a cornerstone to a climate resilient society.

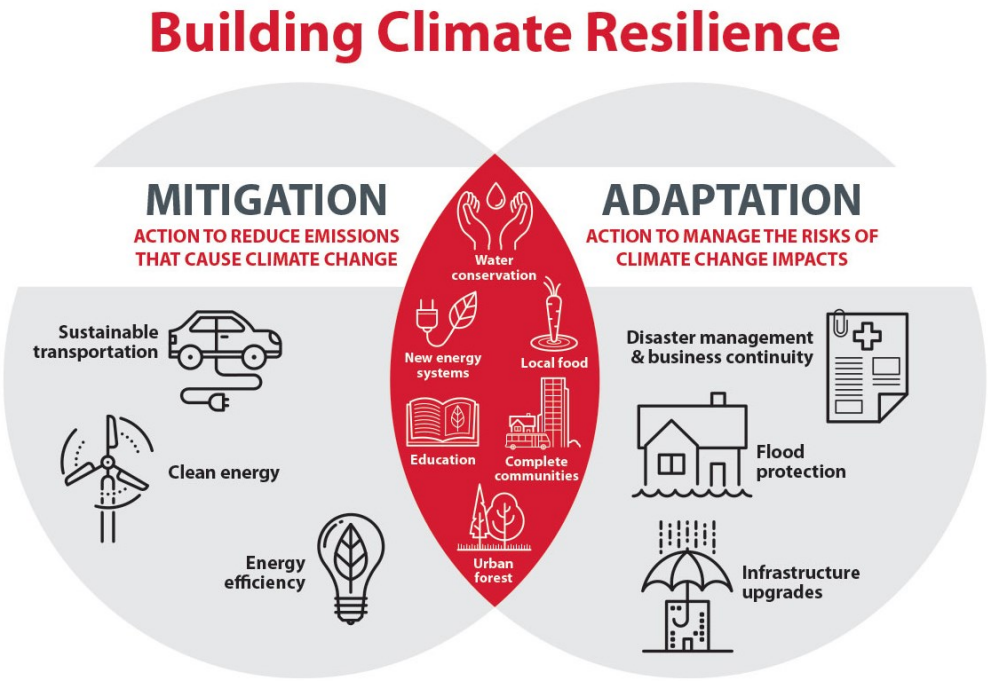


Figure 2: Achieving climate resilience through adaptation & mitigation

Source: (Calgary, 2018)

3.3.3 Assessment of Climate Resilience

Cities use climate resilience assessments to quantify and monitor the various factors that contribute to their resilience. The main goal of such assessments is to identify strengths and limitations, as well as to monitor relative success over time. This offers a comprehensive picture of city resilience, organized around the dimensions that are impacted (ARUP, 2016). Climate change and urban resilience are elevated on political agendas across several cities. An important issue is whether urban areas will be able to adjust to the changing climate. This is alluded to as a city's absorptive capacity or resilience. Urban resilience assessment has become a well-known approach to tracking progress towards the climate resilience of communities. There is no universally accepted method for assessing urban climate change resilience. Indicators are the most common technique to overcome this barrier and make the idea of resilience practical and applicable. While producers of urban resilience assessments employ many indicators to account for all aspects of urban resilience, users of urban resilience assessments are keen to utilize straightforward, pragmatic, and efficient indicators to address the most important aspects of urban resilience. To close the gap, an urban resilience index based on the smallest number of indicators feasible is needed, without jeopardizing the fundamental intricacy of the idea of urban climate change resilience (Zhang et al., 2020).

The World Risk Index (WRI) has been developed for assessing global exposure, susceptibility, and hazard trends based on country level data sets (Birkmann & Welle, 2016). WRI is based on 28 indicators that measure global risk patterns and are inextricably related to the 17 UN Sustainable Development Goals (Zhang et al., 2020). Beside the WRI's method for assessment in the field of resilience, there are other examples. Table 1 presents a summary of the approaches to resilience assessment, based on the review by Zhang et al. (2020).

Table 4: Approaches to resilience assessment

	Description	Reference
1	Review of the history and evolution of the notion of resilience, as well as whether disaster resilience is a pattern or a result, and how it relates to vulnerabilities. Descriptions of the importance of resilience reasoning in catastrophe response.	(Bernard Manyena, 2006)
2	A model for resilience assessment based on a literature analysis. The goal was to enhance comparative catastrophe resilience assessments just at a local level. This model was used to create a community resilience assessment index system with six dimensions (social, economic, ecological, infrastructure, institutions, and community) and 30 indicators.	(Cutter et al., 2008)
3	Community resilience index, wherein the Disaster Resilience Index (DRI) is calculated by dividing community preparedness and vulnerability. The indicators of community preparedness and vulnerability, which include material, economic, social, cultural, and ecological dimensions, are based on a set of geographical and non-spatial measures of community resources.	(Simpson, 2006)
4	Urban resilience assessment methodology in response to natural disasters based on the United Nations International Strategy for Disaster Reduction (UNISDR) concept of urban resilience and the community resilience assessment approach (Simpson, 2006).	(Kusumastuti, 2014)
5	Climate Disaster Resilience Index with five dimensions (economy, institutions, nature, material, and society), 25 parameters, and 125 variables.	(Joerin et al., 2014)
6	Conceptual framework for urban resilience analysis in the context of climate change, citing urban resilience as an essential metric for adapting to climate change.	(Kim & Lim, 2016)

Beside the above-described approaches, various international organizations have announced international cooperation strategies for urban resilience development. The United Nations International Strategy for Disaster Reduction "Making Cities Resilient" campaign and the Rockefeller Foundation's "100 Resilient Cities" initiative are the two most representative international cooperation efforts. The first seeks to improve urban resilience in the face of catastrophes and dangers. It describes urban resilience as a city's capacity to recover, adapt, and flourish sustainably in the face of a variety of threats. The City Resilience Framework (CRF) and City Resilience Index were established by the Rockefeller Foundation in collaboration with the consulting company ARUP (ARUP, 2016).According to this framework there are four components to city resilience. First, a resilient city prioritizes the health and well-being of its residents and workers. Second, the economy and society allow people to live in peace and act in concert. Natural systems and man-made infrastructure may both offer important services, as well as protect and link people. Finally, informed, inclusive, and integrated decision-making requires leadership and strategy. There are a total of 12 objectives, three for each aspect. Intended to help cities improve their functioning to become resilient. The 12 objectives are backed up by 52 indicators. These were created to combine the characteristics of robust systems. Reflective, robust, redundant, flexible, resourceful, integrated, and inclusive are the seven properties of resilient systems (Zhang et al., 2020).

There are few indicators in existing urban resilience assessment frameworks that quantify resilience against non-specific threats. Instead, the frameworks often stress resilience against a

particular form of disturbance, such as natural catastrophes. However, because of the high level of uncertainty regarding climate change, resilience for larger shocks must be built. Moreover, the existing frameworks mostly focus on a particular aspect of the urban system, such as energy, water supply, or urban drainage systems, and there is insufficient knowledge of overall urban resilience. Assessing urban resilience still faces three issues. Firstly, urban resilience should be assessed holistically rather than measuring it in response to a single danger. It is quite simple to assess resilience to a certain hazard or risk. Assessing overall resilience, on the other hand, is a far more difficult task. Secondly, the quantification of the assessment results can pose problems. Existing resilience evaluations mostly use qualitative methods, which leads to a low level of acceptance of the findings. Thirdly, assessing urban resilience requires the use of a sufficient number of indicators. In many circumstances, a significant number of indicators are used, necessitating a significant amount of data and expensive data gathering expenses. Resilience is multifaceted, as well as location, scale, and time-specific, necessitating a holistic approach to measuring and studying it (Zhang et al., 2020).

The major elements of urban resilience stated in the literature comprise five dimensions: social, environmental, institutions, infrastructure, and economic. Each element is examined using a variety of methods. Despite the unanimous use of multiple dimensions, the definitions of these dimensions are interpreted differently by various researchers. Adger (2000) emphasizes the connection between the social and ecological dimension, defining social resilience as the capacity of groups or communities to deal with external stressors and disruptions as a consequence of social, political, or environmental change. This definition emphasizes societal resilience in relation to ecological resilience, which refers to ecosystems' ability to sustain itself in the face of adversity. According to Adger (2000) there is a strong connection between social and ecological resilience, especially for social communities whose livelihoods are reliant on environmental and ecological resources. Kusumastuti et al. (2014) define economic resilience as an adaptation reaction of people or markets to catastrophes, while Cutter et al. (2010) define economic resilience as a community's economic vitality. Shaw et al. (2009) argue that ecological resilience is linked to the prevalence and magnitude of catastrophes, while Cutter et al. (2008) argue that ecological resilience is linked to biodiversity and land use. The previously described variances are a few of the various definitions. These variances are partly attributed to the extent of the region under consideration as well as the aim of the various investigations (Zhang et al., 2020).

3.3.4 Utilized Assessment Framework

Climate resilient societies, according to Brears (2021), are those that are: reflective of their past experiences; robust in terms of both people and infrastructure which can withstand the impacts of extreme conditions; forward-thinking by having plans in place to ensure systems maintain their function in during extreme event; flexible to allow systems and plans to change, evolve, or adopt alternative strategies; and resourceful so that they can respond quickly to extreme events. In a resilient society, all institutions are mutually supportive of common goals.

Vulnerability is a reflection of the current status of individuals or groups with regards to physical, social, economic, and environmental circumstances (UN, 2004). Individuals, families, communities, and nations are constantly moulded by psychological, behavioural, cultural, socioeconomic, and political factors. The UN (2004) divides vulnerability into four interconnected factors; the physical factors, which portray the susceptibility of vulnerable components within a country; economic factors, which portray the financial power of individuals, communities, and demographic groups; social factors, which portray the non-economic variables that influence the well-being of people, demographic groups, and communities, often including literacy, security, accessibility to fundamental human rights, and effective governance. Lastly, environmental factors, which refer to the quality of the environment in a

given area. Figure 2 depicts the four main categories into which various elements of vulnerability may be classified, represented by interconnected circles to demonstrate how all factors of vulnerability are connected with one another (United Nations, 2004).

The vulnerability factors as identified by the UN juxtapose with the dimensions of urban climate resilience. The economic, social, and environmental factors are an identical match to the corresponding dimensions of climate resilience. However, the institutional and infrastructure dimensions of urban resilience are different. And so is the physical factor of vulnerability. To address the resilience of vulnerable groups in Jordan the vulnerability of the vulnerable groups will be addressed. After all, reducing vulnerabilities is the first step in building a resilient society.

Building on the climate resilience dimensions and the climate vulnerability factors, the framework shown in figure 3 is established to allow for a qualitative assessment of the climate resilience of vulnerable groups in Jordan.

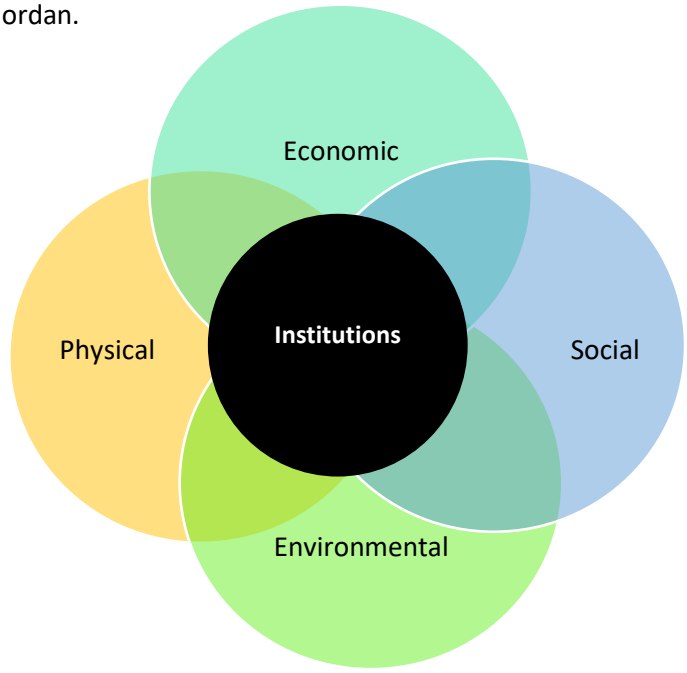


Figure 3: Framework for climate resilience assessment of vulnerable groups in Jordan

The framework contains the four factors of vulnerability and covers the five major elements of urban resilience. However, it slightly different from the vulnerability factors and dimensions of urban resilience. These differences are two-fold:

1. The infrastructure dimension of urban resilience is included in the physical sphere of this framework, as it is part of the physical vulnerability factor.
2. The institutional dimension is centred in this framework, portraying its significance for, and involvement in the other four dimensions.

Using the abovementioned framework, the dimensions of the climate resilience of refugees in Jordan is evaluated on a scale of low, moderate, or high resilience. The level of resilience is derived from a qualitative assessment of the indicators within each dimension. These levels indicate the assessed population's ability to withstand and adapt to the faced climate change impacts in Jordan. The selected dimensions and indicators are shown in figure 4, whereas the relevance of the dimensions with their corresponding indicators is further elaborated in chapter 5.1.

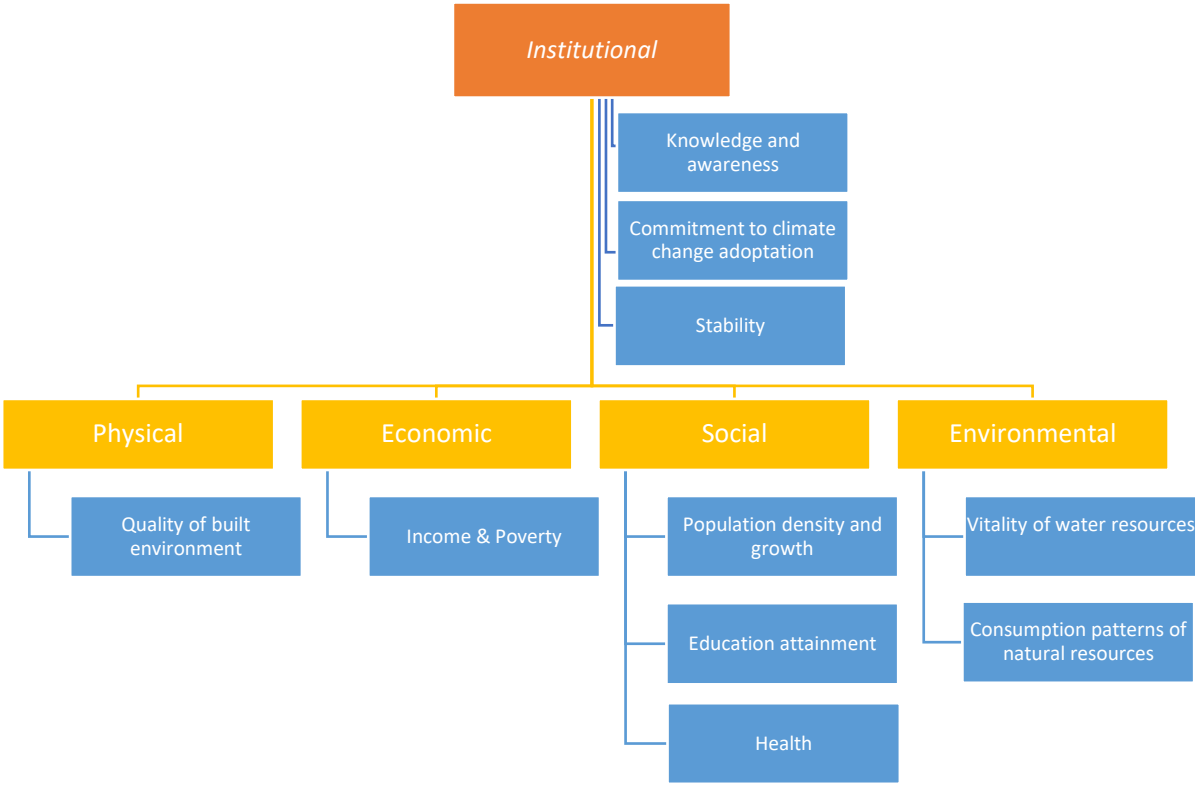


Figure 4: Dimensions and sub-dimensions of climate resilience of vulnerable groups in Jordan

4. Empirical Background about Jordan

In this chapter, the empirical background about Jordan is provided. The chapter is divided into three sections to provide a coherent background about Jordan. Firstly, the chapter starts with a general introduction of the country. Secondly, the climate change impacts, challenges, and threats in Jordan are provided, sectioned as, national, and regional security, socio-economic, water resources, energy, and agriculture. Thirdly, a description of the vulnerable groups in Jordan is provided comprising Palestinian, Syrian, and Iraqi refugees.

4.1 Country Description

Jordan is a Southwest Asian Arab nation located in the stony deserts of the northern Arabian Peninsula. It is bordered by Syria to the north, Iraq to the east, Saudi Arabia towards the southeast and south, and Israel and the West Bank to the west. Jordan has a 26-kilometer shoreline on the Gulf of Aqaba in the southwest, in which its single port Al-Aqaba is situated (Chronicle Fanack, 2020a).

Jordan is a young country that inhabits an old territory which retains the imprints of many civilizations. Divided from ancient Palestine by the Jordan River, Jordan played an important part in history. Until 1918, Jordan remained part of the Ottoman Empire, after which it became a British mandate, and finally became an independent monarchy in 1946. It is now one of the Arab world's most politically liberal nations, and while it bears the region's instability, its authorities have shown a commitment to preserving peace and security (Britannica, n.d.). Amman, the country's capital, and biggest city was named after the Ammonites, who established the city as its capitol throughout the 13th century BCE. Amman was later a major hub of Middle Eastern antiquity, Capital of the Roman Decapolis, and is today one of the region's main economic and transportation hubs and one of the Arab world's significant cultural centres (Britannica, n.d.).

4.2 Climatic Conditions of Jordan

Located in the eastern Mediterranean area, Jordan's elevations are ranging from less than -400 meters at the Dead Sea surface (the lowest point on the planet) to 1,750 meters. Winters with significant rainfall, which last from December to March, are followed by hot, dry summers, which last from April to November. Jordan has four climate zones as show in figure 5, these climatic zones are expected to mainly shift to hot desert and cold arid climate between 2071–2100 as shown in figure 6 (Ministry of Foreign Affairs of the Netherlands, 2018).

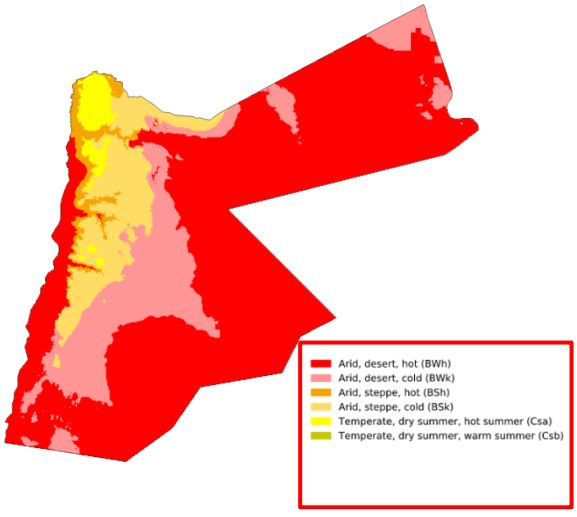


Figure 5: Current climate zones of Jordan
Source: (Beck et al., 2018)

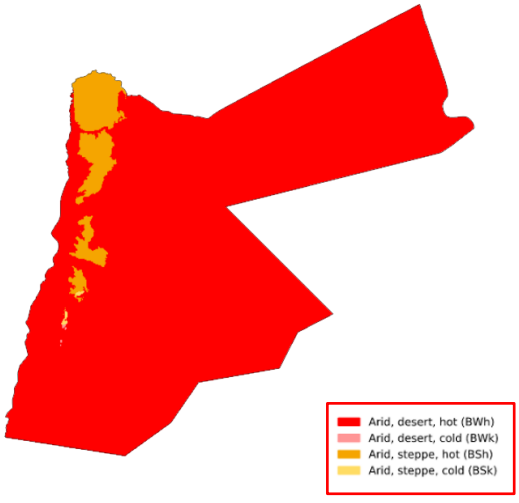


Figure 6: Predicted climate zones of Jordan (2071-2100)
Source: (Beck et al., 2018)

Jordan's climate is mainly dry to semi-arid, with annual precipitation averaging below 220 millimetres. The rainy season lasts from approximately October to May the following year, with the December to March period receiving 80 percent of the seasonal rainfall. The annual average precipitation varies dramatically from one climatic area to the next, ranging from 28 mm in southern Badya (desert) to 570 mm in the hills of Ras Munif's, which is situated in the northern highland region. Annual precipitation in the Jordan Valley area may exceed 280 mm in Dair-Alla in the north and drops to 71 mm in Al Ghor el Safi in the south (Ministry of Foreign Affairs of the Netherlands, 2018).

4.3 Climate Change Impacts, Challenges, and Threats in Jordan

Jordan is among the driest countries on the planet (IUCN, n.d.). Average summer temperatures in the MENA region are expected to rise between 2.2 and 2.5°C due to climate change, with a 4 to 27 percent reduction in annual precipitation, increasing the risk of drought. Surface and groundwater recovery will be reduced, with increasing evaporation and declining soil moisture. As a result, agricultural irrigation will become more necessary. Extreme weather events like heavy rain and snowstorms, that may cause floods, are projected to rise as a result of climate change. It will also lead to more yearly temperature extremes with more unpredictability (Fanack Water, 2021). Jordan's biggest obstacle to economic development and growth is the water crisis, which affects every facet of life. The water crises are only further enhanced by the changing climate, but other factors amplify this problem; The high number of refugees' demands for energy and water are a major contributor to present and future water shortages and energy problems. Climate change will operate as a danger multiplier by reducing water availability and increasing strain on groundwater aquifers that have already had their recharge rates surpassed. The combination of climate change and population growth, enhanced by the influx of migrants are both expected to place further strain on Jordan's scarce land and water resources (Ministry of Foreign Affairs of the Netherlands, 2018).

4.3.1 National and Regional Security

Poverty is a component of a vicious cycle that is exacerbated by a connection to violence. The relationship between crime and poverty isn't dependent on a single cause. Crime and poverty symbiotically affect and develop each other due to the complex interaction of various factors and situations. Discontent with the government is fuelled by a systemic inability to react to socioeconomic and environmental problems. The efficacy of nonviolent means of resistance is further limited by weak democratic institutions, poor political elite transparency, corruption, and exclusion of communities. Internal pressures may unintentionally spark a wave of revolutions and huge riots, putting the system's durability to the test. The Arab Spring was a concatenation of these surges, and its ramifications still reverberate across the Middle East (Carry, 2019) .

The Arab Spring, with its far-reaching implications for Middle East political stability, also demonstrated that broad discontent and a lack of opportunities may result in huge waves of migrants and internally displaced people. Jordan has faced significant difficulties as a result of the admission of nearly 1.5 million Syrians since the civil conflict began, including 600,000 UN recognized refugees. The vast majority of refugees have been settling in the north of Jordan, in both urban and rural regions. The remainder are housed in refugee camps, which are often plagued by illnesses, lack of water and food, and significant levels of crime and violence. Jordan's economy, natural resources, and people's patience are all being strained by the massive inflow of migrants. Public dissatisfaction with the government is being fuelled by diminishing water, food, and energy resources (Carnegie Endowment for International Peace, 2015). Jordan saw significant public demonstrations in 2018 in response to the kingdom's increased gasoline and power costs, which were implemented to help the country's weak economy (Al Jazeera Business and Economy, 2018).

Moreover, according to assessments, a significant number of Syrian refugees do not want to return to their homeland (Jordan Times, 2018). In longer terms, this would imply an increased energy and water demand for Jordan's population, as well as rivalry for fertile land amongst refugees and host farmers, ultimately fuelling any unrest in the country. Both Israel and Palestine have a strong interest in Jordan being a viable neighbour in terms of national security. With virtually every Palestinian family having members in Jordan, Jordan's instability would have far-reaching consequences for the Palestinian people. Jordan is an essential ally for Israel, being the second of only two Middle Eastern "peace partners" and the country with which Israel maintains its greatest border. Its security and stability are crucial for the region's balance, and therefore for Israel's national security. As a result, avoiding political fragmentation and preserving Jordan's integrity is in both Palestine's and Israel's strategic interests (Carry, 2019).

4.3.2 Socio-economic

Climate change will have an influence on various industries in Jordan, including agriculture, energy, water, health, and tourism. Mismanagement of resources and poor governance impede socio-economic development on an individual and national level (Ministry of Environment, 2013). The high and increasing youth unemployment rate, which is almost 50 percent, reflects limited economic possibilities for future generations. This is further exacerbated by the COVID-19 economic shock, which worsened both existing structural vulnerabilities in the economy and unsolved social problems, placing strain on the country's vulnerable macroeconomic position (World Bank, n.d.).

On the other hand, the decreasing agricultural production due to climate change will have a significant impact on Jordan's ability to grow socially and economically (Sustainable Development Knowledge Platform, n.d.). The Jordan Valley, which serves as the region's breadbasket, is a prime example. The agriculture sector's decreased yield has significant consequences, such as decreased farmer income and increased food costs. Customer prices rise as the cost of production for essential resources including water and electricity rise, which is especially agonizing for vulnerable populations. A vicious cycle of poverty and bad public health may reflect a combination of economic crisis and inadequate social security systems. Food insecurity and poor health are exacerbated by the loss of livelihoods. Meanwhile, a lack of financial resources often withholds households from obtaining medical treatment. As a consequence, public health has deteriorated generally, undermining economic activity and perpetuating poverty in Jordan (Carry, 2019).

4.3.3 Water Resources

As already introduced in the sub-section above, climate change is going to have a big impact on Jordan's water supply. Increasing soil erosion, floods, and siltation of rivers, dams, or basins; high salinity and year-to-year unpredictability of water supplies; and decreased streams of important rivers like the Jordan River are all additional impacts. Each of these impacts strains the various dimensions of Jordan’s economy, human health, water security, and food security. Additionally, Jordan is particularly vulnerable to climate change due to its aridity and natural lack of water. Due to arid conditions, where yearly precipitation is less than 50 millimetres as shown in Figure 7, more than 80 percent of the nation is uninhabited (shown in figure 8). The availability of water is mostly determined by rainfall, which varies significantly. The Jordan River basin, the Yarmouk and Zarqa, have salty surface water that is mainly utilized for agriculture, while subterranean aquifers provide drinking water. Flooding is a common occurrence after significant rainfall events in the winter, damaging agricultural land and infrastructure as well as taking lives (Ministry of Foreign Affairs of the Netherlands, 2018).

Increased migration to urban areas is an indirect effect of drought in Jordan (Ministry of Foreign Affairs of the Netherlands, 2018). For decades, Jordan has struggled to close the gap between water supply and demand. However, the problems of demand control are substantial. Aside from that,

Jordan has a slew of additional challenges when it comes to water resources (Fanack Water, 2021). While a thorough examination of these problems is far beyond the scope of this thesis, municipal water loss is significantly enhancing the countries water vulnerability. Jordan has a significant issue with leakage, water loss, and water theft (U.S. Agency for International Development, n.d.). Depending on the region, the network loses between 50 percent of the water supply. The primary causes of this massive waste are inefficient administrative procedures, obsolete infrastructure, and poor maintenance (Al-Ansari et al., 2014).

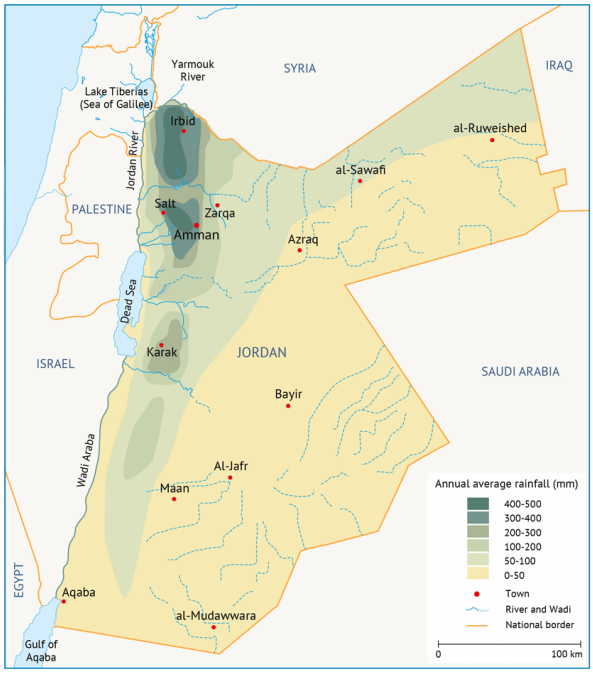


Figure 7: Annual average rainfall and precipitation Jordan
Source: (Fanack Water, 2021)

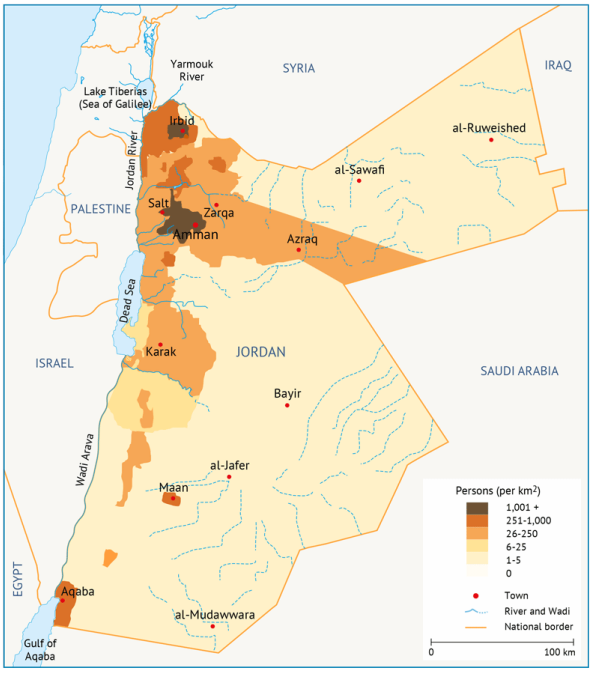


Figure 8: Population density in Jordan
Source: (Fanack Water, 2021)

Unbilled water usage, unlawful system extractions, and metering problems (e.g., reading inconsistencies, transmission errors, connections that are not metered) are among the administrative concerns. Poor maintenance or low quality rebuilding materials, restricted consequences for unlawful water usage (no or inefficient enforcement, no or very minimal penalties), and a lack of public knowledge and/or individual accountability for water waste all play a part in certain regions (Al-Ansari et al., 2014; Fanack Water, 2021).

The country's topography, on the other hand, makes water supply a problem. Jordan's major natural resources (main rivers and basins) are located away from towns and agricultural regions, necessitating water transportation between the source and the user, often across a significant height difference. Moreover, as shown in Figure 8, nearly 80 percent of the country's population resides in the urban areas in the north, at altitudes far above the major rivers and streams. As a result, Jordanian authorities have been forced to invest in a large and costly water supply network that must be managed and improved on a regular basis. Moreover, the distribution and transportation of water to these areas necessitates a significant amount of energy and costs (Grover et al., 2010).

4.3.4 Energy

In the regional climate change debate of the MENA, the utilization of non-conventional water sources, such as desalination and treated wastewater, is by far the most notable response to water

scarcity and droughts. Growing use of either source necessitates large quantities of energy (Djuma et al., 2016). This does not only highlight the issue of cost-effectiveness, but also the need for a lengthy energy security plan. Jordan has now become a leader in the area of renewable energy in the MENA region, this despite its lack of indigenous fossils fuels. The kingdom has sought to diversify its energy supply away from fossil fuels, oil, and gas, and is on pace to achieve its 2030 target of providing 20 percent of its energy from renewable sources (Carry, 2019; Ready, 2020).

4.3.5 Agriculture

Jordan's agriculture industry has declined considerably over the years, producing 5.2 percent of GDP in 2020, compared to 7.2 percent in 1991 (The World Bank, 2021). Jordanian farmers have had to adapt new agricultural techniques as a result of the changing climate (Relief Web, 2016). Some of these techniques include less water intensive and far more heat resistant crops, as well as greater use of fertilizers and pesticides. Unsustainable agricultural methods, which do not take environmental impacts into considerations in certain areas of Jordan, such as with the Zarqa River Basin, have resulted in severe groundwater and river contamination, forcing the shutdown of most of the river's farms. Droughts and heat waves become more common, posing a long-term threat to Jordan's water and food security (due to decreased agricultural output and increasing food costs), with particular damage to Jordanian farmers (Carry, 2019; IUCN, 2012).

4.4 Vulnerable Groups in Jordan

To describe the proportion of vulnerable groups in Jordan it is crucial to define the various segments of Jordan's population. Jordan has been sparsely inhabited for centuries, until the second half of the twentieth century, when the population had expanded exponentially. Jordan's Department of Statistics estimates that the national population will be 10.81 million in 2020, with 54.64 percent male (5.766 million people) and 45.54 percent female (5.084 million people) (The Department of Statistics in the Kingdom of Jordan, 2020). A total population growth of 13.07 percent was experienced over the five years since the previous official census of population and housing of 2015, with an average annual growth of 2.61 percent (Chronicle Fanack, 2020b).

The populace of Jordan has increased by more than tenfold since the 1950's. Mainly attributed to both the refugee influx and the population growth (Salameh et al., n.d.). Between 2004 and 2015, the average rate of population growth was about 5.3 percent, with the rise owing to increasing immigration rates and asylum in the Kingdom mostly as result of conflicts in surrounding countries (Iraq and Syria) (Chronicle Fanack, 2020b). Jordanians have a population growth rate of 3.1 percent on average (Country Meters, 2021). Moreover, Jordan has the largest proportion of refugees in its population. By the end of 2018, the overall influx of Syrian Refugees in Jordan had risen to about 1.38 million. The United Nations High Commissioner for Refugees (UNHCR) announced in January 2021 that more than 750,000 refugees had all been registered with the UNHCR in Jordan (see figure 9 for refugee populations in Jordan, excluding the Palestinian refugees who fall under the UNRWA mandate), including 90,000 displaced people with non-Syrian nationalities residing in Jordanian urban areas, leading to an increase in the complication of living for many of them, especially during the Covid-19 pandemic (Enab Baladi, 2021).

The United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA) has a mission to provide assistance to Palestine refugees in five areas of operation: Syria, Lebanon, the West Bank (including east Jerusalem and the Gaza Strip). Lebanon, Syria, Jordan, the West Bank, including East Jerusalem, and the Gaza Strip). As a result, Palestinian refugees living in these areas do not come within the jurisdiction of the UN High Commissioner for Refugees. However, the UN High

Commissioner for Refugees (UNHCR) has a mandate to assist Palestinian refugees who are outside of UNRWA's areas of operation under specific situations (UNRWA, n.d.).

UNHCR is the lead organization in Jordan for the response to the Syria crisis. UNHCR oversees the entire refugee response plan in Jordan, which is a result of strong cooperation between the government of Jordan, United Nations agencies, and local and internationally non-governmental organizations (NGOs). UNHCR aids the resettlement of the Syrian refugees in Jordan and provides a variety of services and aid to accommodate for their needs, with attention to the most vulnerable portion of the refugees (UNHCR, 2013).

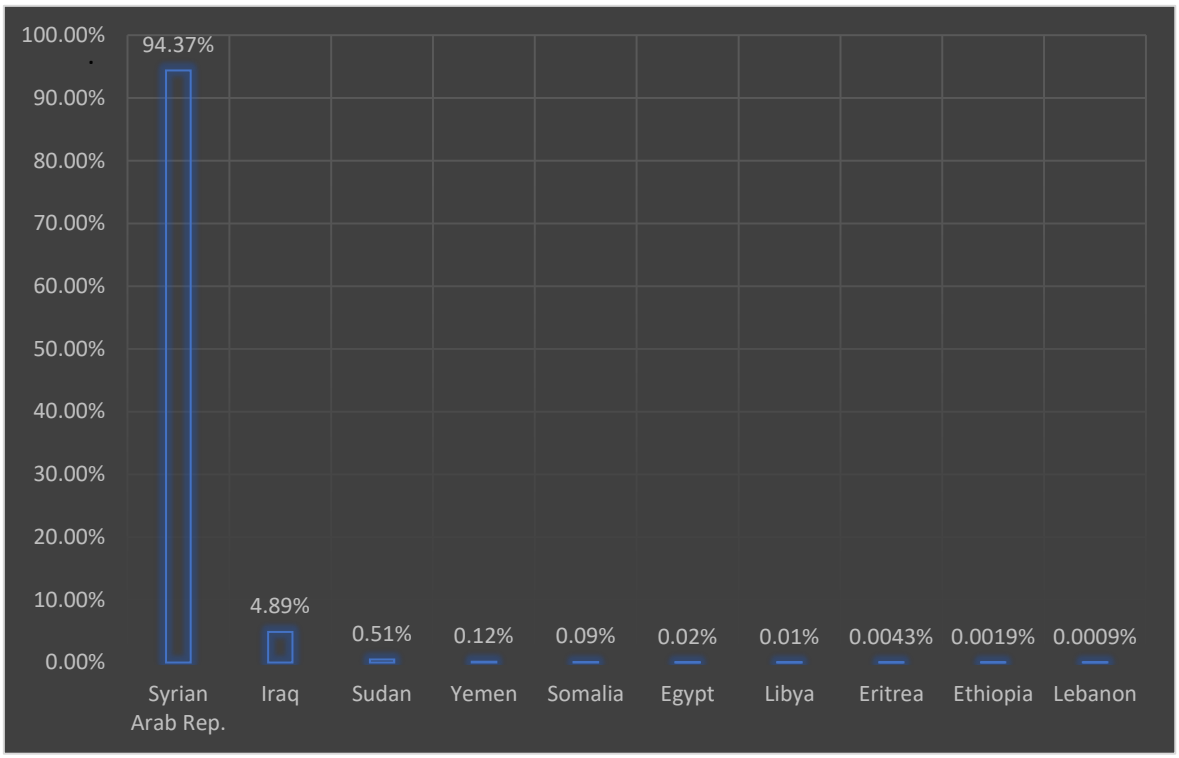


Figure 9: Percentage of refugee populations in Jordan
Source: (UNHCR, 2020)

According to authoritative reports, Jordan's recent (excluding Palestinian refugees) refugees are dispersed across the nation, with Amman accounting for 33 percent, Irbid for 24 percent, and Zarqa and Mafraq for 17 and 15 percent, respectively (The Department of Statistics in the Kingdom of Jordan, 2015).

4.4.1 Palestinian Refugees

Jordan has the largest proportion of Palestinian refugees in UNRWA's operational regions. According to the Department of Palestinian Affairs in Jordan (n.d.), the existence of many similar characteristics between Palestinians and Jordanians, as well as strong familial connections, aided their assimilation into Jordanian society. In Jordan, the total number refugees in the UNRWA operational region exceeded 2.3 million in 2020, including 17,000 Palestinian refugees from Syrian camps. Throughout all UNRWA activities, Palestinian refugees account for 39.1 percent of the total number of registered refugees (Department of Palestinian Affairs of Jordan, n.d.). The number of refugees in the 10 camps (shown in figure 10) recognized by the Agency is about 396,000, accounting for 17.4 percent of Jordan's registered refugees, whereas the amount of refugees well outside ten camps is 1.88 million, accounting for 82.6 percent of the total registered refugees. It's worth noting that Jordan has thirteen "official" Palestinian refugee camps (Chronicle Fanack, 2020b). The other three camps (Prince Hassan, Sugnah, and Madaba) were initially groupings or clusters of Palestinian refugees that were subsequently recognized as camps by the Jordanian government but remain ‘unofficial' by UNRWA (Tiltnes & Zhang, 2013). The three unofficial camps are also visible in figure 10.

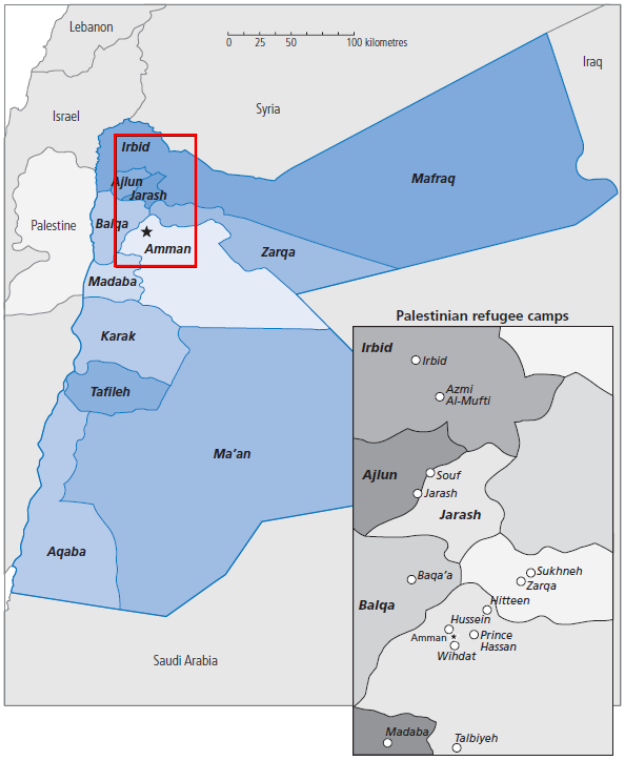


Figure 10: Palestinian refugee camps in Jordan
Source: (Tiltnes & Zhana, 2013)

The 2.2 million Palestine refugees who are registered with the UN Relief and Works Agency (UNRWA) in Jordan are fully integrated into Jordanian social and economic life. The overwhelming majority of them are Jordanians, except for about 158,000 so-called 'former Gaza' refugees, who were Palestinians who escaped from Gaza to Jordan after June 1967 hostilities and were granted Jordanian nationality. There are several legislative limitations that restrict their rights and add to their poor living circumstances. The 17,000 Palestine refugees from Syria consist mostly out of children (47 percent). However, although the vast majority of them are classified as extremely vulnerable and get help from UNRWA, many of them also find themselves in a problematic protective position, which is mostly owing to their uncertain residency status in the nation. Other vulnerable Palestine refugees in Jordan comprise those all living under the poverty line, women and children who are subjected to various forms of violence, which include gender-based violence , and disabled people who are subjected to social isolation because of their disabilities (UNRWA, 2018).

Individuals and groups who are particularly vulnerable in Jordan are targeted by a variety of protection interventions, which include increasing access to UNRWA support and services, enhancing referral pathways with external providers, improving case management processes, and tracking, reporting, and promoting with rights - holders to encourage protection of the rights of Palestine refugees of 1967. A wide variety of security threats are identified and addressed via Area Protection Working Groups, which are comprised of area staff from UNRWA programs (such as the health, education, relief, and social services) and serve as a forum to identify and address a wide spectrum of

security threats. Individual protection assistance for Palestinian refugees is given by protection professionals who are specifically trained in this area. UNRWA also carries out Gender Based Violence operations, ranging from responding to specific cases to promoting preventive efforts (UNRWA, n.d.).

Jordan is the only Arab state that has treated Palestinian refugees who have arrived on its soil as native citizens, granting them citizenship and allowing them to assimilate into the Jordanian society and influence policymaking about the country's social and economic conditions without pressuring them to abandon their national identity. Despite the fact that Jordan's constitution and laws provide full equality for any and all Jordanians and guarantee religious freedom, Jordanians of Palestinian ancestry are often discriminated against by the government. As a consequence, Jordanians from the East Bank dominate the public service, army, and security services, while Jordanians from the West Bank predominate the private sector (Chronicle Fanack, 2020b; Minority Rights Group, n.d.).

4.4.2 Syrian Refugees

Jordan is one of the nations that have been most affected by the Syrian conflict, with 89 refugees per 1,000 people, the world's second highest proportion of refugees to population. The bulk of Syrian refugees in Jordan reside in cities and are impoverished: more than 80 percent live in poverty. Children make up 51 percent of refugees, while the elderly make up 4 percent. Jordan is home to approximately 1.4 million Syrian refugees who escaped the conflict in 2011. Most of these refugees have little professional and educational possibilities attributable to statelessness, psychological distress, delayed schooling, and poverty. According to the UNHCR (2018), 85 percent of Syrian refugee children in Jordan were living in abject poverty. They also found that 94 percent from these children under the age of five lived in "multi - level" poverty, meaning they lacked access to fundamental necessities like schooling and health care (Relief Web, 2018).

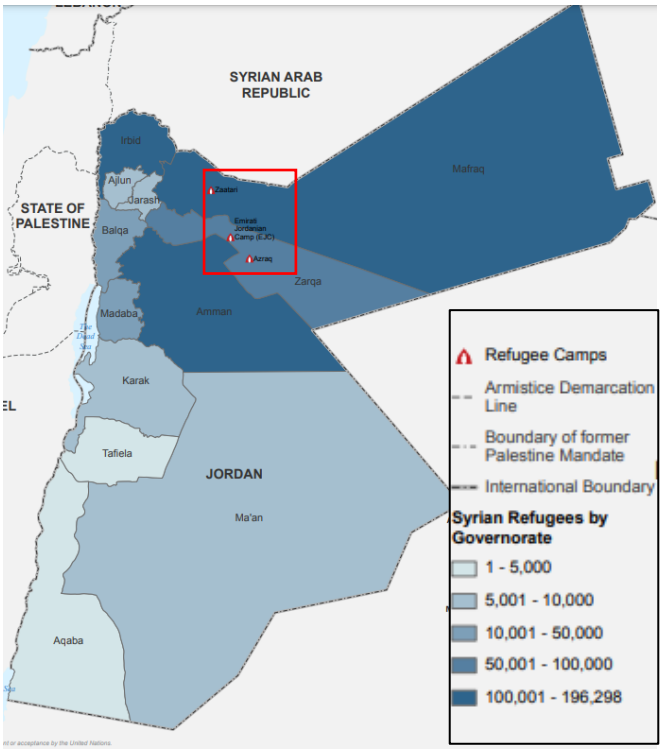


Figure 11: Syrian refugee camps in Jordan
Source: (UNHCR, 2019)

Among the Syrian refugee camps, the Za'atari camp (shown in figure 11), located near the Jordan-Syria border and outside urban areas, hosts about 78,800 Syrian refugees. Since its inception in 2012 to date, it has grown from a collection of tents to a sizable metropolis and Jordan's biggest Syrian refugee camp. The camp has a thriving market with approximately 3,000 unregistered companies (Anera, n.d.). However, since the pandemic the situation changed. The majority of Syrian households depend on humanitarian assistance to fulfil their necessities during a period of aid cutbacks and economic hardship, which has been exacerbated by the coronavirus epidemic. Vital services have been provided in refugee camps, and safety precautions have been put in place to keep people safe. However, urban refugees and local community, on the other hand, have significant difficulties in

gaining access to essential services and earning a living. As an alternative to attending school, some refugee children are put to work or married off at a very early age (European Commission, 2021).

As a response to the pandemic, the Jordanian government has implemented stringent procedures to ensure that entry to refugee camps is tightly restricted. Leave and employment permits for Syrians in camps have ceased to be issued, particularly in the wake of an increase in COVID-19 cases in Azraq and Za'atari camps. Schools and community centres have also been forced to close as a result of this. Moreover, approximately 10,000 people are trapped in the informal community of Rukban, which is in a military-controlled no-go zone on the country's northern and eastern borders. The majority of the people that live there are Syrian women and children. Since the coronavirus epidemic, stranded individuals in Jordan have no longer been able to receive critical health and feeding assistance. In order to become more self-sufficient, refugees require greater access to social services, healthcare, and economic possibilities since they have little chance of returning to Syria in the near future (European Commission, 2021). Especially Syrian refugees who lack up-to-date paperwork, are particularly susceptible to exploitation and mistreatment. The absence of legal papers restricts their free movement and hinders them from participating in the labour market or gaining access to vital services like as healthcare and education, among other things (European Commission, n.d.).

4.4.3 Iraqi Refugees

Approximately 5 percent of the refugees in Jordan are from Iraq. Hundreds of thousands of the Iraqis left their nation when the war began in 2003, taking refuge in neighbouring nations. There are approximately 2 million Iraqis divided evenly throughout Jordan and Syria, especially as these nations have been among the most liberal in permitting Iraqis to come and live in them. (Relief Web, 2007). By the end of 2011, the population of Iraqi refugees in Jordan had dropped to almost 195,000, either to repatriation to Iraq or relocation to other countries, particularly Europe. According to Chronicle Fanack (2020b), the total registered Iraqi refugees dropped to 61,000 in February 2017, but also no verified statistics on how many stayed in Jordan beyond that date is available.

5. Results

This chapter provides the results of the study. Each section of this chapter answers a sub-question. First, the relevance of the dimensions and indicators described in chapter 3.3.4 is provided to answer sub-question 1. Second, the climate actions addressing vulnerable groups in Jordan are described answering sub-question 2. Third, the climate resilience of the vulnerable groups in Jordan is assessed answering sub-question 3. Lastly, the gap between the measured resilience of vulnerable groups in Jordan and the climate actions in Jordan is discussed in 5.4 answering sub-question 4.

5.1 Indicators for Climate Resilience Assessment of Vulnerable Groups

The assessment of the climate resilience of vulnerable groups in Jordan is divided into the five dimensions as described in the framework in section 3.3.4. This means an evaluation of the institutional, physical, economic, social, and environmental dimensions as shown in figure 4. The five interconnected dimensions are the main systems addressing the capability of the vulnerable groups in Jordan to resist, absorb, and adapt to the impacts of climate change. Each dimension is broken down into a set of indicators, shown in the blue boxes of the figure.

The first, elevated dimension in the framework is the institutional dimension, specifically referring to the civic institutions in Jordan. Several researchers have highlighted the crucial role of institutions in climate change adaptation (Agrawal et al., 2008; Cuevas, 2018; Khan et al., 2020; Mubaya & Mafongoya, 2017). Mubaya (2017) defined it as the key dimension to climate change adaptation. After all, institutions play a critical role in moulding climate change mitigation and adaptation by connecting households to local resources and collective action; establishing streams of economic aid; and linking populations to national initiatives. Institutions also influence the management of ecological systems, by playing a crucial role in matching demand and supply of natural resources, providing information on the state of the environment, and facilitating the response to the changes that occur in the environmental system (Agrawal et al., 2008; Waha et al., 2017). For this reason, the institutional dimension has been elevated as a crucial factor that overshadows and impacts the other dimensions affecting the resilience of the residents of Jordan, including refugees. The corresponding indicators to assess the institutional dimension are the knowledge and awareness, commitment to climate change adaptation, and stability of the civic institutions in Jordan.

The second dimension covers the physical factors; As a sudden influx of refugees incredibly pressures host countries, they are often unable to provide refugees with safe housing and permanent infrastructure, if this is managed it is not meant to last as refugees are considered temporarily displaced. This results in camps intended as temporary status and over the years have extended into long-term settlements, testing the limits of the constructions. For this reason, the camps and infrastructure are already vulnerable. Climate change impacts only enhance the vulnerability of the physical factors, adding more pressure to the already pressured structures. Meanwhile, considering their political status refugees are often not allowed to interfere in land use and planning to enhance the quality of these structures to withstand the impacts of climate change, affecting their climate resilience. This necessitates the second dimension, physical factors and the corresponding indicator assessing the quality of the built environment in Jordan.

The third dimension covers the economic factors; A large proportion (82.6 percent of the Palestinian refugees and the bulk of Syrian refugees) of the refugees in Jordan prefer to reside in the urban regions, creating frail systems and dense populations of the socio-economically disadvantaged. These groups are the most vulnerable to climate change impacts as they are economically not vital enough to resist, absorb, and adapt to the impacts of climate change. Beside the vulnerability of refugees, the high and increasing unemployment rate among Jordanian youth reflects a lack of

economic possibilities (almost 50 percent in 2020) (World Bank, n.d.). Moreover, the decreasing agricultural production as a consequence of climate change will have a significant impact on Jordan's ability to grow economically. All of these factors affect the climate resilience of the vulnerable groups in Jordan, necessitating the need for the third dimension covering the economic factors with the corresponding indicator assessing the income and poverty of vulnerable groups.

The fourth dimension covers the social factors; A vicious cycle of poverty and bad public health may reflect a combination of economic crisis and inadequate social security systems. Food insecurity and poor health are exacerbated by the loss of livelihoods. At the same time, the population in Jordan has grown significantly as a result of the refugee influx for numerous reasons. Most of these refugees have little professional and educational possibilities attributable to statelessness, psychological distress, delayed schooling, and poverty, often resulting in the refugees feeling socially excluded. These vulnerabilities affect the resilience of the refugees making them less able to withstand the impacts of climate change. This necessitates the need for the fourth dimension covering the social factors with its corresponding indicators assessing population density and growth, and educational attainment, and health of the vulnerable groups in Jordan.

The fifth dimension covers the environmental factors. Chapter 4 addressed the vulnerability of Jordan to climate change due to aridity and water scarcity. Climate change has significant impacts on Jordan's water supply. Increasing soil erosion, floods, and siltation of rivers, dams, or basins; high salinity and year-to-year unpredictability of water supplies; and decreased streams of important rivers like the Jordan River are all additional impacts. All these dangers will have an effect on the economy, human health, water security, and food security. Whilst the Jordanian population is affected by this unanimously, refugees are as a vulnerable group more susceptible to these impacts, affecting their resilience to climate change. This necessitates the environmental dimension and its corresponding indicators assessing the vitality of water resources and consumption patterns of natural resources in Jordan.

5.2 Inclusion of Vulnerable groups in Climate Actions

5.2.1 Climate Actions of Environmental Organizations

While environmental NGOs in Jordan continue to expand in size and reach, they are trying to establish a paradigm for civil society involvement, collaborative governance, and social impact. They are exemplifying how green advocacy may lead by example and serve as an inspiration to other development leaders. These not-for-profit organizations are tasked with the responsibility of serving not just as gatekeepers and outreach arms, but also organizers of the communities and facilitators of change (EcoMena, 2019).

Eight environmental NGOs agreed to legalize their collaboration in May 2014, ushering in a new age of green social impact, policy advocacy, and good governance by forming the "Jordanian Federation for Environmental NGOs." They provide a blend of traditional roots with modern society, linked by a common set of interests, passions, and goals. The federation's internal bylaws establish the following objectives for the "Jordanian Federation for Environmental NGOs": policy and legal advocacy, public awareness and institutional strengthening, collaboration and coordination among participants and across sectors, information and data dispersal, and participant support (EcoMena, 2019).

There are currently 63 environmental NGOs registered in Jordan. The majority of these NGOs is located in Amman, however, execute activities and campaigns in the entire country (Phenix Center for Economics and Informatics Studies, n.d.).

Environmental NGOs in Jordan work on a community level, with a vision to empower the youth, enabling a sustainable generation who has knowledge and skills to sustain the existing resources in Jordan. At the same time, they attempt to facilitate and transfer technical academic and governmental knowledge to the public to enhance their resilience. Most NGOs in Jordan perform climate actions community level, believing that this scale will have rippling effects enhancing the social and economic dimensions of the society (Interview 5). Examples of these climate actions are campaigns to raise awareness on water scarcity and climate change. This is done through the provisions of sketches in refugee camps and focusing on the lack of water and increasing prices of agricultural goods due to lack of precipitation (Interview 3). Another example is the provisions of trainings, capacity building programmes, and educational activities for vulnerable communities, and executing research on climate change impacts to advocate for climate change actions for mitigation and adaptation (Interview 4, 9).

Inclusion of Vulnerable groups in Climate Actions of Environmental Organizations

Environmental organizations in Jordan working on climate change topics aim to target the vulnerable segments of the society as those are the least equipped to withstand the impacts of climate change. For an NGO vulnerability is dependent on multiple factors, and the poor are more vulnerable, regardless of whether they are refugees or not. The NGOs consider the level of social and economic development as a determinant factor on vulnerability. Moreover, the quality of their built environment and infrastructure is regarded an important determinant as well as the level of their community awareness level (Interview 3).

To build resilience of vulnerable groups, NGOs in Jordan pursue awareness raising through various activities and campaigns. The NGOs stress the importance of the citizens feeling of connectedness to the environment, which they believe will lead to respect and appreciation to the natural environment. To do this, they consider education as crucial. However, this is not solely referring to vulnerable groups in refugee camps, but also urban and rural areas in Jordan (Interview 5, 9).

Moreover, the NGOs recognize that the refugee camps are different from the city, especially with regards to the provided services, built environment, social, economic and employment opportunities. Stressing that there is a strong need for a vulnerability assessment of vulnerable groups to climate change impacts. However, admitting that this is not solely important for refugee camps but also for the three groups of rural areas, urban areas, and refugee camps, highlighting that there is different vulnerabilities and strengths of the different groups of society (Interview 3, 5, 9). Therefore, it is clear that the NGOs in Jordan are aware of the vulnerability of refugees to climate change impacts. This is evident through their actions that are targeted at and inclusive of refugee groups in Jordan.

5.2.2 Climate Actions of the Government

The Ministry of the Environment is responsible for managing the policy and legislative frameworks that govern the country's climate change mitigation and adaptation activities, as well as the preparation of the TNC to the UNFCCC and the INDC. The Ministry of Environment collaborates closely with the Ministries of Agriculture, Health, and Water and Irrigation, which is responsible for managing water resources by executing irrigation policies, allocating water, restricting water infrastructure, and creating water conservation initiatives. Jordan was the first Non-Annex I nation to issue an INC in 1997 and has participated in virtually all global treaties, partnerships, and programs associated with Climate Change as well as other UN Conventions. Jordan joined the UNFCCC in 1992, signed it in 1993, and became a non-Annex-I signatory to the Kyoto Protocol in 2003. It signed the Paris Climate Accord in April 2016 and confirmed it in November 2016, with the agreement entering into effect in December 2016 (Ministry of Foreign Affairs of the Netherlands, 2018). Jordan has developed several climate

strategies, UNFCCC statements, and action plans. The most recent and relevant ones are shown in table 4 and reviewed below.

National Climate Change Policy (2013-2030): The National Climate Change Policy (2013-2020) includes strategies and plans that are aligned with Jordan's goals and activities. Its aim is to build a climate-resilient Jordan with healthy people, water and agricultural resources, and productive ecosystems, allowing for sustainable development. It also aims to provide the Jordanian authorities broad with advice on how to achieve the country's climate change targets in terms of adaptation and reduction of GHGs (Ministry of Environment, 2013). This policy is mainly focused on the short term (2013-2020), with the following goals (Jordanian Ministry of Environment, 2013):

- Adaptation to the changing climate and the reduction of greenhouse gas emissions are the national objectives and cornerstones of the policy, with adaptation being the most important.
- The policy provides an outline of Jordan's climate change initiatives for different sectors but also describes the policy approaches that the country will take throughout the coming years, focussing on water and agriculture as “priority sectors”, which are clearly connected to Jordan's primary sustainable development challenges and pose the greatest risk of exposure.

This policy has been extended by the government of Jordan until 2030, as communicated in the INDC. This was done to allow the policy to coordinate and serve as a leading and supervisory umbrella for the execution of Greenhouse gas reduction initiatives until the year 2030 (Government of Jordan, 2015). The National Committee on Climate Change (NCCC), which comprises representatives from various ministries as well as civic, commercial, and academic partners, oversees overseeing the fulfilment of the climate policy. As the Chair and Secretariat of the NCCC, the Ministry of the Environment has a unique role to play in the climate policy (Ministry of Foreign Affairs of the Netherlands, 2018).

Third National Communication: The Jordanian TNC (2014) is based on the Climate Policy's goals and suggested measures. The TNC uses these goals and suggested measure to further develop and expand them. This publication contains predicted effects of climate change on Jordan, and also a thorough mitigation analysis as well as a detailed analysis of Greenhouse gases. Utilizing downscaling forecast methods, it concludes that Jordan is very susceptible to the effects of climate change, particularly the predicted reduction in precipitation as well as the projected rise in temperatures and dry periods. It expresses great worry for a nation that ranks among the poorest in the world in terms of water resources, and which is grappling with the enormous task of absorbing a large inflow of migrants from nearby nations. The TNC includes detailed risk analysis for key industries in Jordan, involving evaluations of four rural areas, and offers options for mitigation as well as adaptations which Jordan will undertake with assistance of the global community.

Nationally Determined Contributions Action Plan: Jordan's NDC Action Plan lays out the country's strategy for carrying out its Nationally Determined Contribution towards the Paris Agreement. Jordan declared its NDC to the UNFCCC in November 2016, with the target of lowering greenhouse gas emissions by 14 percent, with a 12.5 percent decrease dependent on monetary foreign help. Jordan entered the NDC Coalition in March 2018, becoming part of an international alliance of over 100 nations and organizations working together to achieve transformative climate action whilst promoting sustainable development. The NDC Action Plan is in accordance with existing policies and initiatives, including Jordan's National Climate Change Policy and National Green Growth Plan, and represents prioritized activities aimed at speeding up and simplifying the implementation of the NDC. The NDC Action Plan identifies key issues in mitigation, adaptation, and cross-cutting sectors, as well as goals for transitioning to a low-carbon, climate-resilient nation by expansion of renewable energy in the

energy mix and scaling up energy efficiency measures; improving climate change resilience and adaptation throughout the water and agricultural sectors; as well as inclusion of climate change in education (Government of Jordan, 2015, 2019).

National Green Growth Plan: This NGGP uses green development in Jordan mostly as practical strategy that relies on current government goals, such as Vision 2025, and shows how to achieve these in a sustainable manner. This is shown through an emphasis on moving existing interventions closer to adoption, describing "how it can be done well" rather than "what should be done." This shows itself in the use of a thorough, quantitative assessment of chosen sectoral prospects and the provision of a defined execution timetable. Green growth is being introduced. Green growth is described as Five intertwined outcomes which influence each other in positive and negative ways (Ministry of Environment, 2017). The outcomes are:

- **Sustained Economic Growth:** Sustaining economic growth demonstrates how critical it is for Jordan's economy to be strong and diversified enough to enable broad-based, people-cantered development.
- **Social Development:** Social development emphasizes progress for both the welfare of all sectors of society and enhancements of individual well-being.
- **Ecosystem Services:** Jordan Ecosystems Services emphasizes development that protects natural capital and ensures a continual supply of benefits.
- **Resilience:** Resilience emphasizes growth that enables economic, financial, social, and environmental stability to be maintained or restored in the face of shocks.
- **GHG:** Reduced and avoided greenhouse gas emissions emphasize the critical nature of sustainable, green development in contributing to global and national efforts to combat climate change.

The plan begins by defining Jordan's development trajectory, presenting the idea of green growth in the context of Jordan's current national setting, monitoring current trends, and highlighting some of the possible consequences of inactivity. Furthermore, based on analytical data, the strategy outlines sectoral green development possibilities. This is justified as a proof of concept for utilizing consistent methods in investment and policy decision-making that account for economic externalities and go further than just financial concerns. The plan also focuses on the up scaling of the green growth potential, focusing growth possibilities and highlight the key obstacles and policy drivers to achieving Jordan's Vision. The plan's last chapter discusses green growth policies and governance, as well as the financing structures that will be needed to achieve green growth (Ministry of Environment, 2017).

National Strategy and Action Plan to Combat Desertification (2015-2020): The Jordanian National Action Plan (NAP) to Combat Desertification 2015-2020 includes a vision, systematic framework monitoring program on Desertification, Land Degradation and Drought (DLDD), and Sustainable Land Management (SLM), as well as an integrated finance plan. The plan, just like the other national action plans of the government of Jordan, refers to the countries vision to achieve "productive and sustainable use and management of natural resources to promote poverty reduction, environmental sustainability, and national economy.". The plan focuses on land resource sustainability, improving peoples livelihoods, and contributing to the country's economy. Moreover, the plan includes a logical structure describing the objectives, accountable parties, and assumptions for anticipated results within each of the Strategic Goals. The plan also provides a communications and engagement strategy,

describes policy consistency in addressing DLDD problems, and introduces a DLDD platform for knowledge exchange (Ministry of Environment, 2015).

National Water Strategy (2016-2025): The National Water Strategy 2016-2025 (NWS) is a national cross-sectoral strategy that focuses on developing a resilient sector through a coordinated strategy to comprehensive social, economic, and environmental water sector development. The primary goal of this NWS is to provide sustainable water management and sanitation for all Jordanians. To accomplish the goal, the Strategy focuses on the five key areas of the national water sector (Ministry of Water & Irrigation Jordan, 2016). These areas are:

- Integrated Water Resources Management
- Water, sewage, and sanitation services
- Water for irrigation, energy, and other uses
- Institutional reform
- Sector information management and monitoring

The Strategy also quickly tackles current concerns such as adaptation to climate change, trans-boundary/shared water management, humanitarian WASH sector management, public/private collaborations, and the economic aspects of water (Ministry of Water & Irrigation Jordan, 2016).

National Climate Change Adaptation Plan: The National Adaptation Plan (NAP) supplements the Ministry of Environment's attempts to incorporate climate change into the country's development strategy framework. The NAP report was created from the TNC Report's Climate Vulnerability Assessment and incorporates the NAP Framework's core values. This plan establishes a clear aspiration for adaptation of various sectors and describes what exactly needs to be addressed in different sectors. The plan serves as a guide for institutions from various sectors, providing them with directions on implementing adaptation initiatives. Moreover, the plan also describes directions on the development of partnerships, and the nurturing of synergies with one another to promote the collective achievement of the adaptation goals. The addressed institutions in this plan are governmental institutions, academia, community-based organizations, and private sector entities (Ministry of Environment, 2021).

The plan seeks to enhance Jordan's adaptable capability by decreasing the kingdom's vulnerability by implementing comprehensive adaptation strategies that take gender into account as well as the requirements of the most vulnerable populations. This NAP was created to integrate climate change adaptation into Jordan's development planning procedures across all sectors. The process of producing the NAP document included many stages to guarantee the efficient involvement of different institutions and experts, all of which were overseen by the Ministry of Environment, which is Jordan's competent and accountable body for climate change. The National Committee on Climate Change, which has the authority to establish a platform for policy and implementation coordination for Jordan's climate measures, started the process (Ministry of Environment, 2021).

Following the Third National Communication Report, the plan details several areas, including agriculture, water, urban systems, biodiversity & ecosystems, coastal, health, and socioeconomics. Each sector's vulnerabilities are examined, and a set of adaptation strategies are given. Adaptation measures are structured via a variety of sectoral programs as well as specialized programs that linked adaptation and mitigation (Ministry of Environment, 2021).

Inclusion of Vulnerable Groups in Climate Actions of the Government

The reviewed climate actions from the government of Jordan all included some reference to vulnerable groups. However, the level and form of the inclusion of vulnerable groups differs from the one to the other. The included vulnerable groups in the reviewed documents were mainly poor segments of the population, children and youth, women, residents of rural areas, and refugees. It is notable that refugees were only exclusively mentioned as vulnerable populations in two out of the seven reviewed publications. Below a description of the inclusion of each of the vulnerable groups in the reviewed publications.

Poor segments of the population: This vulnerable group is recognized in four out of the seven reviewed publications. Firstly, the NCCP includes the poor based on their lack of recourses which withhold them from adapting to climate change as well as their low levels of education and lack of professional skills. Despite the inclusion of this group, the described measures and instruments to address 'vulnerable groups' as defined by this document seem to be lacking specific measures targeted at the poor segments of the population. Within the NDC, a brief mention of poor segments of the population is included. Although, this publication highlighted a need for Improving construction standards for newly constructed housing complexes for impoverished families to incorporate appropriate insulation to enhance their ability to deal with climate change impacts. The NGGP and NCCAP, and NWS do not specifically mention the poor segments of the population. Whereas the NSAPCD recognizes the poor segments of the population but lacks clear actions specifically targeting this group.

Children and youth: This vulnerable group is mentioned in five out of the seven reviewed publications. The NCCP, TNC, and NDC do recognize this group but lack elaboration on the specific needs or vulnerability of this group. The NGGP solely covers this group by questioning their ability of the to receive education opportunities that match to the popular skills demand in growing industries. This group is mostly represented in the NCCAP, which recognizes that children and young people make up the bulk of Jordan's population and mentions that empowering them to effectively participate in climate change activities is critical. This publication also mentions that this group is considered most susceptible to climate change, and they are an important component of the adaptation strategies (described earlier in that document) as future decision makers and critical stakeholders. This publication describes the various facets of inclusion for children and youth, the covered topics include raising awareness, capacity development and training, advocacy and community mobilization, interaction with institutions, adapting policies and strategies to children's and young people's needs and requirements, financial allocations. Lastly, this group is not specifically included in the NWS.

Residents of rural areas and women: Residents of rural areas are recognized as a vulnerable group in six out of the seven reviewed documents. Notable is that the NCCP, NDC, and NCCAP, and NSAPCD all link the vulnerability of this group with the component of gender. Highlighting that as women are responsible for the household in rural areas, impacts of climate change would be most felt by them. The NCCAP is most elaborate in addressing the specific needs and rights of this vulnerable group, justifying their focus based on the UN Women (2017) publication which mentions that women in rural regions are especially susceptible to the impacts of climate change since they are impoverished and rely on natural resources for their livelihoods. In Jordan, nearly 9.1 percent of female-headed families are food insecure, compared to 5.7 percent of male-headed households. The NCCP calls for integration of gender considerations of vulnerable groups in climate change actions throughout all sectors, as well as the creation of public practical tools and information that allows the integration of gender in the development of policies. Gender and Rural communities are most elaborately covered by the reviewed publications. For this vulnerable group the publications address both the specific needs and rights.

Refugees: Refugees are the least mentioned vulnerable group in the reviewed publications. Two out of the seven reviewed publications address the vulnerability of refugees, namely, the NGGP and the NCCP. Whereas the NGGP reviews the inclusion of refugees as a vulnerable group in the Jordan response plan for the Syria crisis using the five green growth outcomes. Moreover, the NGGP questions the process in place that ensure that vulnerable individuals are the actual beneficiaries of the various development initiatives. As for the NCCP, special attention is paid to refugees and host communities. The NCCAP mentions a set of tangible actions for greater integration of vulnerable groups into the NCCAP process in Jordan, without direct mention of one specific vulnerable group, the actions also address the specific needs and rights of refugees.

5.3 Climate Resilience Assessment

This sub-chapter provides the description of the refugee group as well as the assessment of the climate resilience of refugees in Jordan. The methodology to assess is as described in chapter 2.3. The dimensions and indicators of assessment have been stated in chapter 5.1.

5.3.1 Climate Resilience of the Institutional Dimension- Moderate Resilience

The Arab Spring, with its far-reaching implications for Middle East political stability, demonstrated that broad discontent and a lack of opportunities may result in huge waves of migrants and internally displaced people. Jordan has faced significant difficulties as a result of the admission of nearly 1.5 million Syrians since the civil conflict began, including 600,000 UN recognized refugees. The vast majority of refugees have been settling in the north of Jordan, in both urban and rural regions. The remainder are housed in refugee camps, which are often plagued by illnesses, lack of water and food, and significant levels of crime and violence. Jordan's economy, natural resources, and people's patience are all being strained by the massive inflow of migrants. Public dissatisfaction with the government is being fuelled by diminishing water, food, and energy resources (Carnegie Endowment for International Peace, 2015).

A continued and significant strain on resources might exacerbate civil instability in an already tumultuous political context that persists in parts of the region. While it is difficult to predict how society will react to such changes, catastrophic consequences can pose unprecedented challenges to the social institutions. Institutions that have previously been damaged by wars or crises are less able to adapt to climate changes and severe occurrences (Waha et al., 2017). Institutions are further strained from the high and increasing unemployment rate among Jordanian youth, which reflects a lack of economic possibilities. This is further enhanced by the COVID-19 pandemic, which worsened both existing structural vulnerabilities in the economy and unsolved social problems, placing strain on the country's vulnerable macroeconomic position, affecting all of its institutions (World Bank, n.d.).

Currently, public and governmental institutions in Jordan are elaborately working to address climate change and raise awareness about its impacts for Jordan. The institutions are involved and leading in the MENA region in terms of climate change actions. However, there is still a lack of commitment from the government in monitoring and evaluating the existing actions. This lack of monitoring is a threat to the resilience of the institutions in Jordan to withstand the impacts of climate change as monitoring is the most crucial aspect to identify weaknesses (Interview 10).

Moreover, despite the presence of an elaborate and descriptive knowledge base resulting in large quantities of governmental publications on climate change impacts in Jordan and adaptation strategies, the actual effectiveness of these policies is questionable (Interview 9, 10). Although the presence of the knowledge base does indicate that the government is aware and acknowledging climate change impacts. According to the interviewed residents of urban areas and refugee camps they are not aware of any climate actions taken by the government to address climate change, especially

ones that include vulnerable groups as defined in the various publications (Interview 1,2,3,5,6,7,9). For this reason, the institutional commitment to climate actions is more questionable.

5.3.2 Vulnerable Groups to Assess

Vulnerable populations are individuals and groups who are more likely to suffer from poor health as a consequence of obstacles to social, economic, political, and environmental resources, as well as restrictions imposed by disease or disability (NCCDH, n.d.). These people may find it difficult to exercise their human rights, such as access to healthcare and social services. They live in inequitable settings wherein they are unable to prosper, feel secure, or engage fully unjust society (United Nations Development Programme, n.d.). According to all 10 interviews, refugees are amongst the most vulnerable groups adversely affected by the changing climate in Jordan. The NCCAP and NGGP also paid special attention to the enhanced vulnerability of refugees in Jordan (Ministry of Environment, 2021).

The segment of refugees as a vulnerable group is divided into two groups. Refugees residing in refugee camps and refugees that reside in the urban area of Jordan. Another distinction is between the old Palestinian and new Syrian refugee camps as the provision of services differs from one to the other considering that the mandate of these camps belongs to two different bodies (UNRWA: Palestinian; UNHCR: Syrian). Another important distinction is the so called 'official' and 'unofficial' camps. Three Palestinian camps (Prince Hassan, Sugnah, and Madaba) were initially groupings or clusters of Palestinian refugees that were subsequently recognized as camps by the Jordanian government, but remained 'unofficial' by UNRWA (Tiltnes & Zhang, 2013). The three unofficial camps are also visible in figure 10. The chapter first analyses the resilience of the general dimensions for both the Palestinian and Syrian refugees. Lastly, the institutional dimension is analysed for both.

5.3.3 Resilience of Palestinian Refugees

Only 17 percent of Palestinian refugees in Jordan resides in the refugee camps or rural areas, whereas the remaining 83 percent live in urban areas. There are 13 Palestinian refugee camps in Jordan, 3 out of which are unofficial camps. Most of these camps are marked by poor living circumstances, as well as health, social, and environmental issues that are connected with them (Alnsour & Meaton, n.d.). The assessment will be done for the residents of the refugee camps, as those are considered the most vulnerable to climate change impacts.

5.3.3.1 Physical Dimension- Moderate Resilience

The physical dimension is assessed based on the quality of the built environment of the refugee camps. The built environment in refugee camps in Jordan largely contributes to the vulnerability of refugees to climate change impacts. The camps have unfinished, small houses, and they are densely populated. Moreover, the camps often lack the proper infrastructure to allow for basic provisions. For example, in case of multiple story buildings the water cannot reach the upper floors due to lack of proper infrastructure. The camps also often lack proper roads making them only accessible through one or two main roads, although, the Palestinian camps are located inside or on the near outskirts of the urban areas (Interview 1,2,5,6).

The physical environment from one refugee camp to the other also tends to be different. The refugee camps that are considered official have better maintained infrastructure, allowing them to better withstand climate change impacts. According to the interviewed refugees residing in the unofficial camp of Madaba and the official camp of Al Baq'a, both camps are much more developed these days than before, the main driver for this is believed to be the youth who have worked hard to modernize the shops and the houses as they feel a sense of belonging to the camp (Interview 1,2, 5).

Alnsour and Meaton (n.d.) have researched the housing conditions of the Palestinian refugee camps in Jordan, examining a variety of physical factors that pertain to the appropriateness of a residential structure for human occupancy. They examined ventilation gaps, the quantity of natural light, humidity, and the overall look of the building. According to their research, there is a large variation in these conditions based on the size of households, the sex, age, occupation, education and income level. According to their quantitative assessment (of the largest camp housing 28 percent of the total Palestinian refugees residing in refugee camps), most of the houses were considered poor quality in terms of their appearance, also concluding that the inadequate materials were used for building the houses. This may be problematic for healthy habitation and the long-term usage of a structure, but it can also be problematic in terms of power consumption. Because of the building materials used and the lack of thermal insulating elements, the homes are warm and humid in the summer and chilly in the winter. Due to the absence of tiled floors, which would be beneficial all year, this is compounded even more. Therefore, throughout the winter and summer months, homes needed more energy to maintain their different temperatures (heating and air conditioning).

Most exterior concrete walls were discovered to be eroded and cracked, according to the study. In many homes, the mortar is often of poor quality or there was just insufficient quantity to guarantee a long-lasting effect. Moreover, it was discovered there are no appropriate rainwater treatment systems on rooftops. Due to a lack of maintenance, old drainpipes were usually in poor condition. Many of the homes seemed to have leaking roofs due to the lack of water-resistant materials utilized in their construction. Numerous walls and windows were also found to have been pierced by rain (Alnsour & Meaton, n.d.). Moreover, the drainage systems in the camps have shown several signs of none-performance over the past years. In 2015 three lives had been lost due to the incapability of the drainage system of Al Hussein refugee camp in Amman, with an additional 698 people trapped in water and 305 vehicles stuck in flooded roads (Flood List, 2015).

5.3.3.2 Economic Dimension- Low Resilience

The economic dimension considers the viability of the residents of the Palestinian refugee camps in Jordan. This dimension contains one indicators, income and poverty. There is significant differences when it comes to economic equality within the Palestinian refugee community. There are significant improvements which have occurred over the past decade in a wide range of socio-economic variables, including school enrollment, educational achievement, medical insurance, and congested living circumstances, among others. And yet many challenges still remain: it was the camps which originally accommodated most impoverished and susceptible refugees in Jordan, although, there is a stark discrepancy in socio-economic development between camp and urban populations, and also between the different camps (Interview 3, 10). People who live in camps have substantially lower income, bigger families, worse accommodation, lower academic achievement, perceived poorer health, as well as a greater dependence on UNRWA or other relief agencies than people who do not live in camps. It is not the only area in which there is inequity among the Palestinian refugee community. Whilst the vast majority of Palestinian refugees in Jordan have obtained Jordanian citizenship, the considerable number who do not (most of whom are from Gaza) face even more difficult living circumstances, often living on less than 1 EUR a day. Those non-citizens are much more likely to live in poverty, but they are also over 3 times more likely to be one of the very lowest and most impoverished (Tiltnes & Zhang, 2013).

Based on the interviews with the citizens of refugee camps (Interview 1,2,6,5), their main concern is the unemployment. They believe this is the reason for their vulnerability to any impacts that might arise from the changing climate as they do not possess the funds to protect themselves from any adverse climate impacts. The residents are unable to work and generate income, which has significant

impact on their lives from different angles. This issue is especially pressing amongst the youth, especially those who have fought to attain a higher education. Often, families sacrifice large proportions of their income to educate their children, hoping that they would be able to enjoy a more comfortable life, but afterwards they are unable to find a job. Leaving the families without their savings, often in debt, and destressed (Interview 1,2,3,6).

5.3.3.3 Social Dimension- Moderate Resilience

The third social dimension covers the social factors of the vulnerable groups in Jordan. This dimension contains the following indicators: population density and growth, education attainment, and health

From a regional perspective, over the last century, the MENA region has had the fastest population expansion of any area on the planet (PRB, n.d.). Given the region's anticipated population growth, which is expected to quadruple by 2070, increased food and water consumption might pose significant challenges. As a consequence, the region's already high reliance on imports might rise, exposing it to agrarian repercussions beyond the boundaries of the region. A persistent and significant strain on resources might exacerbate civil instability in an already tumultuous political context that persists in parts of the region. While it is difficult to predict how society will react to such changes, catastrophic consequences can pose unprecedented challenges to the social institutions.(Waha et al., 2017).

Food insecurity and poor health are exacerbated by the loss of livelihoods. At the same time, the population in Jordan has grown significantly as a result of the refugee influx for numerous reasons. Most of these refugees have little professional and educational possibilities attributable to statelessness, psychological distress, delayed schooling, and poverty, often resulting in the refugees feeling socially excluded. These vulnerabilities affect the resilience of the refugees making them less able to withstand the impacts of climate change (Interview 10).

Former Gazans are an especially vulnerable segment of the refugee camp citizens. The underlying reasons for their susceptibility are their limitations to make a livelihood and attain access to education. In terms of development, arguably the biggest leaps were made in education, with the highest percentages of students finishing all levels of schooling ever, this is a promising achievement of the efforts of UNRWA's Education Programme from over past 60 years. This progress is particularly noticeable amongst female students, whom, as a group, nowadays are surpassing their male counterparts throughout all levels of achievement. Education has been proven to be critical in overcoming poverty, with a significant positive connection established between the amount of educational achievement and income. The gap between camp and urban Palestinian refugees has not only been maintained but seems to have started to increase again and in recent years, even as the new generation of Palestinian refugees is increasingly pursuing higher education. When comparing males under the age of 35 who have finished post-secondary education outside of camps to those who have done post-secondary education within camps, it is more than twice as many. This, along with the favorable associations between higher education and income, as well as with self-perceived good health, and male employment shown in these surveys, highlights the need for ongoing efforts to increase access to education among camp refugees (Tiltnes & Zhang, 2013).

Despite the fact that government hospitals are the primary providers of care to Palestinian refugees in Jordan, the UNRWA continues to be a valuable resource for the impoverished, especially in the camps. Over 70 percent of camp inhabitants and nearly 20 percent of the urban population make use of UNRWA's mother-child care program, whereas 40 percent of the camp inhabitants and just 12 percent of the urban population rely on UNRWA's healthcare services. As is the case with UNRWA's Education program, it is the camp population, as well as the impoverished and underinsured segments

of the refugee population, that remain dependent on UNRWA Health Clinics, demonstrating the significant influence that wealth and insurance coverage have on the choice of medical provider for refugees. Although total coverage of health insurance has risen both outside and within camps over the previous decade, health care coverage among former Gazans and other undocumented refugees continues to be alarmingly low, as has been the case for the last few years (Tiltnes & Zhang, 2013).

5.3.3.4 Environmental Dimension- Low Resilience

The environmental dimension assesses Jordan's vitality of its water resources and the consumption patterns of water in the Palestinian refugee camps. Data for both indicators was not available, however, this section still elaborates on the vulnerability of the water dimension and its effect on the refugee camps. Jordan is already among the driest countries on the planet, making it more vulnerable to the impacts of climate change that affect its water resources (IUCN, n.d.).

Water supplies were already stressed as a result of the inflow of Palestinian refugees. Palestinians living urban and rural areas, as well as the refugee camps, need a household water supply. The camps get their water from municipal systems and freshly dug wells that are controlled by the local government. Supplementary water supplies are distributed by truck and obtained from private wells in certain camps. The supply of well water in some camps is restricted by decreasing groundwater levels and deteriorating water quality as untreated effluent from the camps seeps into the surrounding aquifers. Groundwater contamination is still a concern despite the fact that the Jordanian government has taken adequate measures by building wastewater collecting networks and treatment facilities at the camps (Fanack Water, 2014).

Based on the interviews with residents of refugee camps the main concern is the decreasing supply of water. Households are often without water due to either untimely delivery or polluted aquifers. This forces them to purchase water with their already limited resources. Females tend to experience this strain more elaborately as they are responsible for the cooking, cleaning and caring within a household (Interview 1, 2, 5). The changing climate, rising population, and already inherent vulnerability of the water sources in Jordan this vulnerability is only expected to increase (Interview 3, 9). The climate impacts on the water resources also tends to result in tension in households, affecting the overall atmosphere in the camps in times of drought (Interview 1,2,6).

5.3.4 Resilience of Syrian Refugees

This sub-section assesses the climate resilience of the Syrian refugees in Jordan who reside in the three major refugee camps.

5.3.4.1 Physical Dimension- Low Resilience

According to the Jordanian Ministry of Planning and International Cooperation (2019), the vast majority of Syrian refugees are housed in decent facilities. Living in prefabricated buildings occasionally expanded by tents is the standard within the camps. Flats are far more prevalent outside of the camps than traditional homes, perhaps because flats are more easily accessible in metropolitan locations. In the capitol, up to 96 percent of Syrian refugees reside in flats, opposed to just 45percent in Mafraq, which is mostly rural. In Mafraq, makeshift or temporary housing most commonly tents and sometimes huts is prevalent, with more than one out of every ten families reporting it. Some Syrian refugees living in these makeshift tent communities have been shown to be especially susceptible in the labour market, experiencing food security levels that are lower than those of other refugees. Syrians' homes in Mafraq are typically smaller than those in other parts of the country outside of camps. In the other four non-camp reporting domains, approximately one-third of the families live in homes with just one or two rooms.

Approximately 88 percent of families in Mafraq have a separate kitchen, while 95 to 97 percent of homes outside the camps have one. Moreover, Syrians in Mafraq are more likely to have makeshift toilets outside their homes and to share the toilet with other families. This disparity is explained in part mostly by large number of Syrian refugees residing in Mafraq who live in tents and other temporary buildings. Many of the houses and flats occupied by Syrians in Mafraq, however, appear to be of poor quality. Inside the camps, 82 percent say they have their own kitchen, while almost 40 percent say their toilets are outside their home and shared with other (Ministry of Planning and International Cooperation Jordan, 2019).

Moreover, a large number of refugees continue to reside in refugee camps, wherein trailers are the most common type of accommodation, or in tented communities outside the camps, especially in Mafraq. While the camps provide for the most necessities, living in the camps is a long cry of what Syrians are accustomed to back home, regardless of whether they live in cities or in rural areas. Housing and living circumstances are equally poor and precarious for many individuals living outside of the camps as they remain renters not in possession on their own home (Ministry of Planning and International Cooperation Jordan, 2019) (Interview, 10). All of these factors make the Syrian refugees more susceptible to climate change impacts.

5.3.4.2 Socio-Economic Dimension- Low Resilience

The bulk of Syrian refugees in Jordan reside in cities and are impoverished: more than 80 percent live in poverty. Children make up 51 percent of refugees, while the elderly make up 4 percent. Jordan is home to approximately 1.4 million Syrian refugees who escaped the conflict in 2011. Most of these refugees have little professional and educational possibilities attributable to statelessness, psychological distress, delayed schooling, and poverty. According to the UNHCR (2018), 85 percent of Syrian refugee children in Jordan were living in abject poverty. They also found that 94 percent from these children under the age of five lived in "multi - level" poverty, meaning they lacked access to fundamental necessities like schooling and health care (Relief Web, 2018).

Among the Syrian refugee camps, the Za'atari camp (shown in figure 11), located near the Jordan-Syria border and outside urban areas, hosts about 78,800 Syrian refugees. Since its inception in 2012 to date, it has grown from a collection of tents to a sizable metropolis and Jordan's biggest Syrian refugee camp. The camp has a thriving market with approximately 3,000 unregistered companies (Anera, n.d.). However, since the pandemic the situation changed. The majority of Syrian households depend on humanitarian assistance to fulfil their necessities during a period of aid cutbacks and economic hardship, which has been exacerbated by the coronavirus epidemic. Vital services have been provided in refugee camps, and safety precautions have been put in place to keep people safe. However, urban refugees and local community, on the other hand, have significant difficulties in gaining access to essential services and earning a living. As an alternative to attending school, some refugee children are put to work or married off at a very early age (European Commission, 2021).

As a response to the pandemic, the Jordanian government has implemented stringent procedures to ensure that entry to refugee camps is tightly restricted. Leave and employment permits for Syrians in camps have ceased to be issued, particularly in the wake of an increase in COVID-19 cases in Azraq and Za'atari camps. Schools and community centres have also been forced to close as a result of this. Moreover, approximately 10,000 people are trapped in the informal community of Rukban, which is located in a military-controlled no-go zone on the country's northern and eastern borders. The majority of the people that live there are Syrian women and children. Since the coronavirus epidemic, stranded individuals in Jordan have no longer been able to receive critical health and feeding assistance. In order to become more self-sufficient, refugees require greater access to social services, healthcare, and economic possibilities since they have little chance of returning to Syria in the near

future (European Commission, 2021). Especially Syrian refugees who lack up-to-date paperwork, are particularly susceptible to exploitation and mistreatment. The absence of legal papers restricts their free movement and hinders them from participating in the labour market or gaining access to vital services like as healthcare and education, among other things (European Commission, n.d.).

5.3.4.3 Environmental Dimension- Low Resilience

Almost all Syrian refugee families depend on pipeline water or water purchased from tanker trucks (which is particularly prevalent in Mafraq), while a small percentage rely on more improvised water sources. While some Syrian refugee families drink from this primary supply of water, over half of Syrian refugee households obtain daily drinking water from a separate source, mainly filtered water purchased in big containers, although others also drink from smaller bottles (Ministry of Planning and International Cooperation Jordan, 2019).

Syrian refugees are used to different climatic conditions than Jordan, which is why they have different consumption patterns from the Jordanian/ Palestinian portion of the population. According to a water governance expert (2021), the Syrian refugees in Jordan have been found to consume larger quantities of water than the average Jordanian citizen. Along with their lack of awareness on climate change and its implications for Jordan's already vulnerable water sources they have become even more vulnerable to climate change impacts such as drought (Interview 10).

5.4 Gap Analysis: Climate Actions versus Climate Resilience of Vulnerable Groups

Section 5.3 has elaborated on the climate resilience of Syrian and Palestinian refugees in Jordan. As it already is, both populations live in poor housing conditions, are mostly living in poverty and suffer from lack of access to sufficient water resources, food and health care. Especially the Syrian refugees consist for a large segment out of more vulnerable sub segments such as women and children. Moreover, Jordan already lacks natural resources and now with the immense population growth the hardships are greatly enhanced. This growing population also has growing demands of an ecosystem unable of meet those needs. Experts believe this problem in Jordan might lead to political instability, enhanced by climate change, questioning what would happen to the country's stability if the drought conditions get any worse than they already are (Interview 3, 10).

At the same time, the country is suffering from high unemployment rates and increased dissatisfaction of the local community. Whilst Jordan addresses all these challenges in its recent climate actions, the most vulnerable segment of its population, refugees, is not widely included. Two (National Green Growth Plan; National Climate Change Adaptation Plan) out of the seven reviewed climate change publications addressed refugees as a vulnerable group, whilst one highlighted the role of refugees in the increasing water scarcity in Jordan (National Water Strategy). The NCCAP is the most elaborate inclusion of refugees as a vulnerable group, highlighting their specific needs along with the impacts of their influx on hosting communities.

Experts reason that there is not an exclusive mention of refugees, because a large proportion of the refugees is considered part of the local community. This is especially referring to the Palestinian segment of the refugees, which according to the interviewed population also consider themselves as much Jordanian as they are Palestinian. Interviewed locals confirm this view of the Palestinian refugees, confirming that they are as much Jordanian as any local Jordanian (Interview 1,2,3,4,6,7,8,10). Desk research findings, elaborate that even though Jordan's constitution and laws provide full equality for any and all Jordanians and guarantee religious freedom, Jordanians of Palestinian ancestry are often discriminated against by the government. Claiming that as a consequence Jordanians from the East Bank dominate the public service, army, and security services, while Jordanians from the West Bank predominate the private sector (Chronicle Fanack, 2020b;

Minority Rights Group, n.d.), the refugees and locals confirm that this has changed in recent years with increasing numbers of Jordanians of Palestinian decent representing in the parliament and other public services (Interview 1,3, 4, 10).

Notable from the climate actions in Jordan is that the actions by the NGOs are more clearly described in terms of actual actions rather than mere plans and policy recommendations. The climate actions addressing refugees by the government (as shown by the review of national documents) are more general, the focus in these publications is mostly on the gender imbalance and vulnerability of women in rural areas as a result of climate change. This is notable because refugees comprise a large proportion of the population but are not elaborately included in the publications. A more pressing issue faced by refugees, is the challenge of unemployment. Although this is affecting locals as well, Syrian refugees who reside well outside of the urban area are more affected and therefore vulnerable because of this as they are unable to generate income.

Moreover, the declining health of the refugees is not discussed as elaborately as it is experienced by the refugees. Refugees are more likely to suffer from poor health as a consequence of obstacles to social, economic, political, and environmental resources, as well as restrictions imposed by disease or disability (NCCDH, n.d.). These people may find it difficult to exercise their human rights, such as access to healthcare and social services. They live in inequitable settings wherein they are unable to prosper, feel secure, or engage in society (United Nations Development Programme, n.d.). With the recent pandemic the health of refugees is greatly affected, especially due to the high density of the population in refugee camps. Despite this increasing vulnerability, there is little mention of the health of refugees in the governmental publications. Although, speaking to the refugees there has been some actions (opening of healthcare centres in camps) by international organizations to alleviate the lack of healthcare provisions in camps since the recent pandemic (Interview 1,2,6).

Jordan's climate actions, particularly those related to energy and water, have thus far been modest in scope and implementation. A main factor for this is because the majority of policymakers do not regard climate change as a high priority issue (in comparison to, say, unemployment), partly owing to a lack of knowledge of its consequences, costs, and rewards of action (Interview 3,5,9,10) . Another factor is that governance on the subject is distorted, with plans and organizations which lack consistency, robustness, linkages, and a shared vision. Climate change action on a broad scale is also poorly financed, yet adaptation requires significant investments, such as in increasingly efficient water and energy infrastructure. Furthermore, implementing approved rules in particular areas would require substantial adjustments in the people's behavior, yet this might jeopardize the livelihoods of large segments of the community. Moreover, the rapid population expansion, coupled with internal movement to urban centers and a significant refugee population, has intensified competition for lands and critical commodities and services, leaving tough policy options. As a result, the government prefers strategies and regulations that enhance the supply of limited resources above those that reduce demand. Jordan is still heavily reliant on regional and international trades, particularly for water, food, but also energy. There has been minimal regional policymaking and climate change collaboration with neighboring countries. In the region, Jordan still has attempted to work with Israel and Syria on water issues, but both nations have broken agreements and misused water to Jordan's disadvantage. Jordan is trying to diversify its fossil fuel suppliers while also boosting local renewable energy generation (specifically solar and wind energy). It has achieved considerable success in this area as a result of good policies, but this is still a long way from substantial independence, and questions remain regarding the rate of change that its policies will allow (Combaz, 2019).

Furthermore, the climate publications have several limits. For starters, the policy writings tend to use more descriptive rather than analytical perspectives, and the political economy analyses that

emerge are generally less critical and broad in scope than those found in academic literature. Moreover, the policy literature seems to be mainly financed by different Western or multinational assistance donors, increasing the possibility that certain problems or regions may be covered excessively or insufficiently, or affected by the donor organizations views. Second, the publications have a limited number of authors, limiting the variety of viewpoints. Only a few academic scholars are involved for example. Third, there are substantial sociological deficits in institutionalizing emphasis on inequality patterns in the literature. Though the publications may not do so systematically, but they often discuss socioeconomic class, nationality, and ethnicity in connection to migrants. On the other hand, they elaborately mention gender imbalances. Despite this, it often simplifies gender to 'girls and women,' but even then, the policies and elements of political economy it examines are uneven (e.g., there is little on unpaid care work and participation in the paid workforce). Furthermore, it mostly ignores age (particularly children and senior age), disability, and non-refugee movement, such as labor migration. It also fails to examine how different vulnerability aspects interact with one another in a systematic way. Especially in the case of refugees, where vulnerability is multifaceted.

6. Conclusions and Recommendations

6.1 Conclusions

This research was conducted to assess the climate resilience of refugees in Jordan using appropriate and case specific climate resilience indicators. The dimensions in the assessment included institutional, physical, economic, social and environmental juxtaposing both dimensions of climate resilience and climate vulnerability. These dimensions were qualitatively assessed using a set of indicators that are case specific. This section draws conclusions through answering the four sub-questions based on the research results.

SQ1: Which indicators are appropriate to assess urban climate resilience within the context of Jordan?

There are numerous scientific and grey publications on assessment of climate resilience comprising both qualitative and quantitative methods. However, there is no clear-cut indicator set to measure the resilience of refugees in Jordan. This multidimensional and complex case is difficult to measure due to two reasons: firstly, refugees area already extremely vulnerable to numerous risks such as violence, abuse, victimization and exploitation, beside climate. Therefore, making it challenging to measure vulnerability and resilience separately from other risks. Secondly, research into specific climate change vulnerability and resilience is important and largely lacking in Jordan, especially as climate change impacts are intertwined with other well-known risks refugees must face, and are often not well equipped for, having little resources and no bargaining power. Nonetheless, to allow for assessment of the resilience of refugees in Jordan a framework has been created based on the climate vulnerability and resilience index. Each dimension has been equipped with case specific indicators which allow for assessment. The framework comprises the following dimensions and indicators.

The institutional dimension assessing the awareness and knowledge of institutions of and about climate change, the commitment of the institutions to climate change adaptation, as well as the general stability of the institutions. These indicators measure the viability of the agency in Jordan, after all, a lacking institution creates vulnerability to all kind of risks and makes it unlikely that resilience is pushed.

The physical dimension assesses the quality of the built environment as an indicator. This indicator is included as the quality of the built environment affects the refugee's exposure to climate change impacts, such as heatwaves and sudden and heavy precipitation.

The economic dimension assesses income and poverty, which both are closely related to how well-equipped refugees are to withstand adverse effects resulting from climate change impacts such as increasing water and food prices.

The social dimension assesses population density and growth, education attainment and health. The population density and grow affect the demand for the scarce natural resources such as water, educational attainment is linked to significantly higher Human Development Index scores, indicating that more educated individuals are more robust to the harmful effects of climate change. Lastly, the health of refugees dictates their ability to withstand the discomfort that may arise from climate change impacts.

The environmental dimension assesses the vitality of water resources and the consumption patterns of natural resources, these indicate the supply-demand relationship of the most threatened and scarce natural resource in Jordan, water. Vulnerability of this dimension increases the vulnerability of the residents of Jordan to climate change impacts, especially affecting refugees.

These dimensions and indicators allowed for a qualitative resilience assessment. The indicators and dimensions are situation specific, dependent on availability of data, type of vulnerable group and geographic location.

SQ2: How do current climate actions in Jordan address the climate resilience of vulnerable groups, particularly refugees?

Jordan has prepared elaborate climate actions addressing climate change. The reviewed climate actions from the government of Jordan all included some reference to vulnerable groups. However, the level and form of the inclusion of vulnerable groups differs from the one to the other. The included vulnerable groups in the reviewed documents were mainly poor segments of the population, children and youth, women, residents of rural areas, and refugees.

It is notable that refugees were only exclusively mentioned as vulnerable populations in two out of the seven reviewed publications. Making them the least mentioned vulnerable group in the reviewed publications. The two reviewed publications addressing refugees as a vulnerable group are the NGGP and the NCCAP. However, the NGGP reviews the inclusion of refugees as a vulnerable group in the Jordan response plan for the Syria crisis using the five green growth outcomes. Moreover, the NGGP questions the process in place that ensures that vulnerable individuals are the actual beneficiaries of the various development initiatives. As for the NCCAP, special attention is paid to refugees and host communities. The NCCAP mentions a set of tangible actions for greater integration of vulnerable groups into the NCCAP process in Jordan, without direct mention of one specific vulnerable group, the actions also address the specific needs and rights of refugees. Moreover, the NGOs recognize that the refugee camps are different from the city, especially with regards to the provided services, built environment, social, economic and employment opportunities. Stressing that there is a strong need for a vulnerability assessment of vulnerable groups to climate change impacts. However, admitting that this is not solely important for refugee camps but also for the three groups of rural areas, urban areas, and refugee camps, highlighting that there is different vulnerabilities and strengths of the different groups of society (Interview 3, 5, 9). Therefore, the NGOs in Jordan are aware of the vulnerability of refugees to climate change impacts. This is evident through their actions that are targeted at and inclusive of refugee groups in Jordan.

SQ3: What is the level of the climate resilience of vulnerable groups in Jordan, with a focus on refugees?

The vulnerable refugee group in this sub-question has been divided in Syrian and Palestinian refugees. As it already is, both populations live in poor housing conditions, are mostly living in poverty and suffer from lack of access to sufficient water resources, food and health care. Especially the Syrian refugees consist for a large segment out of more vulnerable sub segments such as women and children. Moreover, Jordan already lacks natural resources and now with the immense population growth the hardships are greatly enhanced. This growing population also has growing demands of an ecosystem unable of meet those needs. Experts believe this problem in Jordan might lead to political instability, enhanced by climate change, questioning what would happen to the country's stability if the drought conditions got any worse than they already are (Interview 3, 10).

At the same time, the country is suffering from high unemployment rates and increased dissatisfaction of the local community. Whilst Jordan addresses all these challenges in its recent climate actions, the most vulnerable segment of its population, refugees, is not widely included. Two (National Green Growth Plan; National Climate Change Adaptation Plan) out of the seven reviewed climate change publications addressed the specific needs of refugees as a vulnerable group, whilst one highlighted the role of refugees in the increasing water scarcity in Jordan (National Water Strategy).

The NCCAP is the most elaborate inclusion of refugees as a vulnerable group, highlighting their specific need along with the impacts of their influx on hosting communities.

All of this has demonstrated that in the light of the current situation in the Palestinian and Syrian refugee camps, they are unable to withstand additional external shocks that may result from climate change impacts. Palestinian refugees have a low resilience for the economic and environmental dimensions but a moderate resilience for the social and physical dimension. This has been the result of two factors. The Syrian refugees have a low resilience across all dimensions. Altogether, this means that both refugee groups do not have a high climate resilience however, the Syrian refugees are much less resilient to climate change than the Palestinian ones.

SQ 4: What is the gap between existing climate actions and the climate resilience of vulnerable groups in Jordan, with a focus on refugees?

Notable from the climate actions in Jordan is that the actions by the NGOs are more clearly described in terms of actual actions rather than mere plans and policy recommendations. The climate actions addressing refugees by the government (as shown by the review of national documents) are more general, the focus in these publications is mostly on the gender imbalance and vulnerability of women in rural areas as a result of climate change. This is notable because refugees comprise a large proportion of the population but are not elaborately included in the publications. More pressing issues, faced by refugees, is the challenge of unemployment. Although this is affecting locals as well, Syrian refugees who reside well outside of the urban area are more affected and therefore vulnerable to this.

Experts reason that there is not an exclusive mention of refugees, because a large proportion of the refugees is considered part of the local community. This is especially referring to the Palestinian segment of the refugees, which according to the interviewed population also consider themselves as much Jordanian as they are Palestinian. Interviewed locals confirm this view of the Palestinian refugees, confirming that they are as much Jordanian as any local Jordanian (Interview 1,2,3,4,6,7,8,10). Moreover, despite the inclusion of refugees in some of the climate actions in Jordan, specific vulnerabilities and adaptative strategies to those are not included or defined in terms of action. Climate actions tend to be more general in nature mostly driven by international donor organizations, elaborating the impacts of climate change rather than climate actions towards an enhanced resilience of vulnerable groups in Jordan. This is especially notable as both refugee groups have been assessed as not climate resilient. Therefore, there still is a large gap between the existing climate actions and the climate resilience of vulnerable groups in Jordan, especially reefing to refugees. There is still a large gap between the assessed climate resilience of refugees and the awareness of the institutions about the specific vulnerabilities of the specific refugee groups with its corresponding actions to remedy those vulnerabilities.

Moreover, the declining health of the refugees is not discussed as elaborately as it is experienced by the refugees. Refugees are more likely to suffer from poor health as a consequence of obstacles to social, economic, political, and environmental resources, as well as restrictions imposed by disease or disability (NCCDH, n.d.). With the recent pandemic the health of refugees is greatly affected, especially due to the high density of the population in refugee camps. Despite this increasing vulnerability, there is little mention of the health of refugees in the governmental publications. Although, speaking to the refugees there has been some actions (opening of healthcare centres in camps) by international

organizations to alleviate the lack of healthcare provisions in camps since the recent pandemic (Interview 1,2,6).

Main RQ:

"How can the climate resilience of refugees be enhanced in the context of Jordan?"

This study has shown the dependency of the climate resilience of refugees on the many other extreme facets that refugees are exposed to, such as violence, abuse, victimization and exploitation. This only highlights the complexity of the case of refugees in a climate change context. However, the impacts of climate change are so intrusive that they are expected to further enhance the vulnerabilities of refugees, even exposing them to new vulnerabilities related to the changing climate. Therefore, research into specific climate change vulnerability and resilience of refugees is important and largely lacking. After all, the climate change impacts are intertwined with other well-known risks refugees already must face and are often not well equipped for.

To enhance the climate resilience of refugees in the context of Jordan it is crucial to first gain clarity on their vulnerability to climate change impacts. This requires investments in elaborate research mapping the current conditions of the different refugee streams. This thesis focused on the two largest groups of refugees, however, there are several others as shown in the empirical background. After mapping the current conditions, research into their vulnerability to climate change impacts can be studied in a more comprehensive manner. Following this, there is a clear need for an action plan that is followed up, reviewed, and enhanced regularly. In doing this, it is crucial to include a wide range of stakeholders, including refugees, to ensure a representative plan. Lastly, this research concludes that there is a clear lack in the awareness of the refugees on climate change and climate change impacts. Therefore, education and awareness raising amongst this vulnerable group on this matter allows them to become better equipped to withstand the adverse effect of climate change, resulting in a more climate resilient population.

Reflection Validity

The aim of this thesis was to assess the climate resilience of vulnerable groups in Jordan with a focus on refugees. Intending to shed light on the pressing challenges refugees are facing as a result of climate change, in addition to their existing exposure to several other harms and challenges. In order to collect valid data for this thesis, several and diverse sources of data were utilized. Therefore, cross verification was utilized to examine the same topic. This resulted in the triangulation of sources to prevent a one-sided perspective about any aspect.

The sample for the interviews was selected based on purposive sampling. Reflecting on this, it has provided the research with rich data from the different segments of the climate change stakeholders in Jordan, allowing for representation of the different vulnerable group segments. However, the population segment is quite small (10 interviews) which might have affected the representativeness of the group of refugees. It is notable that during the interviews it became clear that refugees are not a homogenous group. It is a group in which one person holds multiple identities. This resulted in a reflection on the original intention to hold semi-structured interviews, it became evident that it is necessary to shift the interviews towards a unstructured/ open interview design. This allowed for elaborate conversations on the relevant topics since it enabled the interviewer to dig for a deeper understanding, ask for clarification, and allow the interviewee to influence the course of the interview based on their various identities.

6.2 Recommendations

Based on the assessment of the dimensions and elaborate discussion of the climate actions in Jordan, this chapter provides the recommendations for responsible authorities to enhance climate resilience of refugees. The recommendations can also be relevant to other countries addressing the climate resilience of refugees.

- Including refugees as a vulnerable group in climate actions is crucial. Refugees are not born weak, and they do not intrinsically lack resilience or agency. Rather, numerous and overlapping kinds of discrimination, injustice, and economic and institutional dynamics lead to reduced and uneven levels of authority and enjoyment of rights, making more vulnerable to any threats such as climate change.
- Mapping the current conditions of refugees is essential for addressing their vulnerabilities. There is very little recent data on the recent conditions of refugees, this is especially for the Palestinian refugees which makes it more challenging to address the vulnerability and resilience in a more specific manner.
- To effectively address climate change impacts on vulnerable populations in Jordan, create an institutional framework which incorporates the private sector, NGOs, and civil society in addition to conventional government authorities. Decentralize decision-making, increased budget allocation, stakeholder participation, and improved coordination. These steps are all required and highly encouraged.
- Monitor the effectiveness and progress on ongoing climate plans addressing vulnerable groups. Despite the presence of elaborate plans, little progress updates on the publications is available.
- Help refugees to identify their power dimensions. To do this, create new opportunities for refugees to participate in reliable, applicable modules. Another point is to educate them, invest in them and include them across the decision-making process.
- Raise awareness on climate change and its impacts amongst the population of Jordan. Climate change awareness has shown to be crucial in the process of developing climate change resilience, since it promotes collaboration and behaviour change.

6.3 Reflection and Directions Further Research

Climate resilience of refugees is an emerging and still very little studied issue. During this research it became evident that the climate resilience of refugees is not simply enhanced or exactly measured through the efforts of one thesis. There is still a pressing need for more research into this subject and its complexity only highlights the need for the spotlights its necessities. When designing a similar assessment, consider that the target group of this research should not be seen as a homogenous single group but as people with multiple identities and roles. Moreover, during this research the definition of the term refugee would often be discussed, with politically displaced people often not willing to be referred to as refugees, this would be interesting to include in further research. Lastly, the climate resilience of the refugees was assessed with the available data showing a clear lack of data, in the future, this research could be approached differently using more recent data when it is available to produce sound and reliable findings. Moreover, from the interviews and literature study it is evident that the economic dimension and unemployment are beside climate vulnerability a very pressing issue, this would be another interesting direction for further research.

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Appendix 1: Interview Guide

Prior to the interview:

- Introduce myself and explain my role
- Tell them what the goal of my research is
- Provide Arabic information letter and consent form and explain them
- Describe how what I am doing might affect them
- Explain that the interview might take up to an hour
- Let them know if I would like them to prepare for the interview
- Tell them how they were selected.
- Share any information they need and ask for any information I need to be able to conduct the interview, such as Skype, Teams, or Zoom

During the interview:

1. Introduce myself and explain my role
2. Tell them what the goal of my research is

Questions for representatives from the government of Jordan

General questions:

1. **What is your role?**
2. **Which stakeholder group are you part of? (Refugee, local, refugee urban citizen, refugee camp citizen, expert, Governmental representative, expert, other…)**

Questions:

1. **What is your opinion on climate change?**
2. **What do you think are the possible impacts of climate change in Jordan?**
3. **Could you describe the role of your organization in climate change adaptation or mitigation?**
4. **Could you describe the impacts of climate change in Jordan?**
5. **What is your opinion about the effects of CC impacts on refugees?"**
6. **What do you think about the actions the government is taking to address climate change in Jordan?**
    a. **Can you describe in what ways these actions address climate change …?**
    b. **What is your opinion about the effectiveness of the actions… ?**
7. **Which of the following dimensions are targeted by these actions: social, economic, environmental, institutional, and physical *Briefly describe dimensions* ? Could you please elaborate?**
    a. **Could you describe how vulnerable groups, particularly refugees, are addressed in this action?**
        i. **How do you compare climate actions targeted at refugee camps and the urban area?**
        ii. **Could you describe which refugee camps are included?**
    b. **I saw that there is a regional climate policy, are you familiar with a similar plan for refugee camps?**

Optional questions, in case not obtained through desk research:

1. **Can you provide me with data on the population of the refugee camps?**
2. **Can you provide me with data on the natural resources supplying the refugee camps?**

Questions for international/donor organizations and local NGOs

Questions:

1. **What is your opinion on climate change?**
2. **What do you think about the possible impacts of climate change?**
3. **Could you describe how you are noticing the impacts of climate change in Jordan?**
4. **what is your opinion about the effects of climate change on refugees?"**
5. **Is your organization involved in any climate actions?**
    a. **If so, how, and which dimensions are addressed (social, economic, environmental, institutions, infrastructure, and community)?**
    b. **In which areas?**
6. **What is your opinion on the actions taken by the government (in any of these fields: social, economic, environmental, institutions, infrastructure, and resources) *Describe dimensions briefly* to address climate change in Jordan?**
    a. **Can you describe in what ways these actions address climate change …?**
    b. **What is your opinion about the effectiveness of the actions… ?**
    c. **Could you describe how vulnerable groups, particularly refugees, are addressed in this?**
        i. **What is your opinion on how they are addressed in this?**
        ii. **What do you think about the inclusion of refugee camps in this?**
        iii. **Could you describe which camps are included in this?**
    d. **I saw that there is a regional climate policy, are you familiar with a similar plan for refugee camps?**

Optional questions, in case not obtained through desk research:

1. **Can you provide me with data on the population of the refugee camps?**
2. **Can you provide me with data on the natural resources supplying the refugee camps?**

Questions for Stakeholders of refugee camps in Jordan

1. **Which refugee camp are you from?**
2. **Do you live in the camp?**
    a. **If yes, how is the access to resources (WASH services, food, energy, healthcare, education, housing and economic resources) in the camp?**
    b. **Do you think this has changed over the years?**
    c. **What do you think is the reason for this?**
3. **What is your opinion on climate change?**
4. **What do you think about the possible impacts of climate change?**
5. **Could you describe how you notice the impacts of climate change in Jordan?**
6. **Could you describe how the refugee camp is affected by these impacts?**
    a. **Which dimensions have been impacted the most in your opinion (social, economic, environmental, institutions, infrastructure, and community)?**
    b. **Could you describe how have they been impacted?**
7. **How do you compare the impacts on the refugee camp and the city?**
    a. **What is your opinion on the impacts?**
    b. **Could you describe what you think is the reason for this?**
    c. **What about other refugee camps in Jordan?**
8. **Could you describe how you are involved in any climate actions?**
    a. **If so, how, and in which dimension (social, economic, environmental, institutions, infrastructure, and resources)?**
    b. **Where in Jordan are you doing this?**
9. **What is your opinion on the actions taken by the government (in any of these fields: social, economic, environmental, institutions, infrastructure, and resources) *Describe dimensions briefly* to address climate change in Jordan?**

a. **Can you describe in what ways these actions address climate change …?**
b. **What is your opinion about the effectiveness of the actions… ?**
c. **Could you describe how vulnerable groups, particularly refugees, are addressed in this?**
    i. **What is your opinion on how they are addressed in this?**
    ii. **What do you think about the inclusion of refugee camps in this?**
    iii. **Could you describe which camps are included in this?**

10. **Could you describe how you think that the government could address the climate change impacts that you are experiencing in the camp?**
    a. **What are in your opinion the barriers for this?**

Appendix 2: Informed Consent Form

Please tick the appropriate boxes	**Yes**	**No**
Taking part in the study		
I have read and understood the study information, or it has been read to me. I have been able to ask questions about the study and my questions have been answered to my satisfaction.	□	□
• I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason.	□	□
• I understand that taking part in the study involves a video-recorded interview which will be transcribed and confirmed with me and destroyed after the duration of the research.	□	□
Use of the information in the study		
• I understand that information I provide will be used for the assessment of refugee's climate resilience in Jordan in the form of a publicized report.	□	□
• I understand that personal information collected about me that can identify me, such as my name or where I live, will not be shared beyond the study team.	□	□
• I agree that my information can be quoted in research outputs	□	□
Consent to be Audio/video Recorded		
• I agree to be audio/video recorded	□	□

Signatures

_____	_____	_____
Name of participant	Signature	Date

I have accurately read out the information sheet to the potential participant and, to the best of my ability, ensured that the participant understands to what they are freely consenting.

_____	_____	_____
Researcher name [printed]	Signature	Date

Student contact details for further information: Hanadi Al-Baz h.al-baz@student.utwente.nl

Contact Information for Questions about Your Rights as a Research Participant

If you have questions about your rights as a research participant, or wish to obtain information, ask questions, or discuss any concerns about this study with someone other than the researcher(s), please contact the Secretary of the Ethics Committee of the Faculty of Behavioural, Management and Social Sciences at the University of Twente by ethicscommittee-bms@utwente.nl