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CLIMATE CHANGE AND THE ARAB UPRISINGS

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Climate Change and The Arab Uprisings

İklim Değişikliği ve Arab İsyanları

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ACRONYMS

AHDR	:	Arab Human Development Report
AMWC	:	Arab Strategy for Water Security in the Arab Region to Meet the Challenge
EJF	:	The Environmental Justice Foundation
FAO	:	Food and Agriculture Organization of the United Nations
GPC	:	Gafsa Phosphate Company
ICARDA	:	The International Center for Agricultural Research in the Dry Areas
IFPRI	:	International Food Policy Research Institute
ISIS	:	Islamic State of Iraq and Syria
LCIPP	:	Local Communities and Indigenous Peoples Platform
M7YAP	:	Muslim Seven Year Action Plan
MENA	:	Middle East and North Africa
NATO	:	North Atlantic Treaty Organization
NTC	:	National Transitional Council
OCHA	:	United Nations Office for the Coordination of Humanitarian affairs
OECD	:	Organization for Economic Co-operation and Development
SIDA	:	The Swedish International Development Cooperation Agency
UNDP	:	United Nations Development Programme
UNEP	:	United Nations Environment Programme
UNEP	:	United Nations Environment Programme
UNFCC	:	United Nations Framework on Climate Change
UNICEF	:	United Nations International Children's Emergency Fund
UNISDR	:	United Nations Office for Disaster Risk Reduction
UN	:	United Nations
USAID	:	United States Agency for International Development
WFP	:	World Food Programme
WHO	:	World Health Organization

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ABSTRACT

The Arab uprising is generally perceived as the revolutionary movements against authoritarian regimes in the Arab region. Therefore, the triggering factors to the social unrests have been determined in the political-economical, and sociological aspects of society. This thesis aims to provide a link between climate change and social unrest in the Arab world. The research mainly focuses on the Arab uprisings in Tunisia, Egypt, Yemen, Syria, and Libya and addresses the underlying factors to the outbreak of social protests. Therefore, it involves an analysis of the general impacts of climate change across the world together with international and regional cooperation. As a consequence of the study, the main purpose is to provide a comprehensive approach to climate change and conflict interaction. In this regard, the paper reveals the interaction between environmental and socio-political factors for further understanding of how mass protests have begun in the Arab region and what was the underlying reasons. The case studies show that political and sociological discontent could turn into mass protests when exacerbating factors appear in society. In the end, it is vital to say that the study does not claim that climate change could lead to social unrest; rather it claims that climate change exacerbates current political and economic conditions that could translate into mass social protests.

ÖZET

Arap isyanları genelde Arap bölgesindeki otoriter rejimlere karşı başlatılan devrimsel hareketler olarak algılandı. Bu nedenle, sosyal çatışmalara neden olan faktörler ekonomik, politik ve toplumun sosyal yapısında arandı. Bu tezin amacı küresel ısınma ve toplumsal huzursuzluklar arasındaki ilişkiyi sunmaktır. Araştırma temelde Tunus, Yemen, Mısır, Suriye ve Libya'daki Arap çatışmalarına odaklanmış ve sosyal protestoların başlamasına neden olan temel faktörlerden söz etmektedir. Dolayısıyla, araştırma küresel ısınmanın dünya üzerindeki genel etkilerinden ve uluslararası ve bölgesel iş birliğinden söz eder. Çalışmanın asıl amacı küresel ısınma ve çatışma ilişkisine kapsamlı bir yaklaşım sunmaktır. Bu bağlamda, bu çalışma Arap bölgesinde isyanların nasıl başladığına ve görünmeyen nedenleri küresel ısınma ve çatışmaların etkileşimi bağlamında inceler. Ülke incelemelerinde, politik ve sosyal memnuniyetsizliklerin ancak kışkırtıcı sebeplerin toplum içinde görünür olmasıyla ayaklanmaların ortaya çıkabileceğini göstermiştir. Sonuç olarak, çalışmanın küresel ısınmanın kendi başına sosyal ayaklanmaya sebep olamayacağını aksine küresel ısınmanın mevcut politik ve ekonomik şartlar ile birlikte protestolara neden olan faktörlerden biri olabileceğini savunur.

INTRODUCTION

Climate change has been defined as average changes in precipitation and temperature which cause extreme weather events such as floods, storms, droughts, and a rise in sea levels. To exemplify the notion of climate change, recent news about the changes in the temperatures can be observed; the highest heatwave was recorded in 2010, the same year was also recorded as the wettest year since 1900 that had caused floods in many areas across the world.[1] As can be seen from the example above, the unpredictable consequences of weather changes have been defined as the new 'security threat' to states and nations among scholars. There have been precious academic researches that demonstrate the link between climate change and its impacts on human security. The recent conflict issues specifically in the Arab region have shown that climate change has triggered some factors of conflict and violence. As US secretary of defense James Mattis said upon a question that had asked by a member of the Senate Armed Services Committee that:

"I agree that the effects of a changing climate such as increased maritime access to the Arctic, rising sea levels, desertification, among others – impact our security situation. I will ensure that the department continues to be prepared to conduct operations today and, in the future, and that we are prepared to address the effects of a changing climate on our threat assessments, resources, and readiness."[2]

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1 Jay Gulledge, Daniel G. Huber, December 2011, Extreme Weather& Climate Change Understanding the Link and Managing the Risk, p.1-2

2 Andrew Revkin, Trump's Secretary of Defense says climate change is real, and a national security threat15 Mar 2017, https://www.businessinsider.com/james-mattis-climate-change-national-security-2017-3

In other words, climate change acts as a "threat multiplier"[3] as amplifying instability in the countries that are facing the severe impacts of climate change.

It is predicted that in near future, the competition over natural resources will amplify as a result of the rise in the sea-level and severe changes in weather patterns, which will be also the main reason for conflict in locations that are already politically and economically unstable.

It is so obvious that MENA is one of the most vulnerable regions to climate change. In conjunction with the social insecurities and inequalities, researches and reports indicate clear evidence that climate change may have not been a direct reason for Arab uprisings, rather it may be one of the driving factors in the region especially for the economic sector that mainly drives people into poverty and inequality. The world bank report describes the impact of climate change upon social riots as stating:

"Climate change puts additional stress on people and the economy. Climate variability and change can lead to, and add to, disruptions to social, infrastructural, environmental, or productive systems and resources, which in turn can slow economic growth and increase poverty. Regions that rely heavily on climate-sensitive sectors, such as agriculture, fisheries, and tourism, and have high poverty rates, lower levels of human capital, or less institutional, economic, technical, or financial capacity will be the most vulnerable."[4]

This study aims to analyze the relationship between climate change and the Arab uprisings by taking account of the fact that climate change has played a triggering role over the social tensions in the MENA region. In this regard, in the first chapter, I have addressed the definition of climate change and its possible impacts on the world regardless of narrowing the scope down to a region or country. The common consequences of climate change such as drought, floods, heatwaves and

[3] Outrider post, https://outrider.org/climate-change/articles/climate-change-national-security-threat/

[4] Verner, Dorte, Tunisia in a changing climate, 2013, the World bank study, Washington, p: 8-9

wildfires, desertification and salinization; and lastly, massive livestock mortality have been addressed. Therefore, it would be crucial to define the types of droughts and floods since droughts and floods have become one of the main mass migration reasons for affected countries that the economic sector mostly depends on agriculture and livestock as in the case of Syria where the most severe drought was observed in 2010 in Syria, which forced local communities to migrate urban centers.

Along with drought, heatwaves could be said to be one of the most devastating impacts of climate change since peaks in temperature even for a short term or a few hours, could cause a dramatic decrease in the yield production as it was seen in 2010 when heatwaves hit Russia's agricultural lands and caused a decrease of 20 percent of crop yield, which was resulted leaping in global wheat prices.[5] "Heat stress"[6] events are expected to be more frequent in the future.

In the second part of the first chapter, I have tried to provide a proper definition of the securitization of climate change while debating the topic in the context of environmental and water security. Climate change has become one of a new phenomenon in the academic and political world since it has been displayed on the scene with its damaging effects on living areas. Since security has been debated in the academic areas, and securitization of nations has become the main purpose of governments, the consequences of climate change have become one of the causes of threat on the security of states; as James Mattis added that "*climate change is a direct threat to the national security of the United States."*[7] However, the recent conflicts in the MENA region have shown that climate change is not a national threat for only a part of the world rather it is a global threat for the security of all states. As a result of the climate insecurity, economic loss and costs

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5 Edmar I. Teixeira; Guenther Fischer; Harrij van Velthuizen; Christof Walter; Frank Ewert, Global hot-spots of heat stress on agricultural crops due to climate change, Agricultural and Forest Meteorology, 2013, 1-2

6 Teixera, p.1-2

7 Andrew Revkin, Trump's Secretary of Defense says climate change is real, and a national security threat15 Mar 2017, https://www.businessinsider.com/james-mattis-climate-change-national-security-2017-3

would be more devastating for the countries that have an unstable economy. As the MENA region is economically dependent and inflation is unstable in the countries of the region, the consequences of climate change would be more devastating. As it is obvious that social unrests derive from the poor economic conditions, weak political policies on the society and the economy, we may easily assume that climate change could be one of the reasons for commencing to social conflict in the near future, especially when we look at the background of those social unrests.

In terms of environmental and water securitization, it is well known that drinkable water resources flourish through annual rainfalls and rivers. However, an increase in temperature causes high evaporation on lands, and a decrease in precipitation rate results in a significant decrease in groundwater and river water levels. Apart from aquifers, MENA's freshwater resources mainly provided by the Euphrates and the Tigris, the Jordan River, and the Nile Basin rivers that are being fed by rainfall and snow melting. Therefore, it has become essential to mention water security and securitization in this chapter since many countries are sharing and debating on the water of rivers.

In the second chapter, human insecurity that derives from climate change consequences will be discussed. Human security has become the main topic of international security since the end of the Cold War. In 1994, the UNDP published the 'Human Development Report' and defined human securitization in separate aspects; economy, food, health, community, and political security that have also been addressed in the chapter. Also, food security has been discussed in the context of importing grain and legume, crop failure, and food price rises in the second part of the chapter.

The annual average temperature is significant in terms of crop yield increase and decrease. In that regard, climate stability has been playing a key role in overproduction and food security. Besides, the impact of climate variability over yield production, groundwater resources, and developing technology are also

pivotal for agricultural production. The countries that have an inefficient agricultural system for yield production and agriculture sector depending on pattern variabilities are economically vulnerable to changes in global food prices. For instance, the first food riot occurred in France, which is known as the French revolution, due to increased food prices and poor economic conditions of the public. In the chapter, the place of food insecurity in the climate threat loop is debated for further understanding of the connection between climate and conflict.

The fact remains that the unemployment rate, poverty, and migration are the other affected factors from climate variabilities. Especially farmers are the biggest workgroup that suffers from the consequences of climate change since their unstable income has an effect not only on living expenses but also on their ability to adapt to the results of climate change. As explained in the chapter, poverty is one of the 'push factors'[8] of migration along with conflict, drought, and famine. Considering the MENA region that has already had a high rate of the unemployment rate, food insecurity and poverty can cause mass migration and social unrest. For instance, once the farmers lose their livelihoods and lands, migration may become the only choice for these people. In other words, once climate change unites with poverty and migration as well as political and economic instability, the occurrence of social protests can be said to be inevitable. Therefore, food security plays a key role in the prevention of the occurrence of conflict.

The importance of international cooperation to cope with the outcomes of climate change have become vital in the last century once the severe impacts of the temperature changes on human and natural life were observed. In the case of an environmental annihilation, there would not be a chance to sustain life on the planet. Thus, the states have a big role in taking measurements related to climate mitigation and adaptation. The third chapter has been divided into two categories: international initiatives and ad hoc organizations. Briefly, the procedure of organizations has been analyzed to see their environmental mitigation and

[8] http://eschooltoday.com/human-migration/the-pull-and-push-factors-of-migration.html

adaptation process within the frame of the state's collaboration. Ad hoc organizations are mainly framed in a regional manner which means since this paper focuses on the MENA region, the environmental organizations in the MENA region have been analyzed.

In the last chapter, the study discusses the relationship between Arab uprisings and climate change on a case basis. At that point, it is important to bear in mind that climate change has played an indirect role in the recent social unrests rather than directly affecting the economy and social security. The first conflict was ignited in Tunisia, in 2010, after which the wave of uprisings against dictatorial regimes begun throughout the MENA region. In a broader context, all factors having been discussed in the previous chapters have been analyzed by considering the question of whether climate change causes social protests or not.

As the evidence shows that economically and politically poor and weak countries will most likely experience some social unrests caused by the devastative impacts of weather changes. Thus, the countries taken into account in this study have poor and weak economies and have an authoritarian regime. The chapters have been embodied in the following questions; "How climate change can play a role in social unrest?", " What can be the driving factors of the occurrence of conflict?", "What was the main demand during Arab uprisings?", " What were the current policies of governments against drought, food insecurity, and poverty?", and lastly "How the state's environmental policies could be a driving factor of conflict?"

Hence, the theoretical framework of how climate change could contribute to social unrest in the MENA region is embedded in the approach of "invisible factors led to violence and conflict"[9] offered by Buhaug, Theisen, and Gleditsch.

[9] Halvard Buhaug, Nils Petter Gleditsch and Ole Magnus Theisen, "Implications of Climate Change for Armed Conflict," in *Social Dimensions of Climate Change: Equity and Vulnerability in a Warming World*, ed. Robin Mearns and Andrew Norton (Washington DC, The World Bank: 2010), 21.

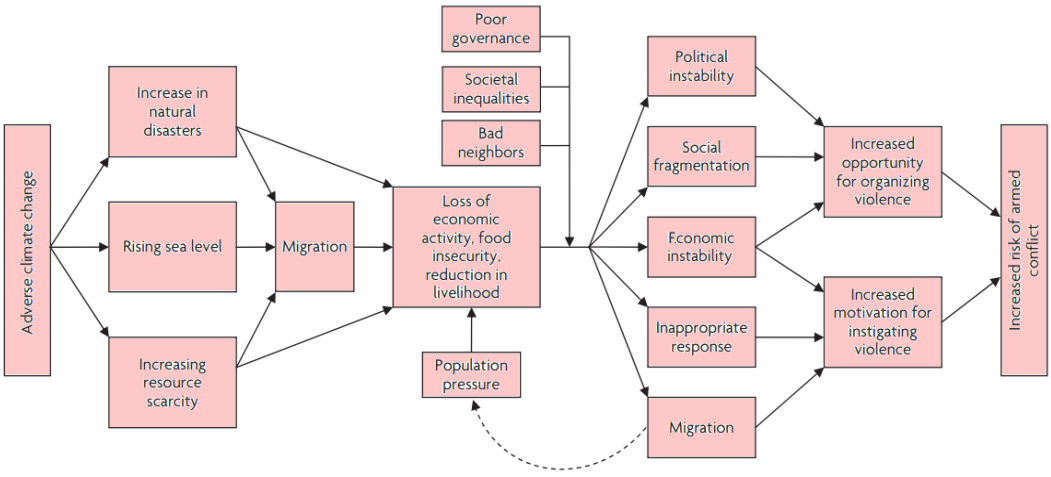

Figure 1: Possible Pathways from Conflict to climate change

Source: Buhaug, Gleditsch and Theisen, 2010, 21.

The framework of figure 1 shows that there are several causes of conflict in which the root of social unrest can arise from the interaction between the consequences of climate change and socio-political indicators. As seen on the framework, although the impacts of climate change led to macro changes in society, macro factors could cause further political and economic instabilities, thereby increase the possibility of conflict.[10]

A policy conceptual conflict has been addressed within the environmental view as conflict could come out of the changes in the political economy of energy resources that have been designed to reduce emission and, the conflict could be stimulated by changes in climate that are the main driver of social changes.[11] This paper tries to offer a new view of the link between climate change, human insecurity, and conflict together with the role of state actions to cope with climate change.

Although there is no evidence and empirical research that proves the correlation between climate changes and violence, researches show that there is a clear link

[10] Ibid. (Staff, 2017) (Buhaug, et al., 2010)
[11] Climate change, human security and violent conflict, Jon Barnett, W. Neil Adger, Political Geography 26 (2007) 639-655

between poverty and conflict. This link has been defined as 'stylized fact'[12] which means 'poverty breeds conflict and violence'[13] and the second frame has clearly suggested that human insecurity is the triggering factor on violence and conflict. It argues that human security could be materialized by having a decent income, food security, healthy environmental conditions which decrease poverty in households. Therefore, in the absence of clear evidence related to conflict driven by climate change, it would be acceptable to say that there is an indirect correlation between these factors. Hence, the paper focuses on this indirect connection on a case basis.

Research on the connection between climate change and conflict has been conducted through a qualitative case study that enables analysis of news, articles, and reports. In that regard, reports of UN, UNFCC, The World Bank, The Arab Development Report, AMWC, ICARDA, IFPRI, OCHA, OECD, UNEP, UNISDR, USAID, FAO have been analyzed in terms of seeing the impact of climate change over the population, region's weather conditions, food security, health, and agriculture sector. The secondary sources involve articles directly pointing out the interaction of climate change and violent conflicts in the region. These articles have enabled me to find visible and clear evidence of the damaging causes of climate change over the region. It has also become crucial to check the news for international cooperation measurements and to see the public demand during the uprisings. Additionally, video sources have been found to provide visual sources.

Lastly, it is important to mention the time frame of the study, especially for the last chapter. The last chapter is mainly framed before the Arab uprisings that exploded on 17 December 2010. On the other hand, it is essential to analyze bread riots before the uprisings that occurred in the mid-1970 and onwards.

[12] Ibid.
[13] Ibid.

1. CHAPTER 1: THE CLIMATE CHANGE AND SECURITY CONCERNS

Introductory Remarks

1.1. THE MATTER OF CLIMATE CHANGE

Since the destructive effects of climate change have been being seen on the earth, people and policymakers have initiated some campaigns for new regulations in order to prevent further damages. In this regard, a proper definition regarding the matter of climate change has become vital in the area of academia. In this chapter, the definition and the consequences of climate change have been explored by focusing on current climate events. In the second part of this chapter, the securitization of climate change has been debated in the sense of international security. Thus, a new securitization phenomenon has occurred in the academic area which essentially contains environmental, water, and economic securitization.

It is important to distinguish the definitions of weather and climate for a better understanding of the chapter. Typically, "*climate is what you expect; the weather is what you get."* In the definition of weather, it generally refers to the meteorological conditions of a certain period or place. However, climate covers an extended period with a series of weather. The Oxford Dictionary defines climate change as *"the changes in the earth's weather, including changes in temperature, wind patterns and rainfall, especially the increaser in the temperature of the earth's atmosphere that is caused by the increase of particular gases especially carbon dioxide*" (Oxford, n.d.)

Soil erosion, which is mainly caused by the increase in the amount of wind and water, reduces soil moisture and thus, triggers global warming. Drought, which ca the main consequence of climate change, is expected to be more extensive,

intense, and longer in the future. Recently, the news has been exclaiming the danger of the melting icebergs. (Gordon, 2017) According to a UN report, the overall reduction in precipitation is up to 40 percent and the reduction in wet days will be observed mostly across North Africa. The report also claims that the annual temperature in East Africa is predicted to exceed 2 degrees and for the Arab region this rate would be 2-5 Celsius degrees between 2011-2014. (UNDP, 2018) According to The World Bank Natural Hotspots Study, 43 percent of Somalia's land area is under the risk of flooding and droughts, which also proves that almost 54 percent of the population is highly under the risk of extreme weather and natural risks. Similarly, 29 percent of the population of Sudan and 32 percent of the population of Djibouti is at risk. (UNDP, 2018)

As a result, underestimating the existence of climatic problems make it impossible to correctly address the issue at hand. Climate change matters, particularly for environmental and life sustainability. Reports have been warning politicians, academicians, and the public in order to motivate them for proper measurements to prevent disasters happen. It is obvious that climate change will have a detrimental impact on food production and the global food supply system; and thus, damages to this system would make our life more complex and chaotic.

Therefore, other unpredictable effects of climate change on life sustainability make the title vital and more sensitive among academics and politicians. Particularly, heatwaves, droughts, and sea level rises are likely to force people to migrate and cause hunger and poverty. The matter of climate change could be seen in many dimensions of weather patterns which will be discussed in the subtitles.

1.1.1. Droughts and Flooding

Drought is one of the extreme climate events characterized by the reduction of precipitation rate in a certain period. It is generally associated with other climatic events such as low humidity, high temperature, and high wind. Drought occurs in most parts of the world regardless of humidity or wet conditions since the rate of

precipitation in a period is the main determinant factor of drought. In other words, the precipitation rate in months to years shows us the tendency of the area to drought. Undoubtedly, arid areas are more prone to drought since these areas more dependent on rainfall. (Dai, 2010)

There are three types of drought: meteorological drought, agricultural drought, hydrologic drought. Meteorological drought is related to a prolonged period of a dry session with a below-normal average of precipitation. Agricultural drought is seen when there is insufficient moisture in the surface for crop and range production and this condition arises together with soil erosion and misuse of agricultural techniques. Hydrological drought occurs when the water reservoirs such as lakes, aquifers fall below the statistical average. (Erian, et al., 2010)

Floods are amplified by both human and weather-related indicators; weather-related factors are generally known heavy and prolonged precipitation, thunderstorms, hurricanes, ice or debris jams on the other side, human-induced flooding occurs mainly due to the failures of dams and levees, altered drainage, land-cover alterations such as pavement construction. The main types of flooding are flash flooding, urban flooding, river flooding, and coastal flooding. (NCA, n.d.)

Flash flooding generally occurs during intense precipitation in a short duration. Dam or levee failure along with the collapse of debris and ice jams can also cause flooding. Urban flooding can be caused by very intense precipitation in a short time, mainly as a result of the decreased capacity of storm drain caused by urbanization; roads, buildings, pavements. River flooding occurs when the channel capacity decreases, especially when *"surface water drained from a watershed into a stream or a river"*. Precipitation, soil moisture, and snowmelt can cause river flooding. Coastal flooding is caused by storms, hurricanes that push large seawater into shores. Storm-related flooding can cause massive deaths and migration. Climate change is the main factor of floods since it affects sea

level rise, storm surge, and increasingly intense and prolonged rainfall during storms. (NCA, n.d.)

1.1.2. Heatwaves and Wildfires

As many of the researches are focusing on extreme heatwaves and spreading wildfires around the world, people have become more aware of the connection between extreme heatwaves and spreading wildfires and global warming. It is well explained in the reports that extreme heatwaves occur more often, and statistical data points to the increase in the degree of heat in hot days.

A heatwave is a period of hot weather that the temperatures are higher than historical averages. In the last two summers, Europe, the United States, and the MENA region faced the highest temperatures recorded in the last 500 years. The main factor in heat stress has been seen in climate change. Heavy rain, cloudy weather across Europe and the US are more likely to occur as a result of increasing carbon dioxide in the atmosphere. (Harvey, 2019) Extreme heat stress poses a devastative threat to the ecosystem and humans. Statistics reveal that in 2018, from spring to summer, about %22 habitant place and agricultural lands experienced hot temperature stress and this heat stress occurred concurrently in North America, Europe, and Asia. Recent heatwaves, particularly in Russia in 2010 and India in 2015, resulted in thousands of deaths, major crop failures, economic loss, and massive wildfires. It is claimed that the present climate warming is around +1 ◦C and it is the main devastating effect of human-induced climate change. (Adger & Pulhin, 2014)

The factors that create suitable conditions for wildfires are high temperatures, strong winds, dry weather conditions causing dry vegetation. As the temperature increases, it is likely to see wildfires more frequently. Research generally highlights the connection between climate change and wildfires over the mass wildfires in California. The reasons why California has been liable to wildfires are being a big wooded country, having experienced a heat rise of 1.80◦C since 1896, and naturally, having a dry soil during warm seasons. The two most destructive

wildfires were seen in California in 2017 and 2018, causing many deaths and economic loss. Researches showed clear evidence that human-induced climate change has caused more evaporation and therefore made the soil drier. It is also expected that this data will have been doubled by 2060 unless any measurements have been taken. (Evans, 2019)

1.1.3. Massive Live Stock Mortality

The world's largest land use is for livestock. Most of the land is used for grazing and agricultural fields, and almost 80 percent of agricultural lands are used for feed production. At the same time, it is one of the fastest-growing sectors in the world as a result of increased demand for food and meat, particularly in developing countries. There are many benefits of livestock for communities; it provides an expanded employment scope for the farmer and family members, contributes gender equality as providing opportunities to women, improves the health of the soil, and controls insects and weeds. (FAO, 2009)

The most vulnerable group against climate change is fisherfolks, pastoralists, and livestock keepers. The impact of climate change over livestock could be seen either directly or indirectly. The direct impact can be seen during heat stresses when morbidity and mortality rates of livestock increase. The indirect impact can be observed in increased animal mortality and the decrease in the quality and availability of food and forages. (FAO, 2016) The impacts on overgrazing systems are generally defined as an increase in extreme weather such as the magnitude of drought and floods. In non-grazing systems, impacts can be seen as a decrease in water availability, an increase in the cost of animals and resource prices, and more frequent epidemics. (FAO, 2009)

1.1.4. Desertification and Salinization

If the effects of drought once have mismanaged, these effects may lead to water shortages and land desertification. As seen in Syria, the governance subsidized water to wheat and cotton farming, yet did not invest in the irrigation systems

which resulted in current poor water policies, resulting in water loss such as in the case that 60 percent of water wasted in Syria. This mismanagement once combined with the socio-ethnic grievances among non-Alawite Arab and Kurdish populations in rural areas, the way of the social unrest would be paved. (Werrell, et al., 2015)

Besides, the MENA is generally under the threat of dust storms, which cause massive damages to people, agriculture, and the economy. Water scarcity especially in the dry areas brought out land degradation, desertification, and widespread poverty. These issues are the main driving factors of unsustainable agriculture and increased migration from rural areas to urban areas. (ICARDA, 2010)

Climate change will not only affect the freshwater resources but also the water demand for agricultural, industrial, ecological purposes. Sectors connected to these purposes are mostly under the influence of high evaporation levels.

1.2. SECURITIZATION OF CLIMATE CHANGE

The debate of securitization in the academy of international relations has started just after the end of the Cold War. Climate change has become the main security threat issue in the 21st century and it is predicted to be one of the main reasons for the violence in the future. Even though the relationship between human security, climate change, and violence has always been underestimated by academicians and policymakers, the recent civil conflicts have shown us that climate change and its consequences have a significant impact on human security and civil society. Recent consequences of climate change have never been experienced in the history of human civilization, which makes the consequences more intensive and devastative due to the lack of tools and experiences to cope with the consequences. The macro-environmental changes such as declining precipitation, drought, storm intensity, species migration pose a likely rising risk of human security. Climate change has become a vital security issue in the global world.

The securitization of climate change is defined to identify the environmental issues, which are the consequences of climate change such as drought, flooding, global warming, and desertification, and so on. (Barnett & Adger, 2007)

For this thesis, I am not going to use the term of securitization in the context of the Copenhagen school of security studies that refer to the existence of the threat and the situation where certain measures are taken against it. Insecurity, also, has been defined as a security problem in which adequate measures have not been taken against it or no response has been given. In the international literature, academicians and researches tend to use securitization according to an existing threat. Therefore, in the practical sense, securitization can be framed with present threats in military, political, sociological, economic, and environmental dimensions. (BAYSAL & LÜLECİ, 2011) In the thesis, the term securitization has been used in the context of social and political practices. It means securitization has been used in the general sense that enables the paper to frame securitization into the environmental, human, and economic perspectives.

1.2.1. Economic Challenges

According to reports, climate change has cost 1.6 trillion dollars worldwide and only California wildfires caused 24 billion-dollar loss. Scientists estimate that if the temperature rises 2 C, the global domestic product would be affected at large and the production would decrease by 15%. All the industries, agriculture, fisheries, and forestry are under the biggest risk. Extreme weather events have cost approximately 23 million in working life since 2000. The estimated losses as consequences of climate change and extreme weather events have been dramatically increased. Due to floods in Europe during 1990 and 2000s the losses were 17.4 billion dollars and it is anticipated to be 4 million dollars in 2100 due to the sea level rise and its impacts over coastal systems. The increased hot weather of 2003 in Europe cost 10 billion EUR and caused dramatic damage to farming, livestock, and forestry. (Amadeo, 2020)

However, for some estimations, climate change will have a positive impact on the developed countries' economic systems in terms of crop yield. According to estimates for Northern Europe, crop yields will increase by 10% in contrast to the estimated reduction in the Mediterranean and Balkans since it will promote more crop yields thanks to increasing heat stresses. However, the common opinion of the economic challenges due to climate change is that specifically by 2100, countries whether rich or not will suffer economically. (News, 2019)

The impact of climate change over the livestock will considerably be seen. According to estimates, changes in patterns will likely impact the economic gain through obtained dairy production. Research shows that anticipated heat stresses in the United Kingdom in 2080 may cause an increase in mortality and economic losses for about 40 million. Reports also indicate that the most recent heat stress resulted in 5 000 animals' death. (OECD, 2015)Therefore, losses will be seen on agriculture as the changes in crop yields, fisheries; on coastal zones where inland will be flooded due to sea-level rise, on health since the mortality rate may increase due to heat stresses, on energy demand, water stresses, and ecosystem.

1.2.2. Environmental Security

In the context of climate change, environmental security is highly connected with environmental sustainability as well as the equal distribution and access to resources. The immediate consequences of environmental change have brought 'environmental security' issue as the possible main security problem of international relations as degradation of agricultural lands, loss of product, food and health security, stratospheric ozone havoc, and global warming are the main concerns for all humankind. The UN general secretary Kofi Annan urged all the states for an immediate collaboration against climate change and its adverse consequences and said that:

"Another serious concern is the loss of biodiversity, which is occurring unprecedented rate within and across countries. Worrying in its own right, this

trend also severely undermines health, livelihoods, food production, and clean water change." (Dodds & Pippard, 2005)

Environmental security aims the securitizing of living spaces of humans against short- and long-term natural threats and deteriorations. Issues like clean water accessibility, climate migration, agricultural devastation have put environmental security into the center of security issues. Poor sanitation, deforestation, and long-term dry sessions decline the level of the potable water (UNDP, 1994) and force people to migrate to places that may have clean water. Since 2008, nearly 27 million people have been migrated due to a lack of livable environmental conditions. Besides, the rising migration due to ecological degradation may generate conflict among ethnic communities or with their home governments. This means refuges might have a deep feeling of rage and might tend to join armed groups and cross border violence attacks. (Gordon, 2017) It is generally agreed today that loss of biodiversity, drought, heatwaves, and famine are the main threats for the sustainability of life. For instance, the significant correlation between rainfall and human well-being has been introduced clearly, and according to researches, the raindrops collected on the surface and transformation to runoff for dry regions can provide various benefits for human well-being and the ecosystem. In this regard, the protection of biological diversity can improve health conditions, provide convenient food accessibility and availability, generate material well-being, contribute scientific and medical innovations.

The significance of the natural ecosystem could be given as another important example, for its protection role over people living spaces. For instance, when a tsunami hit the Indian Ocean in 2004, communities in the coastline were protected by coral reefs, coastal sand dunes, and mangrove forests. Besides, biodiversity also helps people adapt to transformed environmental conditions, as the unpredictability of climate change brings unprecedented natural events, therefore, rich biodiversity could provide more options for adapting to changes. (Dodds & Pippard, 2005)

1.2.3. Water Securitization

Attempt to address the linkages between climate-related contingents and cumulative conflicts had been neglected until the Arab Uprisings erupted. After the Arab Uprising sparked in Tunisia in 2010, scholars tend to signalize the unemployed rate, population growth, poverty as well as administrative issues, cronyism, and the unwillingness of the state to take action regarding social discontentedness as the main impetus factors. Nevertheless, whether water scarcity played the triggering role in collective conflict and violence or not has remained dim. Water scarcity due to low precipitation and its role in international and national security has become a new phenomenon for the academic area, along with the population growth, rise in resource demand both for industrial and domestic use. Additionally, water resources have become an instrument of terror groups for semi-arid regions experiencing long-duration drought sessions. In this chapter water scarcity and its dimensions on sociological and political contexts will be assessed in terms of rising demand associated with population growth and international cooperation particularly the Euphrates-Tigris river basin.

Drinkable water reserves depend mainly on annual rainfalls and rivers. Nevertheless, increasing temperature and evaporation leads to a decrease in the amount of freshwater in the Arab region. From 2005 to 2015, annual freshwater dropped on average of 20 percent, according to a UN report, while water demand will increase in the Arab region by 60 percent by 2045, runoffs and groundwater will be reduced by 10 percent by 2050 due to climate-induced reasons. (UN, 2018)

Taking population growth in the MENA and the states' unwillingness to take necessary actions regarding the productive use of scarce resources into account, it is fair to say that the region will face more subversive events in the near future. Most of the reports concur that population growth is also one of the conspicuous characteristics of the region. Statistically speaking, population numbers increased dramatically from 124 million in 1970 to 350 million people. According to the UN, it is expected to rise around 600 million, 685 million in 2070, and 845

million in 2100. Concordantly, the youth population which was 27.9 percent in 2010 is expected to go up to 100 million by 2035. As it may be predicted, along with the impacts of changing climate, resource scarcity in the region, and existing pressure for new job opportunities will continue to change the inner dynamics. (Tur, 2018)

A UN report pinpoints some predictions and estimations about water scarcity. Over 2 million people currently live in countries that have high water scarcity. By 2050 this number will have reached around 4.8-5.7 billion people. By 2030, 700 million people will have been displaced by the intense paucity of water. In this regard, the unavailability of fresh water could be a new challenging issue for the growing population problem. According to a UN report, 70 percent of the population will start to live in cities that house about 50 percent of the total population today. Currently, most of the people in urban areas do not have adequate access to fresh water. Besides, water availability is being impinged by pollution caused by industrial production, mining, and untreated urban runoff, wastewater, and sanitation. Around 1.8 million people are currently using contaminated water which also puts them at risk of diseases such as typhoid, cholera, and polio. (UN, n.d.)

Additionally, the importance of the Euphrates and the Tigris rivers, the Jordan River, and the Nile Basin has always been observed in the international circles. The rivers of Euphrates and Tigris are born in Turkey and flow through the southward of Syria and Iraq. This course provides Turkey a strategic advantage, considering that Syria's and Iraq's around 60 to 75 of water sources rely on cross-border water reservoirs. Geographical conjuncture demands comprehensive cooperation between states. It is well known that solutions which launched in 1970 by building the Turkish Ataturk Dam and Southeastern Anatolia Project in 1992, remained inadequate due to low rainfall over GAP and increasing demand depending on rapid population growth. (Dinic, n.d.)

The Nile basin countries are Burundi, Democratic Republic of Congo, Egypt, Ethiopia, Kenya, Sudan, Rwanda, Tanzania, Uganda. While the other riparian countries could benefit from the other alternative resources, Egypt 'cannot exist without drawing water from a river which rises far beyond its borders'. Therefore, The Nile is extremely important for the riparian countries. The importance of the Nile river is taking a vital position for the riparian countries due to the growth in the population and rising water demands for agricultural, domestic use, and electric production. Although, the consequences of climate change over the Nile river are not certain, yet it is discernable that the river will be affected by a decrease in precipitation and an increase in evaporation due to high temperatures. (Carius, 2010)

The Jordan river differs from the Nile river in terms of delivering annual floods. Even though the Nile river delivers annual floods, the Jordan river has never experienced floods except for flows from waterfalls from uplands. This situation naturally creates a competition between the riparian states. the Jordan river wedged among the most water-poor countries; Syria, Iraq, Israel, Saudi Arabia, Jordan. According to scientists, if fossil fuels continue to be used at an increasing rate, then annual rainfalls will decrease by 30%, and annual average temperatures will rise by 4.5 C; Jordan's most vital tributary will fall 75 percent. The available data seems to point out that along with the population growth, economic development, increase in irrigation are the other factors of the desertification of the Jordan River. (Radford, 2017)

Concluding Remarks

In this chapter, the recent climate events and their historical process have been addressed in order to see how climate change has been a vital topic in today's world. Seeing the intricate relations of the consequences of climate change with each other gives evidence for future effects. It has been also addressed in the chapter that how a small change in the weather could create huge results for natural life. The other aim of the chapter is to prepare the reader for the next

chapter regarding the securitization of climate change and its possible impacts on conflict and violence.

2. CHAPTER 2: HUMAN INSECURITY AS A CONSEQUENCE OF CLIMATE CHANGE

Introductory Remarks

This chapter firstly addresses the meaning of human securitization by covering food security and political stability in order to capture the dangerous impacts of climate consequences on life sustainability. The definition will be given in a broad context inspired by the reports and recent environmental and political events. Secondly, the section will underline the impacts of the consequences of climate change on the recent social unrest. By doing so, the interaction between human security and environmental security will be emphasized through the current migration flows, conflict events, and poverty regardless of considering specific regions in the world. Thus, human insecurity with its various dimensions would be addressed by associating with the dynamics of climate change.

Although climate change seems to be a meteorological phenomenon, it has become a matter of interest among scholars of a wide range of disciplines of social sciences. Scholars started to call it 'the main security threat of this century' due to its environmental, national, and global consequences. Statistics show that human security will increasingly be threatened by climate change because of its adverse results over the natural environment such as coastal erosion, declining precipitation, increased storm intensity. In recent studies, climate change has been labeled as the new "global threat factor" for human life since life sustainability is dependent on natural resources more than economic and social structures. The purpose of this chapter is to focus on human security in the context of climate change.

Human security got involved in academic and political realms in the 1990s just after the end of the Cold War. The security question was whether military and national entities would be able to provide well-being for citizens. The question

was expanded itself from military concerns to economic, environmental, health, and social areas. (Gregoratti, n.d.)The UNDP addresses human security on the 'people-centered' concerns that "how people live and breathe in a society, how freely they exercise their many choices, how much access they have to market and social opportunities and whether they live in conflict or in peace". Moreover, human security is defined as being secure from chronic diseases, hunger, threats, and state repressions which emerges suddenly as political and sociological disruptions either in homes, communities, or jobs. Human insecurity is a process that is slow, and silent and can be dependent on human-made activities and natural events or can be the combination of both. (UNDP, 1994) Human security is also defined as having the capacity to cope with the stresses for the value, dignity, and rights of human beings. (Barnett & Adger, 2007) If we get back to UNDP's definition, it emphasizes 'freedom from fear' and divides human security into various subcategories.

It is vital to note that before identifying the dimensions of human security, food security is the most critical dimension in terms of understanding the root of uprisings in the MENA region. Food security is one of the main driving factors of uprisings that also could be taken into account together with the other socio-political factors. However, it does not mean that the outcomes of climate change cause political repercussions; in other words, climate change and political unrest are not a mathematical equation that claims the equation of one thing with another. For a better understanding of the thesis, it is highly critical to say that climate consequences may not cause social unrest for all parts of the world rather, it can be one of the triggering factors in the countries that have been suffering from political and economic instabilities.

Economic security: Economic security is to have a job which could provide income for individuals. Especially for young people, it is difficult to find and keep a job in today's world, the rate of worldwide young unemployment population grows, nominal wages also remain stagnant or its value decrease due to rising high inflation in the countries which have unstable economies. One of the radical

reasons for amplifying poverty and stimulation of social unrest is rooted in the economic fluctuations. (UNDP, 1994)

Food security: Food security is to provide appropriate peripheral and economic conditions for people's accessibility to basic nutrition. Even though food availability is an important part of food security, it is not the most vital part. Famines can occur even if there is enough food for households, therefore food accessibility is the core factor in food security. To obtain daily food, diets, and economic security need to be ensured for each citizen. Particularly women in households who traditionally eat last need to have equal chances. Generally, these women do not have stable jobs making them more vulnerable and dependent on the male-dominated system. Unless employment and income security problems are seriously tackled by the state, the international and national attempts to improve food security will remain insufficient. (UNDP, 1994)Yemen, Somalia, and South Sudan are currently at the risk of famine due to dramatic weather changes and inefficient state responses. (Gordon, 2017)

Health Security: Healthy security aims to protect communities and individuals from diseases related to malnutrition. In today's world most of the people die because of infectious and parasitic diseases on the other side in the industrial countries, most of the deaths are due to air pollution and other environmental causes. The disparities in health security are observed more frequently in rural areas compared to urban centers. (UNDP, 1994)Poverty and poor environmental conditions create convenient conditions for epidemics and pandemics. Thereby, health security depends on the medical systems as well as political, environmental, and nutritional indicators.

Community security: Community security is mainly linked to the protection of minority-ethnic groups from sectarian and ethnic violence. The main target groups for states are armed groups of minorities during tensions. The main intention in such circumstances has always been the annihilation of differences in society. The

other threat comes from traditions such as genital mutilation applied to the women in the African continent. (UNDP, 1994)

Political security: Political security requires the protection of people from state repressions and providing a safe environment in which citizens can live together with basic human rights, values, and dignity. (UNDP, 1994) The state has a critical role in creating appropriate conditions for its citizens, where people can live their political freedom, which includes freedom to vote, freedom of speech, freedom of media, and economic freedom. Thus, people can benefit from employment opportunities and will have an equal chance to benefit from the economic conditions in their favor. States must provide a guarantee of transparency and must be able to control the legitimacy of power. For Adger, most strong liberal- democratic states have the capability of implementing policies through state tools and thus, anxiety about the future among citizens will be less and the possibility of violence and conflict will be reduced. (Barnett & Adger, 2007)

The link between human security and climate change is prominently complex. Climate change has been defined by the Center for Naval Analyses (CAN corporation) as a "*potential threat multiplier, a term first used by CNA's Military Advisory Board and currently being broadly used by the US Department of Defense, for instability in some most volatile regions in the world".* (Gordon, 2017) Climate change has the potential to be the main security problem in terms of its affected areas. The main problems could be seen in various dimensions of human security; it undermines cultural aspects of social order, causes mass migration, and may incapacitate the state's ability to provide necessary living conditions for individuals. (Adger & Pulhin, 2014)Damages on the social and ecological structure, annihilation of culture and individual identity, inefficient state policies, increasing climate migration flows are the other adverse results of climate change. (AHDR, 2009) The question also should be tackled in terms of resource varieties and services that states and human beings have, to compete with the threats of climate change. German Advisory Council on Global Change

emphasizes that climate change plays a significant role in international relations as it has a triggering effect in terms of causing conflict and competition among states over the sharing vital natural resources such as water and agricultural lands. (Gordon, 2017) Therefore, decreasing natural resources especially water obtainability will lead to competition and tension among states. (Barnett & Adger, 2007) As in the case of the Nile Basin, the uncertainty of the future of climate change has allowed the states to use the issue in the political discourses. Egypt's government defines 'water scarcity' as the main "national security" problem and protection of current legal water agreements with the other African states has become its main political aim. (Swain, et al., 2015)

Climate change acts as a *'threat multiplier'* particularly in the regions which have economic problems and are susceptible to an outbreak of war. As it has recently been in Syria, Egypt, Yemen, with the interaction of other prevalent issues, climate change may escalate and create ripple effects on current disruptions. (Gordon, 2017)

Climate change has also dramatically affected people's living spaces and livestock. As it has recently been seen, the drought in Afghanistan in 1999-2000 and Ethiopia 1999-2004, it cost the lives massive livestock to the household; the floods in 2009 affected at least 15 percent of farm households (Adger & Pulhin, 2014) and Northern Pakistan, South Asia, the Niger Delta, the Pacific Islands, and Ethiopia. (Barnett & Adger, 2007)

The MENA is one of the most vulnerable regions as it has been experiencing war and conflict for decades and suffers from water paucity, land desertification, growing population, and growing needs for this population (Adger & Pulhin, 2014). The UNDP defines the MENA as *'the direct victim of climate change'* in one of the recent reports. (UNDP, AHDR, 2009: 4) Most of the Arab region is currently suffering from water pollution, lack of access to fresh water, and such issues have been deepening human insecurity in numerous ways such as epidemic disasters among children, the tension between neighboring countries, competition

over resources, and agricultural unproductivity. (AHDR, 2009) According to the Failed States Index and the Notre Dame Global Adaptation Index; there is strong evidence showing that before the upheavals in Egypt and Syria, both countries had experienced a prolonged and the worst drought, water scarcity, and food insecurity. In addition to these issues, the state policies to cope with the issues remained inefficient. Drought-hit Syria's agricultural lands resulted in acute crop failures and livestock devastation from 2007 to 2012 and after that, the tension concussed the ethnic class of society which then turned into a civil war. (Werrell, et al., 2015)One of the main responsibilities of the state is to provide political freedom, income support, food-health aid, social and economic opportunities, transparency in the political activities, a secure future for its citizens in which they will be able to adapt to environmental changes. However, once the state's capacity remains insufficient to provide a secure life for the citizens, the possibility of conflict will be augmented. (Barnett & Adger, 2007) On the other hand, the ability of these facilities depends on the current social and political situations as these facilities are damaged by conflict and war conditions and state capacity will remain inefficient to take tangible measures. (Adger & Pulhin, 2014)

2.1. FOOD SECURITY

Food security is defined as *"Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life."* (Schmidhuber & Tubiello, 2007)

In this definition, we can see four-key dimensions of food security: food availability, food stability, access to food, and utilization of food. Food availability implies the ability of the agricultural system to supply food demands, while food accessibility is related to individuals who are at the risk of losing access to adequate food either permanently or temporarily. The third dimension is defined as to have appropriate access to acquire daily nutritious food and utilization of food for a healthy life.

However, the increase in worldwide hunger rate is not only because of the reasons linked to food accessibility and availability but also linked to current political stability. Food insecurity also depends on the current social welfare, hereby conflict and forced migration likely cause food insecurity. (IFPRI & FAO, 2017) Civil conflict is more common and prolonged in today's world and most of the agricultural lands are affected by the damages of conflict, as the situation hinders stable food production, depredate livestock, and large-scale crops as well as vandalizing infrastructure facilities and causing large-scale economic losses. (FAO, 2016) This vicious circle of interaction can be seen in the case of Yemen. (FAO, 2016) Due to the worsening economic situation and deterioration in people's social standards, and the state's incapability to find solutions are identified as the main cause of sparked civil conflict. (IFPRI & FAO, 2017)

The Arab region has already had the difficulty of currency depreciation, economic sanctions, inflation, migration, high unemployment rate, and climate change can act as 'threat multiplier' (Werrell, et al., 2015) and can exacerbate the social, economic, and political situation with the combination of drought, water scarcity, food insecurity. (WHO & FAO, 2017) For instance, Syria has faced almost all these driving factors just before the outbreak of civil war. The embargo on substantial services, biological and chemical materials, Syrian oil imports, and currency depreciation in the economy has led people to lose their jobs and consequently incited a large scale of civil conflict. (WHO & FAO, 2017)

In addition to the political and economic problems, the Middle East has been suffering from population growth which increases the demand for resources and endangers the youth population due to the lack of job opportunities and anxiety about the future. A rapid increase in population growth requires solutions to problems of providing sufficient daily food as well as the state's action regarding possible food insecurities. However, it is commonly known that the region will not be able to feed itself, food insecurity will expand in each part of the region. (Tur, 2018)

It has been debated whether peace initiatives could prevent food insecurity and conflict among ethnic groups. For instance, pastoralist societies of Kenya and Uganda have been in intertribal conflict for many years. The main compound of this conflict is the protracted drought in the region. Thanks to FAO, the capacity of communities against climate vulnerability has been reduced by setting up Pastoralist Field Schools (PFS) to exchange traditional coping strategies and experiences. (WHO & FAO, 2017)

2.1.1. Importing Grain and Legume

Even though in the last 50 years many Asian farmers have been able to overcome the progressive climate variations through improved technological and agricultural tools, existing technological and crop management tools may become insufficient as a result of the unpredictability of weather changes. Therefore, the sustainability of crop production can face a serious challenge for both producers and customers. Apart from the impact of the climate over agricultural yields, we can say that human population growth will be a remarkable challenge due to the augmentation in the demands of grain and legume. Many other factors also will reshape the global food security over the next few decades in terms of income growth and distribution, dietary preferences, disease incidences, and the level of improvement in agricultural productivity. In addition to these fields, demand for water resources and land will also increase since the technological progress develops in bioenergy production, carbon sequestration, and urban development. (Lobell & Gourdji, 2012)

Moreover, rice takes an important part in global trade. China, the Philippines, Bangladesh, and Japan are the major importer countries in global trade. On the other hand, in recent years we see Indonesia, some of the sub-Saharan African countries, Iraq, Iran, Saudi Arabia, and some European countries in the scene of world trade. Even if we see the rice is widely consumed and grown, only 8 percent of rice is traded annually compared to 18 percent for wheat and 25 percent for soybeans. (Wang, et al., 2010)

There is empirical evidence indicating that one of the main reasons for the crisis in 2007-2008 was the 'weather-induced' decline in world agricultural production, amendments, and measurements. In 2004, tariffs, loss in value in the US dollar, 4.7 declining precipitation adversely affected world wheat production from 2005 to 2007 which also led to a 67 percent wheat price increase worldwide. As the prices of wheat, maize, soybean soared, petroleum incited policymakers were forced to take radical decisions. However, these decisions also led to sharp price peaks in global trade. For instance, the decision of restriction of India's rice exportation in 2007 sharply escalated wheat prices in the global market. The reason behind this decision can be seen as the weather-related damages on wheat crops in 2006. In that time, India was importing 6.7 million tons of wheat, and this was the biggest part of its exportation in the last 30 years. (FAO, 2009)

China is known as the world's largest wheat producer, but the droughts in 2006, 2007, 2009, and 2010 surged commodity prices in the global grain trade and fueled inflation in world markets. Due to droughts of 2010-2011 in winter, 2.2 million people faced with water scarcity in China (Bradsher, 2011) At the same time China's wheat production fell by 0.5 percent, while wheat consumption increased by 1.68 percent. (Braun, 2016) Keith Bradsher posited in the NY Times that "If China does become a large importer of wheat- it imports a lot of soybeans but tries to be essentially self-sufficient in rice and other grains for national security reasons-then it could push up world product prices and make it harder to poor countries to afford food imports" (Bradsher, 2011) As a measurement policy, the existing government decided to purchase wheat at a higher price in order to compensate the financial losses of drought; hereby, this policy led to increase the wheat price in the importer countries and triggered social unrest in Egypt. (FAO, 2018) Social unrest also plays a significant role in the wheat trade. For instance, Syria was the largest agricultural producer and wheat exporter by 1.5 million tones just before the outbreak of the civil conflict. The government was keeping 3.5 million tons of wheat as reserve stock against potential drought and

economic sanctions. However, after the upheaval situation has changed and the country has involved in the net of importers of food. (HA, 2018)

The worst drought in the last 130 years hit Russia's croplands together with the extreme heat and wildfires scorched grain crops in around 10 million hectares of farmland. In the same year, Ukraine and Kazakhstan were stricken by drought and Canada's yield output was lower than expected due to floods.

According to analysts, the harvest stocks of the world's major wheat exporters were less than 70 million tons, and almost 12 million tons of grain was imported in 2010. However, Russia's crop yield was 97 million tons 21.4 million tons of which exported in 2009. On the other hand, the prices of wheat-related products such as flour also soared and resulted in instabilities in social, political, and economic security particularly in Egypt since the country was the largest grain importer of Russia and the first spark of Arab Uprisings thereby was incited. (Kuebler, 2010)

2.1.2. Crop Failure

Over the last 100 years, humanity has experienced climatic, economic, and political changes in the food demand and supply chain. The adverse consequences of climate change on crop productivity undoubtedly have a serious impact on food availability and accessibility. According to food consumption reports, the most supplied crops are wheat, maize, rice, and soybean. Since they are considered as major sources of calories and protein for a daily diet, these crops have become the main elements of a nutritious diet for humans. Today, %45 percent of overall world agricultural lands are being culminated for these crops. The growth in agricultural productivity depends on changes in soil quality and availability, cost of mineral fertilizers, and support from the public and private organizations. (Lobell & Gourdji, 2012)

Indeed, weather and precipitation stability are the key factors of stable crop production. In the last decades, hot weather temperatures have been increasing,

especially for world cereal cropping lands. The rise in hot weathers, intensifying hydrological cycle[14], increasing CO2 level and risen tropospheric O3[15] are four key factors that dramatically affect crop production (Lobell & Gourdji, 2012)

Weather temperatures can cause faster or shorter crop maturing, increase or decrease photosynthesis-respiration. Therefore, rising temperatures along with atmospheric CO2 lead to a reduction in soil moisture result in massive crop failure. However, the level of temperature sensitivity differs for each type of crop. Sessional temperature averages are identified for wheat as15°C, 18°C for maize, for soybean and rice, and 23°C for the bean. (Lobell & Gourdji, 2012) To see the magnitude of the impact of a heatwave on overproduction, it will also be essential to take account of timing, frequency, and extensity during crop development. Hence, a small degree of high temperatures can cause irreversible crop failures in the reproductive period. Besides, high sessional temperatures can cause drought, restrain proper light interception, and limits photosynthesis rates. Even though the short term of heatwave stresses has not been considered as a dramatic dimension of crop failures among scholars, it is estimated that heatwaves will become more frequent and have a detrimental effect on agricultural lands in near future. The number of flowers/plants, pollen tube development, pollen release, flower fertility, and pollen viability are all vitally depending on current heat degrees. (Teixeira, et al., 2011) For instance, as a consequence of heatwaves in 2010, Russian agricultural lands were dramatically affected; and therefore, wheat prices soared by up to %50 in the international market. (Northoff & Kourous, 2020)

The report claims that at least six heat stresses hit harvest lands and damaged crops in China in the last 50 years. In 2003, almost 3 million hectares were damaged causing a significant loss of grain around the Yangtze River Valley.

[14] Hydrological cycle is also known as water cycle which describes evaporation of water from the surface to the oceans and then turn into cloud forms and turn back to the surface as precipitation.

[15] Tropospheric Ozone(O3) is one of the main reasons of air pollution, it causes warming and reactivate oxidant therefore, it is destructive in terms of crop production and human health.

(Teixeira, et al., 2011) According to analysts and over 20000 empirical trials, each degree in temperature above 30 C degrees reduces the final maize yield from 1% to 1.7%. In other words, whilst temperatures rising to 28 and 30 could increase the yields, a little above the threshold would decrease crop yields significantly. Long session drought would be one of the other main reasons for crop failure as it occurred in Syria and Somalia. In Syria, 800,000 Syrians lost their livelihoods due to prolonged drought between 2006-2010, and in Somalia, drought reduced the annual harvests by 70 percent and resulted in famine; over 360,000 children suffered from malnourishment, and almost 3 million people remained food insecure. (UNDP, 2018)

According to statistic frames, the scenarios show that significant yield outputs will have decreased in rice production by 2030 since warmer nights will be more frequent. Consequently, rice production will not be able to meet demand. In addition to hot days, reduction in rainy days and increasing length of the dry session will also impinge on the rice and wheat fields in Asia, the United States, and Australia. The report also indicates that by 2050, the temperature will have increased around 2-4 C, and livestock and crop yields significantly will decrease in that temperature. Additionally, %50 percent of wheat production lands will become barren. By 2080, due to a temperature increase of 4 C degrees, the yield decrease will have increased from 25 percent to 29 percent. (FAO, 2008)

Apart from heat stresses, pests will also be effective over crop failure. Climate change provides suitable living conditions for pests and therefore, they will be able to live longer including winter seasons. Statistically, Mauritania faced a 10 to 16 percent of harvest decline and at least 220 billion US dollar economic loss due to the pests. Similarly, in Argentina, 700,000 hectares of land remained non-productive. Desert locust has spread over the farming lands and approximately 80 percent of total crops lands were destroyed. It is estimated that locusts will occupy more lands as a result of floods, hurricanes, and warmer conditions for them to survive**.** More importantly, immature locust masses can consume as much crop as 35,000 people can eat for a day. (EJF, 2017)

2.1.3. Food Price Rises

As a matter of fact, food price rises are one of the most critical parts of this context since the reason for social unrest, conflicts, and collective violence are mostly derived from price shocks apart from other external factors. Stabilized food availability is a vital part of human security in terms of having healthy living conditions. Food prices rise and fall depending on local food policies, transportation facilities, fuel prices, climate conditions, precipitations, and global system regulations**.** For these reasons, inconsistent food prices are mostly seen in countries that are economically subordinated by the global food system. Thereby, in those countries, even macro changes may trigger an impact on social, political, and economic regulations.

It is clear that food security is determined by a wide range of factors such as distribution and production of agricultural goods, population movements, economic inflation, income level, food prices, losses in employment, and currency depreciation. (WFP & FAO, 2013) Furthermore, Adger and Pullin consider poverty, water availability, food policy agreement, and economic regulations as the other contents of food insecurity. It is also well understood that most of the factors are much sensitive to climate conditions and environmental events. A decrease in agricultural productivity causes a reduction in urban income level, and therefore, increases poverty due to 'food-price shocks. (Adger & Pulhin, 2014) Apart from these factors, the human appeal report mentions transport infrastructure, rising fuel prices' as the other triggering factors of food prices. (HA, 2018)

The strict dependency of the global food supply system makes the poor countries more fragile to global food prices. (Lagi, et al., 2011) The report also articulates that food price rises are associated with the food riots. For researchers, it is obvious that there is a strong relationship between drought in China in 2010 and the Egyptian revolution in 2011. Drought in the Eastern part of China, the largest wheat producer and consumer in the world, provoked wheat prices in Egypt. Just after that, China's government decided to purchase wheat to sell with high-profit

rates to compensate for the losses from drought. Egypt, the largest wheat importer in the world, was dramatically affected by this regulation, and wheat prices rose and, the situation led people to take the streets to protest bread prices. (Nett & Rüttinger, 2016)

Food riots in 14 countries of Africa in 2008, have robust evidence regarding the impact of food prices on the 'socio-political stability'. (Adger & Pulhin, 2014) According to the UN Food and Agriculture Organization (FAO), in 2008, more than 60 food riots occurred worldwide in 30 different countries and the riots in 10 of these countries resulted in mass deaths. At the end of 2010 and 2011, the largest regional protests arose in North Africa and the Middle East, additionally in Mauritania and Uganda. In 2005 Burundi, Somalia and India; in 2017 and 2010 Mauritania and Mozambique were corrosively affected by global food prices and experienced mass food riots. (Lagi, et al., 2011) High food prices in Guatemala in 2008 and 2010, were caused by a loss of harvests and nearly 80 percent of crop loss. (Nett & Rüttinger, 2016)

In 2007, nearly 47 countries suffered from food crises; 27 of these countries were in Africa, 10 of them were in Asia, and the rests were from different parts of the world. In contrast to riots in 2001, almost in 21 countries, the number of riots increase dramatically. The effects of drought, conflict, and low resilience were the main reasons for food riots in those countries. After these serial riots, interest to climate change and its link with human security has emerged among scholars (WFP & FAO, 2013)

The food crisis in 2008 showed that drought and floods are the major determinant factor of food-producing, food prices, and deterioration effects of weather changes over agricultural lands. (SIDA, 2018) It is also important to emphasize that political instability and social unrest harm food security. For instance, during the ongoing conflict in South Sudan, famine was declared, and 4.9 million people, unfortunately, remained in hunger. The number climbed to 5.5 million people in 2017. Similarly, in the Philippines soaring food prices pushed people into extreme

poverty in that time, daily income was equaled to less than 1 dollar, inflation had risen 9.6 to its highest level since 1999. (FAO, 2008)

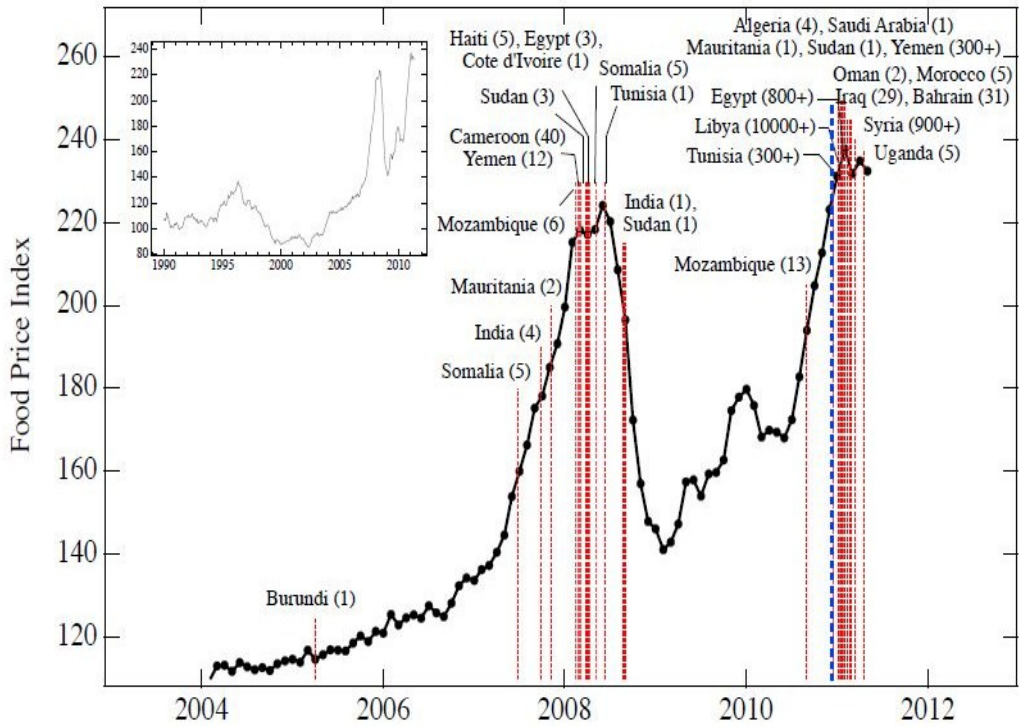

Figure 2: Period of the FAO Food Price Index from January 2004 to May 2011.

Red vertical lines show the start date of "food riots" and protests in North Africa and the Middle East. In the parentheses, the overall death toll is seen. The Blue vertical line indicates that the report presented to the U.S government to warn of this strong connection between food prices and social unrest in 2010.

At the same time, the existence of a terrorist group also plays a notable impact on food price shocks. For instance, the existence of Boko Haram in Nigeria and Cameron and the farmers' fear of attacks of Boko Haram affected food prices, negatively. A report indicates that since Boko Haram appropriated the wetlands of the Lake Chad for shelter to launch its attacks, fisheries, and accessibility of the water for livestock have been restricted, and hence, food prices are peaked**.** (Nett & Rüttinger, 2016)

The conflicts in Yemen and Syria is also important in terms of seeing interactive relations of food prices and socio-political situation. Having a large-scale conflict and war made these countries more susceptible to environmental changes. Yemen and Syria have experienced 'the largest conflict in the last decades and obstructed food availability' says in the Human Appeal report. At that point, it is also important to remember that, Syria was the largest wheat exporter among the Middle East countries before the outbreak of civil war. (HA, 2018)

After South Sudan obtained its independence, large-scale violence erupted in the Greater Upper Nile Region, Equator, and Western Bahr el Ghazal. Because of the ongoing violence, food insecurity increased in these regions, and famine declared in February 2017. According to an FAO report, more than 4.9 million (over 42 percent of the population) are living undernourishment conditions in the country with an increased number day by day. (IFPRI & FAO, 2017) These examples demonstrate that the economically poor and politically unstable countries are more sensitive to climate change and its consequences.

Human security also depends on health security which can be achieved by stable food prices. According to FAO; "About 25 million people in the MENA region are currently living undernourished conditions; four million in Northern Africa (2.7 percent of the total population) and 21 million in Western Asia (10 percent of the total population), higher than in 2008–2010". According to the Human Appeal report almost 815 million people live under hunger conditions because of these socio-political instabilities. (HA, 2018) Rising food prices have stimulated an increase in the rate of hunger. The FAO estimates that in 2007 hunger rate increased by 75 million and a total of 923 million people remained in famine conditions in comparison to 823 million people in 2003 and 2005. Additionally, 420 million people have become undernourished in 2015 as a result of a peak in food prices and changes in global economic regulation. (FAO, 2008)

2.1.4. Bread Protests

Earlier and latest bread riots in North Africa and the Middle East derived from the drastic peak of bread prices beside the other political factors. Historically there have been several 'food riots' across Europe and the MENA. The protests of the French Revolution between 1789-1799 is one of the examples of the historicalness of bread protests.[16]

As mentioned above, the food prices of many poor countries are dependent on global food prices today. The hypothesis claims that in 2011 the riots did not arise not only from political reasons but also from the state's incapability of providing secure conditions to its citizens. Once, the political system fails to provide economic and social security to its citizens, the existing political system loses its legitimacy, and afterward, citizens start to demand their needs on the streets and the fear of death will not be a 'deter action' for the protesters. (Lagi, et al., 2011) However, global food prices are not the sole reason of the riots; for instance, 'bread riots' in Egypt in 1977 which had been heavily suppressed by the government and more than 800 people had been killed, was because of the rule of 'the removal of subsidies for basic stuff'. The Egyptian government had been forced to implement this rule by the IMF and after its mandated rules riots started, that's the main reason for bread riots as it is called 'IMF riots'. (WDR, 2011: 5)

The cutoff wheat subsidies in Sudan also provoked people to protest high bread prices. It is crucial to know that; Sudan's economy came this point due to the secession of South Sudan in 2011 and the loss of oil production and export. The economic crisis in Sudan amplified with the US sanctions, debt arrears, limited access to external financing, and withdrawal of bank relations. The economic reforms at the beginning of this year worsened the situation as the reform packet included austerity measures and removal of subsidies. Sudan has been facing a

[16] https://www.thestar.com/news/world/2013/03/16/did_climate_change_plant_the_seeds_of_war_in_egypt_and_beyond.html

high inflation rate at 68 percent and a shortage of hard currency that causes a collapse in the import activity. [17]

2.2. SOCIAL UNREST: UNEMPLOYMENT AND POVERTY

The UNDP emphasizes social inequality in terms of having personal security. For the report, women and children are the weakest insecure groups because of unequal treats of society and states. (UNDP, 1994) However, in a report personal security has been expanded into the area of population growth and unemployment. Population growth enlarged the demand for energy and natural resources, particularly in the Arab region. Observed resource scarcity, competition over sources among ethnic communities, and inefficient government policies make the region more vulnerable to climate change. Therefore, personal insecurity is mostly mitigated through efficient employment policies for youth people, meeting population demand, and subsidization of daily meals. Otherwise, remaining unemployed for a long time can be frustrating and can be a triggering factor for ideological disruption. (AHDR, 2009)

The main aim of humans is to survive and adapt to environmental changes. At that point, income has a critical role in the sustainability of life and adaptation to environmental challenges. Therefore, low-income level leads to fewer economic opportunities, high illiteracy rate, and lack of access to healthy foodstuff and results as a high rate of child nutrition. (AHDR, 2009)

The feeding relations between unemployment, poverty, and social unrest is mostly seen in the Arab region. According to research done in 2005, about 20.3 percent of the population had to live under two dollars. and about 34.6 million Arabs were living in poverty. 28.6-30 percent of Lebanon and Syria, 59.5 percent of Yemen, 41 percent of Egypt, and 34.3 percent of Sudan, are living in extreme poverty conditions. (AHDR, 2009) Bearing in mind these factors together with the resource scarcity, political instability, fail of subsidizes, climate change and its

[17] https://sudantribune.com/spip.php?article66781

multiplier threat role would be the main players for human securitization. Urbanization and population growth are the main players of human securitization, in 2016, the Arab region hosted approximately 407 million people; however, 100 million people were living in poor conditions. It can be seen in the reports that predictions are not that much optimistic, and reports claim that population growth would be 635 million by 2050 whereas, currently,70 percent of youth under-employed and the region will need 51 million new jobs by 2020. (UNDP, 2018) Otherwise, the young population will face a depressing future which may provoke them to participate in armed groups or attempt rebellion against their home country. (World Development Report, 2010: 6)

The link between the unemployment rate and tendency to collective violence is seen particularly in the countries which have a high rate of impoverishment and struggle with political instabilities. In the example of Nigeria, we can clearly see this connection. Insecure live conditions, sparse income opportunities, lack of participation in political activities, and alienation from the social and political life are the major factors of participation in armed groups for youths in Nigeria. These conditions provide necessary grounds for the legitimization of terrorist activities. Boko Haram which is a radical jihadist terrorist group located in Nigeria initially gained support by declarations against corruption, unjust political activities, social injustice, the frustration of the young generation whose dreams faded away due to lack of income and support of politicians. Boko Haram has become the strongest armed group in the conditions of Nigeria, as 71.5 percent of the population lives in poverty and more than 50 percent are malnourished, and 60 percent of youth are unemployed. Therefore, the prospects which are provided by terror groups such as payments, financial support, promised marriage has attracted the young generation in attendance to extremist groups. (SIDA, 2018)

2.3. UPRISING AND POLITICAL INSTABILITY

There are two different aspects of conflict in the social sciences. Communal conflict is the conflict that groups compete over scarce resources, particularly for

regions that has water shortages and low rainfall sessions. This type of conflict is seen in the Sahel, the zone of Sahara, and savannah areas. These regions are the most vulnerable regions to drought and competition between farmers and herders over the water is fierce. Once the competition starts over the water, we see how the link between food insecurity and communal violence instigates this competition. Thus, the government does not involve in this kind of conflict. However, we can see the involvement of government forces in some cases due to extreme violence among groups. This kind of involvement has been experienced massacres in Darfur, Rwanda, and Burundi. (WDR, 2011: 6)

Civil conflict is the most prevalent conflict in the world and consists involvement of armed groups. Some researches prove that there is a strong connection between weather events. For instance, once the drought-hit the agricultural lands in rural areas, young males from rural areas whose livelihoods are from the agricultural sector with less education knowledge and economic expectations, prone to attend in armed groups and initiate conflicts among locals. We see this sort of participation, especially in Mali. 'The Tuareg' rebellion in Mali is an example of motivated participation regarding losing living sources because of drought and inefficient food security policies. (WDR, 2011: 6) As the recent conflicts reveal that climate change may have a complicated role in the creation of communal and civil tension among locals and regions. Climate change does not lead to conflict and violence, automatically rather, once climate change has the interaction with the other existing risks and pressures, climate change acts as a 'threat multiplier' and increase the risk of violence and conflict. (Nett & Rüttinger, 2016)

Lake Chad can be an important example to see the multiplier effects of climate change on conflict. According to a SIDA report, the Lake Chad where Boko Haram which is responsible for killing 20.000 people and displacement of more than two million people, (Nett & Rüttinger, 2016) fights against central authorities and terrorizes the civil population for own profits, is also important to see the connection of climate change and security threats. Lake Chad is a vital area for growing population, pastoralists, fishers, and farmers however, there has not been

established any consistent social infrastructure investment which can mitigate the adverse results of drought. (SIDA, 2018) According to studies, 80 percent of the population depends on farming, fishing, and livestock breeding, and the economic conditions of people also highly dependent on environmental and climatic conditions. Overall, everything regarding livelihoods relies on the freshwater resource of Lake Chad which Boko Haram has expanded its controlled areas from Nigeria to Cameroon and started to use natural resources as a weapon by poisoning waters, wells, and streams against state troops while making the water dangerous for both habitats and livelihoods. (Nett & Rüttinger, 2016)

ISIS has established its goal of establishing an 'Islamic caliphate' by controlling territories in Syria and Iraq. Apart from ideological aspirations and political failures, thanks to stringent climatic conditions, ISIS would be able to recruit its almost 60 to 70 percent of fighters from locals. Because ISIS acted as municipality services in the occupied regions and established the Islamic Network for Public Services which provided electricity and transportation in Aleppo. (King, 2016) The worst drought in Syria's history hit the country in 2007 and caused mass death of livestock, migration, and food insecurity which also was culminated in a large-scale civil conflict. The absence of efficient irrigation policies and cut of fuel and food subsidies decreased people's ability to cope with issues. Even though the water was not the key contributor to Syrian uprisings, it is strategically used by opposition groups and the regime. When ISIS extended territorial control over Syria and Iraq in 2014, a big part of critical water, energy, and food resources, the Euphrates river and Tabqa dam entered into the domination of ISIS. 20 percent of Syria's electricity demand and water demand of 5 million people were met through the Tabqa dam. Through the control of critical resources, ISIS had been able to gain economic power by taxing water in Raqqa. To establish a caliphate, ISIS never refrained from using water as a weapon on civilians by using water to flood land in order to displace people and poisoned it with crude oil in Syria and Iraq. (Nett & Rüttinger, 2016)

2.4. MIGRATION DRIVEN BY CLIMATE CHANGE

Migration is defined as the movement of people from one place to another to have a better life. In this regard, unsafe living conditions of war and conflict, environmental disasters, and high poverty are the 'push factors' of the movement. In this chapter, I shall evaluate a different dimension of migration which is climate migration. Climate migration is written in the report as "environmental stress can lead to migration itself, or it can lead to refugee-producing civil unrest" (Gordon, 2017)

The effects of climate change over the migration flows are classified by IOM as "the intensification of natural disasters, increased warming and drought that affects agricultural production and access to clean water, rising sea levels make coastal areas uninhabitable and increase the number of sinking island states. (44% of the world's population lives within 150 kilometers of the coast), competition over natural resources may lead to conflict and in turn displacement." (IOM, 2009: 15)

Therefore, it is clear that climate change will continue to force people to find another place for safety. The consequences of climate change have devastating impacts on life sustainability such as floods, drought, and storms. (Adger & Pulhin, 2014) According to the IDM Center "in 2008 nearly 27 million people have been displaced by natural hazard disasters" (Gordon, 2017). Another report claims that as a consequence of weather-related events an average of 21.7 million people in 2008 and 23.5 million in 2016 people forced to migrate. (EJF, 2017)In 2016 extreme weather-related disasters displaced around 23.5 million people. Since 2008, an average of 21.7 million people has been displaced each year by such hazards.

Human Development Report says that the Arab region is one of the susceptible regions to the consequences of climate change, which will affect the region. Water shortages, agricultural activities, economic activities, climate migration and will have a threat to national security. The same research also mentions that Egypt,

Lebanon, Sudan, and the countries of North Africa may be the most affected regions in the future. According to estimations, a small increase in temperature could cause a rise in sea level and could result in 6 million migrants from Egypt. Only one- half-meter sea level rise could create mass migration flows with two million refugees. (AHDR, 2009) Studies also corroborate that specifically in the MENA region by the end of this century-long heat extreme periods will occur for about 30 percent of summer days and living in specific places would be impossible and create inner or external migration flows. (Tur, 2018) For instance, due to the prolonged drought in Somalia from 2006 to 2011, almost 4 million people migrated. (UNDP, 2018)

For instance, due to 'Agatha tropical storms', floods, and droughts in Guatemala, around 28,000 people remained homeless between in 1970 and 2010 and the study (Norwegian Refugee Council) estimates that; the number of displacements which stem from natural disasters would be more than 91,000 in the upcoming ten years. (Nett & Rüttinger, 2016) Between 2006 to 2011 Somalia suffered a prolonged drought session that led to 'displacement of four million people'. Similarly, in Syria, 200.000-300.000 people migrated from farmlands to urban centers just before the outset of the uprising. (UNDP, 2018) Currently, almost 4 million people who are the most vulnerable groups, pregnant, elders, children, herders, migrants are living under food insecurity. (WFP & FAO, 2013)

Researches also claim that forced migration might create cultural diffusion for the ethnic communities. Most of the researchers claim that environmental changes and socio-economic situations will likely constrain cultural rituals and cause cultural fusion in particularly for the people who are herding, fishing, hunting, gathering traditionally. (Adger & Pulhin, 2014) For instance, pastoralist movement is mostly seen in Nigeria among Pastoralists who migrate traditionally through the region to find grasslands and water resources for their herds. However, due to prolonged drought sessions, broadening land degradation, and water scarcity the frequency of this movement is close to Lake Chad. (Nett & Rüttinger, 2016)

Protracted conflicts are also driving people to migrate and according to an FAO report from 40 million people in 2011 to almost 66 million in 2016 are migrated due to political unrest. The UNHCR estimates in 2016 22.5 million refugees, 40.3 million people displaced, and 2.8 million became asylum-seekers as a result of violence, human rights violations, persecution. (IFPRI & FAO, 2017)

Concluding Remarks

Looking through the impact of climate change on human security, food security, agricultural products and their interaction with global trade and food prices would help us to understand that how climate change acts as a 'threat multiplier'. In doing so, statistical data mostly give a different sociological view in understanding the reasons behind social unrest. On the other hand, the definitions of human security and its dimensions are mentioned in the context of climate change. Historically looking to the social unrest may provide clues of further impacts of climate change unless states are unwilling to take immediate action.

3. CHAPTER 3: INTERNATIONAL INITIATIVES TO COPE WITH CLIMATE CHANGE

Introductory Remarks

The importance of international cooperation about the impact of climate change cannot be overlooked. The recent consequences of climate change showed us that climate change is a global issue that needs to be solved in cooperation with national and international states and organizations. In the chapter, the structure of the international and local organizations has been evaluated while mentioning their environmental policies. Since climate change has a high potential to be the next security issue, the measurement plans of international organizations have become vital. However, climate change has not been accepted as a global security issue in the international area. As a result of that, international organizations only provide measurements for the states to cope with existing environmental issues. This chapter mainly examines the role of international organizations, states, and compromised agreements in the prevention of climate change.

3.1. INITIATIVES BY EXISTING ORGANIZATIONS

3.1.1. North Atlantic Treaty Organization (NATO) 's Initiatives

In 1969, the Committee on the Challenges of Modern Society (CCMS) was established to share the knowledge and experience on social, health, and environmental issues for both civilian and military sectors. (NATO, 2014) The environmental challenges were recognized as threat multipliers. However, climate change was officially recognized in 2010 through the *Strategic Concept for the Defense and Security of the Members of the North Atlantic Treaty Organization* and after that, the Emerging Security Challenges Division(ESCD) was established. The main goal of these two institutions is to monitor and anticipate the possible threats and take necessary measurements as well as to describe how

environmental and climate changes will form the future security implications for the alliance's operations and plans. (Söder, 2020) In the same year, NATO highlighted its readiness to explore and improve renewable energy for military use by adopting the Green Defense framework (Femia & Werrell, 2017) and the framework and recognition of climate change accepted as a "threat multiplier". In 2014 the Wales Summit Declaration identified 'climate change, water scarcity, and increasing energy needs' as future disruptors of security. (Söder, 2020)

The implication of climate security was conducted in Bosnia and Herzegovina in May 2014. In 2014, Bosnia and Herzegovina experienced the biggest floods in its history and all NATO members provided humanitarian aid, blankets, medicines, power generations, and helicopters. (Femia & Werrell, 2017)

All of NATO's activities are to provide environmental security and environmental protection. Environmental protection is to protect the physical and natural environment during NATO's operations and pieces of training. Therefore, NATO members have adopted new regulations and rules which measure wastewater, reducing fossil fuel consumption. Also, these two measurements aim to promote cooperation and standardization among NATO members. NATO addresses two regions that are most vulnerable to climate change: the MENA and Arctic. Therefore, NATO estimated the strategic importance of military activities and new policies to protect its members from climate change results.

NATO's current activities regarding environmental protection and security include environment-friendly activities based on military activities and infrastructure facilities. In that regard, NATO firstly addressed the impact of climate change and established a new environment-friendly regulation that is embodied with the education of NATO's officers, enhancement energy and fuel independence, environment-friendly management, and practices as well as protecting the environment during the military operations. (NATO, 2014)

All these activities are framed with two categories:

Environmental protection: "The Environmental Protection Working Group (EPWG)"; the main aim of this group is to reduce possible harmful impacts on nature during military activities and standardization and guidelines and documents and planning the operations and exercises. "The Specialist Team on Energy Efficiency and Environmental Protection (STEEEP)"; the main goal of this group is the adaptation of environmental protection and regulations in technical requirements and equipment and materials. (NATO, 2014)

NATO's current actions regarding the prevention of climate change impacts are framed with support environment-friendly training and practices, educating the workers of NATO, promoting partner countries to enhance environmentally friendly local capabilities and infrastructure, increasing energy efficiency and environmental management. (NATO, 2014)

Environmental security: In order to coordinate the activities NATO has become a member of the Environment and Security Initiative (ENVSEC) with other five international agencies. Another aim of this membership is to address security issues in the four vulnerable regions; Southeast Europe, Eastern Europe, South Caucasus, and Central Asia. The role of ENVSEC in the region is to highlight environmental security issues and funding the projects that may help to reduce the risk of threat with equipment, travel, and training. Recently, NATO launched the Smart Energy Initiative in 2011 by aiming to improve energy efficiency in military activities and military forces. (NATO, 2014) NATO has showcased a video[18] (5 ways NATO makes camps sustainable, 2020)which also demonstrates five environmentally friendly innovative techniques that are currently being adopted in Forward Operating Bases (FOBs) and Camps.

Despite NATO's above-mentioned measurements and policy initiatives, NATO has always been criticized by its rising 'militarism and military spending'. NATO

[18] https://www.youtube.com/watch?v=oI9r8sstnfE

members invest their military equipment by spending $1 trillion annually which is 50 percent more than global military investments. By recognizing 2014 the Wales Summit Declaration, the member states made a commitment to spend two percent of their GDP on military defense and 20 percent of that separated for equipment. As a member of NATO, Canada has used 1.31 percent of GDP, $29 billion, for the Department of National Defense on the other hand Canadian government invested $1.8 billion on the Department of Environment and Climate Change which is 0.08 percent of GDP. Moreover, together with the produced fighter jets, attack helicopters, warships, and amour vehicles, NATO will remain as the largest intuitional consumer of oil and emitter of greenhouse gases. Yet, wealthy NATO countries have invested UN Green Climate Fund only $7.5 billion over the next four years to help economically undeveloped and poor countries to adapt climate-induced results, and thus, the member states have not met the climate financing commitment. (Lorincz, 2019)

Although the consequences of climate change are not well known, it is obvious that the nations of the twenty-first century will face significant economic and political instability and there will be an increased need for international cooperation and organization such as NATO. However, specifically under the Trump administration, the biggest allied force of NATO, the United States has suddenly decided to pull out from the Paris agreement deal and Trump often called climate change as “created by and for the Chinese in order to make the US manufacturing non-competitive” or “mythical”, “nonexistent” and “expensive hoax”. (Cheung, 2020) For another alliance of NATO, Turkey, climate change has never been mentioned or addressed as a security concern on its security agenda. (Söder, 2020) In the end, NATO will face a new international security threat related to climate change which will call for new adaptation and security policies, concepts, and response forms.

Demonstratively, climate change has the biggest potential risk specifically in the MENA and Arctic regions; for the Arctic region, the temperature increase causes the polar ice melt, which causes the seal level rise and also increases the heat

temperatures which also cause more evaporation and accordingly drought and floods. For the MENA region, as a frequently given example, the main contributor to Arab uprising is the heatwave in Russia which led to a price spike in bread and grains. As a result, NATO tends to see the climate-induced results only on the basis of an environmental issue and disregard its high threat potential to international security. However, eventually, NATO will face the necessity of new security measurements and policies in response to climate change consequences.

3.1.2. UN Framework Convention on Climate Change (UNFCC)

The secretariat of The UNFCCC (UN Climate Change) was established in 1992 after the countries were agreed on the United Nations Framework Convention on Climate Change. The UNFCCC aims to "stabilize greenhouse_gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate_system". The framework grounded on non-binding limits on greenhouse gas emission and grounded on non-enforcement mechanism.

UNFCC categorizes its work into seven broad areas: “climate change, disasters and conflicts, ecosystem management, environmental governance, chemicals and waste, resource efficiency and the environment under review.” However, UNFCC does not have legally binding obligations, for this reason, the Kyoto Protocol was established on legally binding obligations for member countries. One of the remarkable tasks set by UNFCC for signatory states was “to set national greenhouse gas inventories of greenhouse gas (GHG) emissions and removals”. In December 2015, UNFCC has 197 signatory nations. (UNFCC, n.d.)

The conceptual policy of UNFCC shaped into twelve broad contexts:

Climate mitigation and adaptation: Climate change mitigation is defined by the UN environment program as “to efforts to reduce or prevent the emission of greenhouse gases by using new technologies and renewable energies, making older equipment more energy efficient, or changing management practices or consumer behavior.” (UNFCC, n.d.)

On the other hand, adaptation is defined as "adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts." Adaptation indicates changes in processes, structures to alleviate potential risks and damages or to benefit from the opportunities derived from climate change. Therefore, a successful adaptation depends on governments as well as national, regional, and international organizations. (UNFCC, n.d.)

Capacity building: In order to establish a climate-friendly environment and sustainable development, the capacity building aims to identify and implement adaptation and mitigation plans, provide access to climate finance, enhance communication, and improve relevant parts of education, train to generate public awareness. (UNFCC, n.d.)

Climate finance: The convention has a policy regarding providing financial support to developing countries. Major financial areas are determined to support mitigation and adaptation policies that will identify climate change. (UNFCC, n.d.)

Climate technology: The role of climate technology is to help reduce GHGs through investment in solar power, hydropower, wind energy. By doing so, 'soft climate technologies' aims to expand training for using equipment and energy-saving practices. (UNFCC, n.d.)

Education/Youth: it is important to educate people about the impacts and processes of climate change. Improving awareness and climate understanding are the key factors of creating solutions to mitigate the ongoing climate change. Therefore, UNFCC adopts Young and Future Generation Day in order to connect the young generation to each other and give them the opportunity to present their projects, and innovative solutions. (UNFCC, n.d.)

Gender: climate change has a higher impact on the countries that have the minimum capacity to cope with natural hazards and have more dependency on natural resources. Women commonly have higher risks of poverty from climate

change. In addition to that, women's social and political inequalities in the decision-making process and labor markets prevent them to contribute to climate solutions. However, thanks to women's local knowledge for sustainable environmental practices, leadership at the household and community level makes their attendance to climate solution process highly critical. Therefore, UNFCC aims to recognize men's and women's equality in the development and facilitation of local climate policies. (UNFCC, n.d.)

Land Use: Land use has a critical role in global cycles of greenhouse gases (GHGs), carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O). UNFCC can significantly contribute to the minimization of the impacts of climate change through the elevation of sustainable forest management, terrestrial, coastal, and ocean marine life systems. The Paris Agreement and the Kyoto protocol also emphasize the importance of land use in response to climate change. UNFCC recently held the Intergovernmental Panel on Climate Change (IPCC) and the report of "Agriculture, Forestry and Other Land Use (AFOLU)" mentions that land use, agriculture, and forestry sector have the big part of the responsibility of anthropogenic GHG emissions according to statistics. (UNFCC, n.d.)

Local Communities and Indigenous Peoples Platform (LCIPP): Indigenous people have the traditional knowledge to cope with climate change. Indigenous people also must be a part of the solution-seeking. LCIPP is established under the umbrella of UNFCC to benefit of their knowledge and exchange practices in response to climate impacts. (UNFCC, n.d.)

The latest Climate Action Summit 2019 is brought together with the private sector, civil society, local authorities, and international organizations and try to develop permanent solutions in the fields of "renewable energy; sustainable and resilient infrastructures and cities; sustainable agriculture and management of forests and oceans; resilience and adaptation to climate impacts; and alignment of public and private finance with a net-zero economy". The action portfolio is recognized as "energy transition, climate finance, and carbon pricing, industry

transition, nature-based solutions, cities, and local action, resilience and adaptation" (UN, n.d.)

However, the UNFCC requires 'soft' commitment from parties in order to undertake the general necessities to mitigate and adapt to climate change. One of the main needs of the treatment is containing a specific GHG reduction rate for the parties instead of emphasizing that the reduction is "with the aim of returning" to their 1990 levels. Apart from a few measurable obligations, there has been no clear understanding of what parties' obligations are, therefore strict compliance to UNFCC cannot be observed among parties. The main goal of the UNFCC is to enhance the capacity building through financial and technical resources. Consequently, the term commitment in the treaty refers to 'implementation' since the treaty has an implementation process which implies that the measures adopted by states can be effective under their domestic law. (Wang & Wiser, 2002)

3.1.3. Kyoto Protocol

Kyoto Protocol is designed as the initial step of UN framework convention implementations. The main goal of the Kyoto protocol with its Parties is to set up an international binding to reach emission reduction targets. The Protocol was embraced with the 37 industrialized countries and the European community in Kyoto, on 11 December 1997. The regulations for implementation were initiated in Marrakesh, Morocco in 2001 which is also called the "Marrakesh Accords". The initial commitment was started in 2008 and ended in 2012. The protocol was one of the important steps towards a global emission reduction which would stabilize GHG emissions[19] and adaptation to climate change as a policy response. After the agreements on the Kyoto Protocol in 1997 and the Paris Agreement in 2015, the UNFCCC was tasked with promoting the global response against the threat of climate change. This agenda currently focuses on the topic of climate technology, climate finance, capacity building, gender, local communities,

[19] https://unfccc.int/kyoto_protocol

indigenous people platform, mitigation, education-youth, land use, pre-2020 ambition, and implementation and science. (UNEP, n.d.)

The second period of the accord was approved in 2012. The only tangible difference between the first and second periods is emission reduction which remained the same with the first period. But the average reduction of emission is decided to be implemented in a short period for 8 years, reaching 18 percent by 2020. However, Canada United States, Russia, and New Zealand, and Japan have refused to be a part of a new period. (Rosen, 2015)

There are three mechanisms of the protocol:

International Emissions Trade: Emissions trading is set up in Article 17 of the protocol in order to "allow countries that have emission units to spare - emissions permitted them but not "used" - to sell this excess capacity to countries that are over their targets." Therefore, the principle of the greenhouse is started to be traded and tracked as like any other commodities. (UNFCC, n.d.)

Clean Development Mechanism: The Clean Development Mechanism (CDM) is figured in Article 12 of the Protocol. This Mechanism basically gives permission to a country with emission-reduction or emission limitation commitment under the Kyoto protocol in order to apply emission-reduction aim in developing countries. The project mainly aims to stimulate the development of sustainable energy in the industrialized countries with some exception in their emission and limitation rate targets. (UNFCC, n.d.)

Joint Implementation: this mechanism is defined in Article 6 of the Protocol which provides emission reduction units from an emission reduction or emission removal project to a country that meets the emission-reduction or limitation under the Kyoto Protocol. (UNFCC, n.d.)

In contrast to UNFCC, the Kyoto protocol structured as a legally binding GHG emission targets which are equal to an aggregate reduction of about 5.2 percent

below. From an environmental point of view, this reduction will be insufficient to prevent climate change threats. The second thing is Kyoto is very short time-limited (2008-2012). It started as a ten-year plan after it was signed by signatories which would take actions related to climate change and achieve climate policies. The third issue is the failure of Kyoto in terms of providing an environmental policy. Kyoto's emission reduction calculation which calculates net emissions rather than gross emission gives a chance the states to avoid deep emission cut at within their borders while paying for emission reduction elsewhere. Therefore, developed countries could benefit the credit system by supporting the emission-reduction project in another part of the world. (Rosen, 2015)

3.1.4. Paris Agreement

Paris agreement is the first universal agreement having global legal-binding obligations for member states. The agreement is a part of the UNFCC, and the working area of the agreement is green-gas emissions mitigation, adaptation, and finance. The agreement was signed in 2016 with 187 signatory countries. The main aim of the agreement is to "strengthen the global response to the threats of climate change and to keep the global temperature rise this century well below 2 degrees Celsius above pre-industrial level and keep pursuing efforts to limit the temperature increase even further 1.5 degrees Celsius." To reach the main aim, the agreement prioritizes enhancement of the capacity, a supply of financial resources, appropriate collaborations, adaptation, and transparency. (UNFCC, n.d.)

The agreement includes some key roles for all member countries and all member countries agreed to keep the global temperature average to below 2 °C above pre-industrial levels**.** All countries presented their national climate action plans to the agreement as a contribution. Member countries also agreed to gather in every 5 years in order to report to each other their national climate implementations, enhance national contributions for long term climate goals and track their progress to a transparency and accountability system. The agreement mentions adaptation

to strengthen societies' capability to deal with the adverse effect of climate change, therefore, supporting developing countries, which is the core principle of agreement. (UNFCC, n.d.)

Zero GHG emission by 2060-2080: the new GHG emission reduction target is written in the agreement as "to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century" in which reduction is specified 40% to 70%or 70% to 95% reduction below 2010 levels by 2050. However, for the scientist, this reduction level is interpreted as zero by 2060-2080. (Clemencon, 2016)

On the other hand, the agreement does not have a legally binding reduction commitment since it places itself on the rights of fair and equitable burden-sharing. The second thing is that developed countries promised financial support to develop countries by providing 100 billion dollars; however, the financing promise remained ambiguous since the partner countries report their financial flows based on their financial methodology. (Clemencon, 2016) The president of the US, one of the world's largest green gases emitter, Donald Trump also mentioned his intention to pull out from the Paris agreement and as a result of this decision, the pact will be restricted only about 80% of greenhouse gas emission in contrast to previous 97 percent level. Due to the US isolation from the agreement, it would be difficult to convince other growing countries such as China, India that need to do more for GHG emission reduction. (Johnson, 2019)

3.1.5. Muslim Seven Year Action Plan on Climate Change(M7YAP)

Muslim Seven Year Action Plan was launched out by the British Earth Mates Dialogue Center together with the Kuwaiti Ministry of Awqaf and Islamic Affairs. From 14 countries, 22 participants from Islamic NGOs, academics, government members, and experts from 14 countries met at the end of October in order to discuss and draw The Seven-Year Plan for Islamic action on the environment. (M7YAP) The project is mainly initiated by the Alliance of Religions and Conversation (ARC) which has become a part of UNDP in order to address the

impact of global warming and develop innovative programs to work with key members in this field UNDP and by Earth Mates Dialogue Center (EMDC) which is a non-profit organization based in UK. The workshop was held in Kuwait for three days and ended up by emphasizing the main goals of the project. The project basically drew in the frame of Islamic vision by associating it with the environment and climate change. The first meeting was held in Istanbul in 2009 and the last meeting was held in 2010 in Bogor, Indonesia. The timeline of the project was limited between 2010 and 2017. (EMDC, 2009)

The plan was declared in Istanbul in 2009 with four broad goals.

- Framing an institutional enabling action plan
- Developing the capacity of environmental conversation to cope with climate change
- Enhancing outreach, collaborations, and communication
- Reviving and reactivating the previous declarations and action plans (Pal & Tok, tarih yok)

At the end of the conference in Istanbul, the action plan was declared as the title of the "Islamic Declaration of Climate Change." As part of UNDP and called "the biggest civil society movement on climate change in history." Therefore, climate change was admitted as human-induced and emphasized the importance of measurements. The action plan was prepared by Muslim countries as a 'green city model' which aimed to be a guidance for greening Islamic countries. The proposals aimed to be achieved through the 'MACCA' the Muslim Associations for Climate Change Action. The notable part of the conference was that Sunni and Shi'a majority countries came together and environmental issues were addressed in collaboration with Muslim states. (Al-Halawani, n.d.)

3.1.6. The League of Arab States

The League of Arab States (LAS) is an intergovernmental organization which has been established by 22 Arab states, 10 of which are in North Africa and 12 in

West Asia. The leagues include the council for Arab Ministers Responsible for the environment (CAMRE) which is established to lead the coordination and partnership among the member countries. The league of Arab states is working in cooperation with UNDP for many years. The league of Arab states recognizes the emergence of climate change as the main catalyst of conflict and displacement. Therefore, the League of Arab states works in cooperation with the UN partners in the region in order to maintain coordination on actions and build stability and resilience in the region. (UNDP, 2018)

Although the Arab states do not expose more than 4.7 percent green gas emission, the region is highly fragile to direct causes of climate change. In the last thirty-five years, the region has faced around 507 environmental disasters which caused 206,390 people to die and to be displaced 3.5 million people. The region is historically at the risk of seismic activities-especially Maghreb countries, Algeria, Morocco, and Tunisia- earthquake in Algeria in 2003 caused 3,000 deaths and more than 5 billion USD dollar economic damage. Yemen and Saudi Arabia faced floods during 2008-2010 which also caused a significant amount of economic loss. In addition to these climate effects, common language, cultural resemblance, and historical heritage brought Arab states together to take measurements against the devastating impacts of climate change (UNISDR, 2018) Hence, the Arab Strategy for Disaster Risk Reduction measurement program is adopted for upcoming 10 years.

The Arab Strategy for Disaster Risk Reduction: The Arab Strategy for Disaster Risk Reduction 2030 (ASDRR) is developed by the League of Arab States. The program is adopted with the council of Arab Ministers Responsible for the Environment and the 22nd session was held in Cairo on 19 December 2010, approved by the Economic and Social Council of League of Arab States in September 2011 and embraced in the highest political level in Heads of States Summit in Bagdad, March 2012. (UNISDR, 2018)

The key priorities for ASDRR, 2020 are identified in building resilience through knowledge, advocacy, research, and training, strengthen commitment for disaster risk reduction in the sectors, enhancement of intuitional, financial and coordination, and improving accountability for disaster risk management. (UNISDR, 2018)

The ASDRR, 2030 aims to reduce the risk in the region by identifying the key roles. In this regard, "Strengthening disaster risk governance to manage risk, investing in disaster risk reduction for resilience and enhancing disaster preparedness for effective response and to 'Build Back Better' in recovery, rehabilitation and reconstruction" are the main themes of the program. (UNISDR, 2018)

Understanding disaster risk: The theme mainly compasses the understanding, adaptation, integration to climate change through investing and improving scientific capacities, increasing public awareness, creating training opportunities with ensuring women's attendance, identifying and intensifying the potential adverse, impacts of climate change. (UNISDR, 2018)

Strengthening disaster risk governance to manage disaster risk: The theme generally consists of cooperating the risk reduction measurement actions into national, local policies for all critical private and state sectors. Addressing financial needs and identifying potential resources for funding and disaster risk management, enhancing transparency, and accountability of actions is the other factor of disaster risk management. (UNISDR, 2018)

Investing in disaster risk reduction for resilience: This theme mentions about analyzing financial mechanisms and identifying the most efficient ways for risk reduction program. Therefore, rural development plans, investing in community security, national infrastructures, education and health sectors, and development to reduce the risk of vulnerability are the other key parts of the risk reduction program. (UNISDR, 2018)

Enhancing disaster preparedness for effective response and to "Build Back Better" a recovery, rehabilitation and reconstruction: the aim of this theme is to adopt international standards as a response to disasters, improve institutional cooperation and capacity for damage and loss evaluations and recovery plans in the concept of 'Building back better' in order to avoid re-constructing risky buildings. The other remarkable factor of this theme is to create a health support service during emergencies that provide free care assistance and help to disaster victims. (UNISDR, 2018)

3.2. AD HOC ORGANIZATIONS AND PARTNERSHIPS

3.2.1. The UNDP Regional Bureau for the Arab States Arab Climate Resilience Initiative

The increased demand for energy in the Arab region is being met through renewable energy resources such as solar and wind, hydro, and geothermal energy in specific countries. For instance, %7 percent of the energy of Syria, Egypt, Iraq, Lebanon, Sudan, Algeria, Morocco, Tunisia, Mauritania is met by hydropower and, solar and wind energy generate a limited capacity of energy in Tunisia, Jordan, Tunisia, and Palestine. However, due to the available geographic position, solar energy investments are increasing with the remarkable projects in Morocco, and North African countries such as Djibouti, Somalia, and Sudan. (Gelil & Dean, n.d.) Additionally, The Arab Climate Initiative Resilience supports the new project submissions to the Green Climate Fund in the region. Other than these tasks ACRI also supports new regional collaborations and initiatives on climate change, peace, security, and sustainable energy solutions. (UNDP, 2018)

ACRI has been mainly confined as a regional initiative with the three regional consultations; Damascus, Syria; Cairo, Egypt, and Manama, Bahrein. The main aim of the ACRI is to provide strategic support to the Arab countries in cooperation with the United Nations Development Program. The process of the program is mainly based on consultation to bring together policymakers representatives of the private sector and international organizations. The goal of

the program is to create strategic guidance for interventions, action plans against the impacts of climate change. (UNDP-RBAS, n.d.)

Arab climate resilience focuses on enhancement knowledge about climate change and its possible impacts, improvement capacities to access climate finance, implementing action plans over prioritized tasks such as water, drought, and sustainable energy, and building new partnerships to extend local actions related to climate resilience development. To achieve the goals ACRI supports countries in the field of renewable energy, urban planning, and financial needs. (Gelil & Dean, n.d.)

ACRI mainly focuses on sea-level rise, water scarcity, and desertification, food security and rural livelihoods, dangerous extreme weather events, economic prosperity, and livelihoods in the region.

Sea-Level Rise: According to ACRI predictions, sea-level rise could cause to inundation of the coastal region and therefore would be the major threat for population lives. In case of an increase of 1-3 degrees, 6-25 million people would be exposed to flooding and it leads to contamination in groundwater resources. (UNDP-RBAS, n.d.)

Water scarcity and desertification: Arab countries contain 90 percent of drinkable water in its arid, semi-arid, and dry sub-humid areas. Due to climate change, increasing in higher temperatures, decrease in rainfall, the flow of rivers and streams rendering the region arider. (UNDP-RBAS, n.d.)

Food security and rural livelihoods: Increasing desertification and aridness due to temperature rises will affect food security, improve nutrition, and agricultural productivity. In the long term, it is anticipated that agricultural yield production will be lower to averages. (UNDP-RBAS, n.d.)

Dangerous Extreme-Weather: In the Arab region the number of severe events is increasing such as droughts, floods, hurricanes, cyclones, and dust storms. These

events will cause huge economic loss, social and environmental damages. (UNDP-RBAS, n.d.)

Economic Prosperity and Livelihoods: currently regions face the 14 percent unemployment rate. It is predicted that climate change will affect all sectors especially the tourism and agriculture sectors are more sensitive to the impacts of climate change. A decrease in agricultural productivity will have a significant impact on employment, heatwaves, and climate events will have an impact on the tourism sector. (UNDP-RBAS, n.d.) ACRI brings together all scholars, politicians, and environmental activists in the workshops and conferences. The outcomes of these events are being published in order to review the progress and strategies.

3.2.2. The Arab Framework Action Plan on Climate Change

The Arab Framework Action Plan on Climate Change (AFAPCC) was developed by LAS CAMRE in partnership with UN agencies in 2009 and the time frame is defined as 10 years. The main goal is to take measures to prevent the progression of climate change and prepare action plans against climate change impacts in the Arab region. The strategy of AFAPCC is determinant based on the protection of the natural environment and resources as well as livelihoods from the negative impact of climate change. Therefore, creating a feasible environment to improve regional coordination and support action plans has become the key role of the program. (ARSP, n.d.)

Like the other programs, this action program also emphasizes the role of adaptation, mitigation, awareness, finance to the prevention of the process of climate change. In addition to these key elements, strengthen the capacities of LAS members, and providing appropriate measurements to address the urgent impacts of climate change is also important. (UNDP, 2018)

3.2.3. Arab Strategies for Sustainable Development and Water security (2010-2030)

The Arab Strategy for Water Security is a long-term program that aims to overcome future challenges in water resources through development and management in the Arab region. The anticipated water challenges are being identified as water scarcity, geographic distribution, increasing competition over water utilization, and the challenges with the streams, rivers such as the Nile, the Euphrates, and the Tigris. The Strategy is the main guidance for the work of the Arab Ministerial Water Council which is established in response to climate change development and its impact on the region. The council mainly tasked by the Arab Economic Summit in 2009, Kuwait to set a water security strategy against future challenges and relevant sustainable development in the region. The strategy has the timeframe until 2030. (AMWC, 2012)

The priorities of the strategy are to:

- Optimization in the use of drinkable water resources
- Providing safe drinkable water and sanitation facilities
- Protecting ground and surface water against water contamination and depletion
- Taking appropriate actions and adaptation measurements against potential impacts of climate change
- Establishing the key principles of water management policy among Arab states.
- Establish the principles of integrated water resource management as a key element to cope with drought
- Strengthen cooperation and raising awareness among all Arab society, civil society organizations, exchange experiences, and action plans between Arab states.

The strategy mainly focusses on the common issues in the Arab region. The report, therefore, mentions the problems which can be solved through proper

implementation of the Strategy, voluntary and active contributions from all nations and parties. In the report, the importance of coordination and cooperation with national organizations and institutions emphasized concern about water scarcity in the Arab region.

As a result, many climate change initiatives and policies in the region have taken place without a proper acknowledgment and understanding of how and why they are prepared and need to be implemented. Specifically, gender inequalities and traditional roles affect both the economic-social system and climate mitigation actions. For instance, many women in agriculture are still forced to work for a small amount of salary or unpaid work. Across the region, the women's literacy rate is lower than the men's literacy rate of 15% and there is a small group in the decision-making process with only 9%. The lack of women in the decision-making process is the main difficulty in including women in environmental issues. (Hajj, 2016) The high unemployment rate, transparency, investment in renewable energy sources do not reach the aimed point by initiatives. For instance, Arab countries still have not fully integrated the implications of the Paris agreement since they are considering fossil fuels as the key economic factor in the future. Hence, for the Arab states, it is crucially important to understand the process of climate change and its link with the communities, countries, economies, and regions. The implementation process, strategies should be well evaluated by economic-political and social sectors. In the end, it should be seen by the governments that the adaptation strategies can also contribute to poverty reduction, renewable, and sustainable energy and equality.

Concluding Remarks

In this chapter, the importance of NGOs, initiatives, and measurements has been emphasized. The outcome is that climate change is not the major problem for only the Arab region but also it is a global problem. On the other hand, the importance of awareness, collaboration, and sharing the experiences among states shows us how a global issue could change state policies and urge them to act in

cooperation. However, in this chapter, we also see the insufficient action plans which remain in the level of workshop or conference levels. As a result, climate change is not a problem of society, region, or states, it is a common problem for all states, and climate policies need to be addressed in appropriate ways.

4. CHAPTER 4: THE IMPACT OF CLIMATE CHANGE ON HUMAN INSECURITY

Introductory Remarks

The abrupt fall of the Ben Ali regime in Tunisia on January 14, 2011, has ignited the wick of uprisings across the Arab region by raising many questions behind the inequal socio-economic structure, unemployment rate, corruption, and environmental issues. This chapter argues whether climate change had a multiplier effect over the trigger of uprisings by focusing on the economic-social and political structures of Arab states as well as their environmental policies to cope with the impact of climate change. Furthermore, this chapter analyzes the fragility of the Arab region to climate change in terms of water use, agriculture lands, weather changes, precipitation, and heatwaves. Therefore, this debate will give some predictions related to increased climate threats for upcoming decades. As a final, the chapter closes with a concluding remark and a summary of the chapter.

4.1. FOOD PRICE RISES: EGYPT, TUNISIA, AND YEMEN

Tunisia

Tunisia is located in North Africa in the southern Mediterranean. While the north of the country is intensely influenced by the Mediterranean Sea, the south and southwest areas of which are influenced by the Sahara Desert. (Treguer, et al., 2018)

Figure 3: The map of Tunisia
Source: lonelyplanet.com

The country is well known for its lower-income rate and vulnerability to climate change. The main climate stressors such as drought, low-precipitation, rising temperatures, floods have the main impact on economic and agriculture development, water resources, and the tourism sector throughout the country. The country has different climate features due to the geographical location of the northern, southern, and eastern coastal border; the northern part of the country shows Mediterranean climate features with mild and rainy winters and hot and dry summers due to mountainous structure. The south has a semi-arid climate, hot and dry summers since it hosts the Sahara Desert inside the region; the eastern coastal region has arid steppe climate features. Naturally, precipitation and average temperature differences among the regions like the south part receives less than 100 mm annual rainfall and the north part receives more than 700 mm rainfall per year. (USAID, 2018) A decline in annual rainfall has also been observed in the country, most of the rainfall is seen in the wet season (from October to April) by 10 to 30 percent decline and dry season (from May to September) decline by 10 to 40 percent. (Treguer, et al., 2018) Meteorological records also show the rapid temperature increase approximately by 1.4 Celsius and decrease in precipitation across all regions since Tunisia's heat level concretely increased 3 Celsius starting from the 1970s as well as a decrease in annual precipitation rates by 5 percent

since the 1950s. (USAID, 2018) The world bank report claims that “sea levels have risen by more than 3 millimeters per year since 1992.” While the coastal regions are experiencing floods and salinization due to sea-level rise, southern semi-arid lands experience frequent drought sessions. (Treguer, et al., 2018)

Climate Change and the Political Unrest in Tunisia

The Tunisian revolution has occurred after Mohammed Bouazizi who was an unemployed, 26 years old, university graduated person set himself on fire outside of the Sidi Bouzid municipality office in December 2010. After the Sidi Bouzid riots, the protests expanded to other cities, Siliana in 2012, Gafsa in 2013, Gabes in 2014, and through country center respectively. Thereby, unemployed youth found the opportunity to express their feelings against corruption, negligence of the regime, inequal distribution of investment among cities, poverty, and being abandoned and forgotten by the government. (Fanack, 2020) Once the streets of Tunis, the capital city, and the cities of Ben Garden, Kasrine, Tala, Douz, Sidi Bouzid, Al Hamah, and Al Kef After was taken by thousands of demonstrators, they chanted the words: “Khubz U Mah U Ben Ali, La” which means “ Bread and Water but No Ben Ali ”. (Derradji, 2012) Tunisian revolution also showed all the world that a 23-year dictatorship can be overthrown in 23 days without any international support, political groups, or a leader. (Kaboub, 2014)

For most of the scholars and researchers, Tunisian protestors hold the streets mainly because of the lack of democracy, the absence of accountability, and high political corruption. However, before the uprising, the report “Country Brief of Tunisia” published by the world bank in 2010, claimed that Tunisia had made remarkable progress in equitable growth in terms of fighting against poverty and achieving efficient social facilities that have a positive impact on income. It was indicated in the report that “Tunisia has consistently scored above its income category in the Middle East and North Africa average on most dimensions of comparative governance ranking and development indexes". However, the report was removed from the website only after a few days of the collapse of the regime.

Kaoub also questions the correlation between political unrest and political situation in Tunisia and describes the country as “one of the strongest police states, politically stable, westernized, highly educated, tolerant and relatively prosperous” among other Arab states. (Kaboub, 2014) In contrast to the report above, AHDR indicates that “Zein el-Din Ben Ali of Tunisia approximated the developmental state model, but the corruption and nepotism reached heights in Tunisia that crippled the experiment and the regime”. (Waterbury, 2013)

Furthermore, the Tunisian economy was defined as an “economic miracle” with steady growth and social and economic transformation before uprisings. However, this socio-economic growth had been inconsistent in terms of the dispersion of the cities, mostly coastal areas of the country had benefitted from it. The interior regions of the country where the natural resources were rich but the unemployment rate was high had not benefitted from the high growth rates and excluded from the investments in infrastructure, education, health services by the existing government. The exclusion of the interior regions led to the perception of ‘absence or neglect of the state’ among people. (Salehi, 2017) The frustration of neglect is described by a former member of the National Constituent Assembly from Kebili explaining the inequality among regions as “There is no equality among the regions, which is a question of power. Kebili is marginalized economically. We have only dates but without factories. If you look at Cap Bon, some dates and factories help with the production, but not in Kebili.” implying that the control of the economy is on the hand of ‘predatory quasi mafia-state’ which is established on corruption and benefiting only Ben Ali’s family. (Salehi, 2017)

As an example of inequality among regions, Despite being known as the biggest phosphate producer, Gafsa is one of the cities which has the highest unemployment rate with 28.3 %, with 46.5% of university graduated young people. In Gafsa, unemployed young activists define poverty as ‘humiliation’ while the city has natural resources and wealth, and explains the situation as the following: “ In the Gafsa mining basin, we produce richness, the CPG

[Compagnie Phospate de Gafsa or Gafsa Phosphate Company] is the backbone of the Tunisian economy, but, to the contrary, richness accumulates on the coastal regions, and leaves us in unemployment, poverty, and disease." By comparison to the other cities, the tourist place of Tunisia, Monastir has remained the lowest unemployment rate at 6.1% of the population. (Fenner, 2017) The inequal treatment to the regions has also been implemented through environmental policies. For example, while the risk of environmental issues has been reduced through waste disposal facilities in Tunis, people in the mining basin or the south of the country are at a high risk of health issues due to polluting industries, phosphate production, or chemical factories. For another example, in Gabes, cancer rates are at the highest level and one of the human rights activists and journalist Zouheir Makhlouf would post these words on Facebook: "Pollution was a taboo topic before 2011. The conscience was there, but people did not dare to speak out." (Salehi, 2017)

In response to the inequality of regions and suffering in poverty, the poorest region of the country would host one of the biggest social movements in 2008 after the Bread riots in 1984. The reasons behind the protest in 2008 were not significantly different from the protest in December 2010 in terms of demanding democracy, economic opportunities, equal treatment with the other regions. In 2008, the movement emerged with the execution of a regulation relating to the government's economic structure that led to a 75 percent dropping in its workers of Gafsa Phosphate Company (GPC)- the region's biggest employer factory. Upon that decision, the investments of the state and private sector remained unsettled and the population in the region felt that the mining basin has been abandoned by 'the Tunisian political and economic elite' in comparison with other regions. This feeling of dereliction made the conjuncture worse for the population and exacerbated them into rebellion. The attendees of Revolt of the Gafsa Mining Basin mostly were from all parts of the social groups such as a large part of university graduated unemployeds, temporary and unskilled workers, students and phosphate workers who had a work-related accident. They were the same social

groups who were the main attendees of the 2010 riots. For some scholars, the Arab uprisings in 2010 have been inspired by the protests in the Gafsa region. (Salehi, 2017)

In fact, Tunisia is familiar with the Bread riots historically due to the fact that the first bread riots in Tunisia occurred on 29 December 1983, in the south region Nefzaoua after the government announced the decision to cut the subsidies on the main bread ingredients, wheat, and semolina. Following this decision, the bread and flour prices peaked sharply and affected the poor households directly since they separate a high portion of their food budget for bread and semolina. (Lief, 1984) The underlying reasons were social and economic difficulties in the country. Before the riots, the government sought solutions against the stagnant economy which hit the European economy in 1983 and directly affected Tunisian tourism and export sectors. In regard, the cut in subsidies has been made to meet the adjustment criteria of the International Monetary Fund (IMF). (Prince, 2013) Rioters were mostly young, poor, farmers, women textile workers, educated but unemployed people. Even though the Bourguiba regime announced the cancelation of the increase in the price of bread and flour, the government overthrown by the coup lead, Ben Ali. (Prince, 2013)

Tunisia's agricultural productivity largely depends on rain and water management which covers 14 percent of the exports; naturally, Tunisia's agricultural sector remains highly vulnerable to climate change consequences. In the coastal zone, primary agricultural products are olive oil, dates, citrus, grain, meat, and poultry products however, agricultural lands are under the damaging impact of sea-level rise, unstable temperatures, and variations in precipitation. It is important to note that 80 percent of the water supply depends on the precipitation in the country. Increased evaporation in the region due to high temperatures also threatens soil salinization which causes the lack of adequate moisture for the full growth of crops. (USAID, 2018) The world bank report indicates that severe drought incidents have been declared officially in the country in "1994, 1995, 1997, 2000,

2001, 2002, 2008, 2010, 2013, 2016 as well as the most severe drought in the last 50 years took place from 2000 to 2002." (Treguer, et al., 2018)

Floods and droughts, which threaten crop yields, mainly wheat production and potatoes with irrigated farming, mostly occur in the coastal, desert, and urban areas. In this regard, rising temperatures, decrease in water quantity and quality, and the drop in crop yields play a significant role in food shortages for households, malnutrition for children especially. The report also asserts that the overall Tunisian economy depends on crop yields and olive oil production however, due to decreased crop yields, increased food prices, food demand as well as decreased income in farmer households lead people to migrate to urban centers. (USAID, 2018)

In the period of 2007 and 2011, which is important in terms of social upheavals in the Arab world, many countries in the world have struggled the drastic food price increases, basic foodstuff availability, and distribution. Food insecurity and rising food prices contributed to social movements to become stronger and the government also has figured out the reason for the first major protest over the increased food prices that led to other protests and forced the existing government to take measures in the food sector such as regulations concerning food prices and restricting food subsidies. (Newman, 2018)

Even though it has been said that the surge in global wheat prices contributed to social movements, Tunisia has not experienced the consequences of high food prices before or after the uprising in the domestic market in the short-term since the government subsidized the prices of food, but in the long-term, local markets may have been affected by soaring prices. (Newman, 2018) However, Johnstone and Mazo emphasize the economic inflation that led food prices to be risen by 20 percent in Tunisia and its triggering impact on protests for the people chant for economic poverty. (Femia & Werrell, 2013)

The revenue of Tunisia also relies on the tourism industry besides agriculture, which contains "6.5 percent of GDP and creates around 206,000 jobs". With its

natural diversity and cultural heritage, tourism is also highly linked to climate conditions. The report implies that tourists would be reluctant to visit the country during hotter temperatures. Furthermore, the cultural heritage and historical monuments would also be under the threat of changing climate conditions due to the fact that floods, storm effects, and rises in sea level are frequently observed in the country. Also, high temperatures lead to humidity that may deteriorate the paintings on the ancient tombs. (USAID, 2018)

Tunisia's beach tourism, diving, and natural tourism are also dependent on the availability of biodiversity and healthy coral reefs. However, coastal lines and 40 percent of species are under the threat of extinction because of the 2 Celsius temperature rise, storms, and sea-level rises. Besides the direct impacts of climate change, the indirect impacts can be seen in high energy consumption through the electric cooling systems and backup generators as a result of extreme temperature changes which will eventually affect the prices in food, energy, and transportation sectors. (USAID, 2018)

The World Bank report statistics provides numerical evidence related to the connection between income, migration, increase in the unemployment rate, and social unrest as the following: "These populations earn a significant portion of their income from agriculture, ranging from 13.7 percent of the active population in Tataouine to 30.4 percent in Kasserine, compared to a national average of 16.5 percent. Unemployment rates are also significant. In 2011, unemployment ranged from 12 percent in Kébili to 21 percent in Gafsa, compared to a national average of 16.4 percent. Rates are particularly high among women, ranging from 19.7 percent in Gabes to 28.3 percent in Gafsa. High rates of unemployment have already been contributing to rural to urban migration as well as social unrest." (Verner, 2013)

The reason of the high unemployment rate is the lack of education and job opportunities that described as "one in three young men in rural Tunisia (33.4 percent) and one in five in urban Tunisia are not in education, employment or

training" .The rate of unemployment of young people was also higher in the south and center than in the coastal regions. Young people spend more than three years to find a job which also discourages young people for searching a job. (Treguer, et al., 2018)

In that climate loop, a small temperature rise could lead to mass migration, increase unemployment and poverty which eventually increases the risk of social unrest. A similar evaluation concerning the correlation between income and social unrest has been made by Climate Change and Arab Uprisings report. The report claims that Tunisia is one of the biggest wheat importers along with Egypt, Libya, and Yemen, and due to the severe drought in 2010, international food prices soared which caused mass political protests in MENA countries. (Werrell, et al., 2015)

The condition in which Mohammad Bouazizi was shows us one more time that poor people and rural households in Tunisia are the most vulnerable group to the adverse impact of climate change. Specifically, when it comes to the farmers, the income fell by 3 percent in 2010 GDP. The scenario for poor people displays that they spend their incomes, which they make through unskilled jobs, mostly on foodstuff. (Treguer, et al., 2018) Ben Ali's government, in general, seemed of being a part of international environmental pacts, however, the main goal of the regime was to receive funds from the European Union regarding environmental issues. For instance, during his administration, streets from all over the country had been named "Boulevard of the Environment". (Salehi, 2017)

Egypt

Egypt embraces twenty-seven governorates; nine of them is located in Lower Egypt. In the Nile Valley region; nine of them extend to upper Egypt from Cairo to Aswan and five frontiers are covered by Sinai and the deserts; the west and the east of the Nile. Alexandria, Cairo, Port Said, and Suez are the other four city governorates. (FAO, 2020)

Figure 4: The map of Egypt
Source: lonelyplanet.com

Whereas global heat increased by 0.85 Celsius in the period between 1980 and 2012, the degree rise was sharper in Egypt than in other countries all around the world. Between 1960-2010, temperatures increased by 0.07 Celsius for winter seasons and by 0.31 Celsius for summer seasons in Egypt. (Schrijver, 2019) The annual temperature on the Mediterranean coast has risen from 20 Celsius to 24 Celsius, 25 Celsius in Cairo, and 26 Celsius in south Aswan which means that the temperature range is averagely 30 Celsius during summers while the winter season is 18-23 Celsius. The numbers show us that while the south of the country is experiencing pretty warm and sunny winter days, the north part of the country has cool nights. (Gosling, et al., 2011)

The precipitation rate has historically been low in the country since it is located between the African and Asian continent in the arid region. The Mediterranean coast receives more annual rainfall as around 196mm when compared to other parts of the country, Nile Valley, Aswan, and towards to Cairo with 25mm and 2mm annual rainfall. (Gosling, et al., 2011) A significant amount of decrease in rainfall has been observed in between 1991 and 2015, which means that this arid

country is getting hotter and drier over the years and the decrease in precipitation and increase in temperatures can have severe effects on economic and political instability since the country economically relies on agriculture and tourism. (FAO, 2020)

Historically, Egypt has been known as the farming nation since the economy mostly depends on the agricultural sector which is the third-largest sector. The agriculture sector is well located in the economy with 24 million Egyptian farming and fishing workers. In this sense, the agriculture sector accommodates 30 % of the population as well as providing 55 % subsistence of the overall population. However, the export rate is relatively high with 40 percent of all food demands. (FAO, 2020) The cultivation period in Egypt is divided into two main sessions; winter and summer sessions which also termed as "Nili" season. During the farming session, main crops wheat, maize, rice, cotton, soybeans, broad beans, sugar cane, sugar beet, vegetables, and fruits occupy the agricultural lands. (UNFCC, 2016)

Although the report claims that the field crops have maximum production capacity through improved new cultivars, modern technologies, and developed management programs, (UNFCC, 2016) climate change will have a negative effect on agricultural production. Flooding as a result of sea-level rise, evaporation, and drought due to increased temperature will cause increasing inland salinity, land desertification, and therefore a significant decrease in agricultural productivity. It is supposed that the only crop which will be increased by 2050 is cotton. (Abdel-Maksoud, 2018)

Water supply in agricultural, industrial facilities is largely dependent on the Nile river. However, the dam built on the Nile and the decrease in rainfall has altered the natural flow of the river. As a result of that, the irrigation system has become highly important for the farming sector. Although there is groundwater in the western deserts and Sinai, the deepness of these aquifers and the possible

deterioration of water quality put them at risk to be used in facilities. (UNFCC, 2016)

According to recent studies from the Egyptian Agricultural Research Centre, “the productivity of crops such as tomatoes and oil crops in the Nile Delta have been decreased throughout the past 10 years, as a direct impact of climate change”. (Elsaid, 2018) Rising temperatures also have an impact on Lake Nasser which is one of the main irrigation waters, located behind the Aswan High Dam, high evaporation rates and decrease in rainfall cause declining in the water level of the river. Thus, declining freshwater causes a decrease in agricultural output. (Schrijver, 2019)

Egypt is among the five most vulnerable countries to climate change in the world. The consequences of climate change will not only impact agricultural production but also will adversely affect the farmers' income and economic growth consequently. (UNFCC, 2016) Most of the Egyptians are living in rural areas and Hanaa El-Din split that population into two categories: “*the farm or agricultural sector* and *the non-farm or non-agricultural sector.”* Non- farmers, who are included in small, micro, and medium activities, are employees and social service workers such as teachers and doctors. Non-farmers' income constitutes 47 percent of Egypt's total revenue in comparison to farmers' income with 40 percent. The agricultural income remains less than non-farming income, it is nevertheless the most vital source for households since a quarter of population income depends on farming activities. (Kheir-El-Din & El-Laithy, 2008)

Furthermore, domestic agricultural production almost totally relies on the government’s regulations and support; Particularly wheat production is under the control of the government since the government is the only biggest purchaser of domestic wheat which makes it more important since the ingredient of Baladi bread is subsidized by the government. Through this wheat policy, the government assures low-priced bread for all citizens of the Egyptian population. Under the ‘Egyptian ration card system,’ almost 80 percent of the population would be able

to purchase Baladi bread at the subsidized price. This regulation has been fixed since 1989. (McGill, et al., 2015)Yet, the production of grain in total domestic lands meets only half of the population demand which put Egypt among the major wheat importers in the world. (Schrijver, 2019)

The period when the food prices rose in the global wheat market in 2010 and 2011, shook domestic prices in Egypt. Wheat prices in global markets almost doubled from "$157 per metric ton in June 2010 to $326 per metric ton in February 2011". (Werrell, et al., 2015) Thus, the doubled prices of wheat deeply affected the country's bread supply and availability since the households spend 38 percent of their income on foodstuff. (Almahdi, 2017) Global wheat producers, China, Russia, Ukraine, and Canada experienced drought, heatwaves, and fires in 2010 as a consequence of climate change and the production decreased "by 32.7 percent in Russia, 19.3 percent in Ukraine, 13.7 percent in Canada, and 8.7 in Australia." (Femia & Werrell, 2013)

While wheat production decreased significantly, wheat consumption increased and global wheat producers became unable to meet the demand, which led global wheat prices to soar, as a consequence. (Werrell, et al., 2015) Egypt meets 45% of wheat demand through Russia's markets, along with Australia with 9.3 percent and the United States of America with 23 percent. (Schrijver, 2019) According to Werrel "China is the largest wheat producer and consumer in the world". Drought in China's wheat farming regions in November 2010 and decline in precipitation in winter caused a significant decrease in wheat production which forced the government of China to take measures on releasing wheat to the global market; led to peaks in global wheat prices. (Werrell, et al., 2015)

Climate Change and the Political Unrest in Egypt

There were many pro-democracy movements that have fueled the uprisings, the one of them was organized by Kefaya[20] in 2005 to reveal Mubarak's 'rigged

[20] 'Kefaya' is known as The Egyptian Movement for Change but the group is more popular with this name.

elections', lack of political plurality, and transparency as well as the absence of the independence of the judiciary. The other segment of society also involved in movements with strikes such as hunger strikes, stoppages of labor, and sit-in protests that raged against the regime in 2006, 2007, and 2008 by textile workers in Mahalla and Kafr el Dawwar. (Balata, 2011) The other individual attempts, occurred when the police killed Emad el Kabir and Khaled Said excruciatingly, fueled the youth to occupy the streets. (Bakr, 2016) After the Mahalla strikes, the April 6th movement emerged with the support of 'growing workers' in 2008. The young activists played a key role in the building of the movement by employing social networking to publicize the demand of Mahalla workers and the death of Emad el Kabir and Khaled Said by police officers. (Balata, 2011)

It was not a coincidence that Egypt experienced social protests in the 2000s. The first bread riots in 1977 were similar to the riots in 2011 since it also occurred due to food price rises. he United States, the largest wheat provider for Egypt, decided to cease the aid due to the war between Egypt and Israel, which forced the regime to cut subsidies in wheat and flour production. Due to the failure of the 'Al-intifadah' economic program, Sadat required IMF's assistance which was provided under the condition of a reduction in the subsidies program. (Karesky, 2012)

The immediate reaction was:

"*On January 17, 1977, the government announced plans to cancel around LE277 million (around £30 million) worth of subsidies, especially on food, as well as the cancellation of bonuses and pay rises for state employees. This immediately led to rapid price increases."* (Alex, 2009) *Over this decision, people began to shout like 'Ya baṭal el-'obūr, fēn el-fotūr?*" ("*Hero of* the_Crossing[21] *where is our breakfast?)*' refers to the corruption of the regime. After three days of violent demonstrations in Alexandria, Mansoura, Quena, Suez, Aswan, and other urban

[21] The code which has been used for the Egyptian military operation on October, 1973 to cross the Suez Canal.

areas, the regime stepped back and announced that the decision of subsidy cuts has been canceled. (Karesky, 2012)

Before the uprising in Egypt in 2011, the GDP growth was 5 percent and 20% of the population had trust in economic growth. According to the survey which was completed before the uprisings, only 9 percent of Egyptian citizens described the economic conditions that they were living in was “thriving”, while the rest of the Egyptian population describe it as “struggling” or “suffering”. (Anon., n.d. *Egypt*)The population of Egypt increased to 83 million people and characterized by rapid population growth. According to the UNDP report of 2010, 23.5% of the population was categorized between 18-29 ages among which unemployment was the most critical factor. Canadian International Development Agency(CIDA) reveals the fact that “Egyptians who are in the 15-to-24 age group” constitutes more than a quarter of all unemployed people in Egypt. At least 90 percent of Egypt's unemployed are under 30 years of age.” The combination of poverty, unemployed rate as well as economic inflation and stagnation reminded people of the need for change. (Balata, 2011)

In addition to these factors, the attacks to Coptic Christians and the presidential elections in November 2011 were the other triggering factors of uprisings. In 2011, the violent attack against the Church of Two Saint in Alexandria was the terrorist attack which caused the death of twenty-three people and a part of the church being burnt. In the same year in November, due to the absence of President Mubarek the parliamentary elections, his son was delegated, and thereby the chance of competition was eliminated for other candidates which were aimed to pave the way for son’s future presidency. (Bakr, 2016) For Vincenti, who is a researcher of Arab movements, the 2011 riots first propagated in the Mahalla al-Kubra that is known as the industrial town of Egypt and the place that previous bread riots emerged. The struggle for food, jobs, and security ultimately spread to Tahrir Square with the slogans like “nurīd isqāt an-nizām” (“we want the fall of the regime”) and made their demand as the following: “e’eish, horreya, a’adala’h ijtima’iya!” which means “bread, freedom, social justice!”. (Ghafar, 2012) The

underlying demands in these slogans were to have ‘sustainable access and use of management sources’ and ‘protection of environmental and natural resources’ along with referring ‘massive ‘theft’ of financial and natural resources’. (Vincenti, 2015)

In combination with social, political, and economic reasons, rising food prices triggered the conflict in the country, along with the fact that natural hazards and livelihood scarcity pushed people to live under the circumstances of poverty and struggling with food scarcity. (Schrijver, 2019) In addition to these reasons, Hosni Mubarak’s economic and development agenda which aimed at “fostering private sector-led growth combined with the modernization of the Egyptian economy and its integration into the global economy” deepened social poverty as it was promoting the new cities in desert areas and resettlement of millions of Egyptians outside of the Nile Valley, which also caused accessibility problems to essential services, job opportunities, and uncontrolled urbanization. (Vincenti, 2015)

It is important to point out that the food subsidy policy in Egypt is mainly introducing the government's involvement in all phases of the wheat production chain. In general terms it is described:

“The Egyptian government purchases almost all of the domestically produced wheat from farmers, at or above the global market prices for cost, insurance, freight (c.i.f), with the aim of promoting domestic wheat production; it is also the largest wheat importer from global markets in the country by far, and owns inland wheat storage facilities and public mills. The government sells domestically procured and imported wheat flour to bakeries at subsidized prices and provides eligible consumers with subsidies for bread.” Through this policy, the Egyptian government aimed to encourage farmers to cultivate wheat and decrease the import of wheat and wheat flour. (McGill, et al., 2015)

In 2008 “*Egypt, which has removed import taxes on staples, increased the amount of assistance to beneficiaries, purchased local cereals from farmers, and*

encouraged farmers to plant wheat. Planned long-term actions include a focus on reducing wheat and wheat flour imports, building government cereal silos to encourage more imports by the private sector, and encouraging the local production of wheat by supporting local farmers" (Wiebelt, et al., 2011)

However, the report also claims that due to corruption, waste, and inefficient policies along with the growing population, rising world prices have led to a spike in wheat prices in Egypt. Food and Agriculture Organization report stated the correlation of economic instability together with the political instability as the country experienced social grievances which led to conflicts in 2011 due to high price rises and the scarcity of Baladi bread at bakeries. (McGill, et al., 2015)

One of the accurate examples of the rising food prices in Egypt has been posted as a video[22] by Al Jazeera which emphasizes the fact that food price rises did not only affected citizens, it also affected shopkeepers and caused an according to decrease in the state's economic revenue because of the decline in tax collecting and consumption rates. Daily News Egypt posted the situation on 30 January 2011: "*One of the main reasons protests started are rising food prices and unemployment rates. The populated country of 80 million has an estimated 40 percent of its population living in poverty*." As the same thought has been shared by the United Nations " *food prices breaking an all-time high internationally by rising 25 percent for the year which is being led by the rising costs for staples such as rice and wheat*." (Daoud, 2011) It means that the adverse consequence of food risen mostly felt by poor people in rural areas with the "*spikes of more than 300 percent*" since they meet their bread demand through government subsidies. (Schrijver, 2019)

Nonetheless, the food riot lasted in Egypt. Following the flotation of the Egyptian pound, Egypt seeked support from IMF in November 2016. One of the conditions of IMF to support Egypt in this manner was to cut expendings and additonal taxes which led to economic devaluation and food inflation; a peak at 42 percent for the costs of bread and

[22] https://www.aljazeera.com/news/middleeast/2009/10/200910168027248397.html

cooking oil. After the supply cut for subsidized *Baladi* bread in 2017, Egyptians took the streets in Upper Egypt and Nile delta and riots spread to Alexandria and Giza by chanting *"One, two, where is the bread?"* and calling to bring down the government of El Sisi. (Ketchley & El-Rayyes, 2017) The Newspaper Middle East Eye posted this bread riots in a video[23] which shows that people are struggling with poverty and chanting as "*we want to eat*" and "*we want bread*". It can also be seen in the video that for Egyptians, bread is life especially for poor people who constitute more than half of the population.

Yemen

Yemen has a tropical, semi-arid to an arid climate. Yemen is located in the Middle East and North Africa. The south and the west part of the country are surrounded by the Red Sea and the Gulf of Aden while the north is surrounded by Saudi Arabia and Oman. (Grzywacz, 2020) Yemen has five major ecological features; "Hot-humid Coastal Plain, Temperate Highlands, Yemen High Plateaus and Hadramout–Mahrah Uplands, the Desert Interior, and the Islands Archipelago". Yemen has a high temperature with 21 Celsius annual average and the coastal regions have a limited amount of rainfall besides having generally hot and dry climate conditions. The northern regions are also characterized by long hot and dry sessions while highlands have more various climate patterns with cold winters and rainy, mild summers. (Affairs, 2018) However, it is observed that the annual temperature has increased averagely by 1.8 Celsius in the past 40 years and the precipitation rate has declined by 1.2 mm per month in the past ten years. (USAID, 2016)

Figure 5: Physical feature of Yemen
Source: encyclopedia Britannica)

[23] https://www.middleeasteye.net/news/egypt-bread-riots-protests-erupt-after-subsidy-cut-hits-poor

The Yemeni economy is dominated by mainstays that are oil and agriculture, however, both are extremely vulnerable to global price fluctuations. Oil is the most important natural resource for external exchange revenue as almost the total export amount (90 percent) is constituted by oil exports, which makes the country a net oil exporter. On the other hand, oil reserves have significantly declined which will make the country a net importer of oil. The other source of income for Yemeni households is worker's remittances that constitute almost 9 percent of total households' income. The other income flows result from self-employment and wage labor. (Breisinger, et al., 2010)

The agriculture sector is mainly dependent on wheat, maize, cereals, fodder, fruits, vegetables, legume, coffee, qat production as well as fish and livestock. However, the farming seasons are under the risk of frequent floods, soil erosions, droughts, and land desertification that cause a significant fall in the annual amount of crop yields. (USAID, 2016) The sector is mainly maintained by employing traditional methods including rain steams which also make the country more vulnerable to droughts in desert areas and floods in the Western Highlands. According to the analysis, in the west, south, and the eastern part of the country, the cities Raymah and Abyan, the annual desertification which is around 3 to 5 percent, will negatively affect food security and cause the extinction of arable areas. (Ali, 2012) Due to the small amount of domestic agricultural production less than 5 percent, Yemen is one of the major food importer countries. The country imported 70-90% cereals among other foods before the conflict in 2015. (Affairs, 2018)

While agricultural lands are highly at the risk of natural hazards such as floods with a high magnitude that mainly cause the losses of planting lands, uprooting trees, death of animals, destruction in infrastructures, these aggravate the desertification and degradation processes as well. (Breisinger, et al., 2010)Natural hazards may have likely led to displacement, conflict, and economic instability in the country with almost 100,000 people having been affected by them, yearly. For instance, floods and tropical storms in 2008 caused mass displacement of 20,000 people. (USAID, 2016)

It is important to note that water resources were at the lowest level in Yemen when compared to other countries in the world. For example, the capital city of Yemen, Sana'a, is the most insufficient in terms of water, in the world as the groundwater source is getting decreased 1 to 7 meters per year. (Grzywacz, 2020) The rapid decrease in groundwater sources due to rainfall variability and extreme temperatures analytically proves that natural water resources will be depleted in the next 20-30 years regardless of climate consequences. It is estimated that the other aquifers in Abyan, Tuban, and Sa'adah will be emptied by 2025. (Affairs, 2018)

The Yemeni population was estimated at approximately 22.5 million people, 75 percent of which live in rural areas while 25 percent live in urban cities in 2009. Besides, the population growth rate was about 3 percent which means that there is limited infrastructure, health, and education services. (Ali, 2012)With this growth rate, the population is expected to be doubled to 50 million by 2050. Therefore, rural areas eventually suffer from inaccessibility to natural sources as well as food and water. (Jeneau, 2013)

Bodetti summarizes the link of food, health, and environmental securities, as stating that:

"Sea level rise is causing environmental issues in ports such as Aden and Al-Hodeidah. As a result of unusually high temperatures, malaria is spreading. Fluctuations in rainfall have affected crop yield across Yemen. The supply of fish in the seas around Yemen is decreasing, and several species have vanished. Climate change is one of the biggest threats to biodiversity."(Bodetti, 2019) According to the report of USAID, 17 million Yemenis in total live under the threat of food insecurity, while 21.1 million are in need of humanitarian assistance. Additionally, it is recorded that 2,8 million people displaced internally in 2017, according to the World Bank Report. The climate hazards have an adverse impact on the income sources as well, as most of the households' income depends on agriculture in the country. (Bank, 2019)

Meanwhile, a lack of adequate services, water scarcity, and ongoing conflict have a dramatic impact on the health sector. Serious diseases such as malaria, cholera emerged as common diseases, and recently the country experienced malnutrition with 1. 7 million children and in total 2 million people. It is estimated in the report of the International Food Policy Research Institute(IFPRI), which is discussion paper series, that climate change exacerbates the rate of famine and predicted to reach 80.000 people by 2050 as well as 270.000 people at the risk of hunger. (Wiebelt, et al., 2011) UN estimated that;

"In 2019, 24.1 million people—80 percent of the population—were "at risk" of hunger and disease, of which roughly 14.3 million were in acute need of assistance. An estimated 17.8 million people were without safe water and sanitation, and 19.7 million without adequate healthcare." It means that poverty in the country is getting worse and it is difficult for households to access food. (UN, n.d.)

Climate Change and the Political Unrest in Yemen

Yemen was going through a rough passage because of certain multiple problems such as social and economic pressures at that time, just before the Arab uprisings arrived at the country. The economic and social stressors are mainly; insufficient infrastructures, high population growth as well as the incapability of government, corruption, and high illiteracy rate, and last but not the least; the imminent depletion of water reserves and oil reserves which provide a substantial amount of government revenue. (Jeneau, 2013) Climate change also played a key role to prolong the conflict in the country with its devastating consequences such as a decline in precipitation, sea-level rise, water scarcity, and poverty. (Grzywacz, 2020)

Yemen is one of the most water-stressed countries. Once climate change, drought, inefficient water policies, overpopulation, and water-intensive plant(qat), poor governance, and tribal grievances came together, the conflict would be inevitable. (Douglas, 2016) In 2010, 45 percent of the Yemeni population was already

suffering from poverty which was followed by most of the Yemenis struggling with the lack of foodstuff, water, and health in that insecure atmosphere. In 2011, the inflation was higher than before with 20-30 percent and the output of oil was lower than the previous year. (Thiel, 2012) A 2010 survey conducted by the Yemen Polling Center (YPC), a Sana'a shows that almost half of the responses complain of the economic conditions, lack of job opportunities, and living conditions that should be the priority for the current government. However, for Yemenis, the government and political parties do not care about the public's conditions or a prosperous life, they only make promises during election campaigns. (Salisbury, 2018)

The protests began with demands for jobs, reformed social conditions, and modification of the government. There is no doubt that protesters were inspired by the uprisings in Egypt that overthrew an authoritarian regime. Hundreds of students, political activists, and teachers gathered in the capital city, Sana, and slogans started to be heard as: "Yesterday Tunisia, today Egypt, tomorrow Yemen" and "Ash-Shab yurid isgat an-nizam (the people want to bring down the regime)". (Fattah, 2011) Upon the protests, a new settlement, which consists of the transfer of power from President Saleh to his vice president Abd Rabbu Mansur al-Hadi within 30 days, designed by Saudi Arabia, the United States, and the Gulf Cooperation Council (GCC), was reached. The aim of the agreement was 'the establishment of a transitional government' that would be followed by-elections. Hadi was elected on the presidential elections on 21 February 2012. (Salisbury, 2018)

Just after this political transmission, a rebel group known as Houthis act upon the insecurity of the new government and took the control of Saada and Sana'a. After that, multiple actors such as Saudi Arabia, Al-Qaeda, 'a southern secessionist groups' and the United States (Grzywacz, 2020) and western-backed Saudi and UAE, (Douglas, 2016) in addition to millions of Yemenis played a role in the conflict which will be defined by the UN as the "world's worst man-made humanitarian disaster". (Grzywacz, 2020)

However, a research paper written by Douglas states that "Climate change exacerbated drought, inefficient management techniques, overpopulation, dependence on a water-intensive plant used as narcotic, poor governance and the persistence of tribal grievances are all coming together to drive the current crisis." (Douglas, 2016) In today's world, armed conflicts are the main threat for societies as the potential drivers can be identified as "poverty, income inequality, weak governance, and pre-existing history of conflict". In this regard, climate change may not be directly associated with the conflict. Rather, it has the potential to exacerbate the existing social grievances. (Schleussner, et al., 2016)

In the Yemen case, the ongoing social conflict, massive corruption, and the overuse of natural resources are primary contributors to Yemen's social, economic, and political instabilities. However, it is so obvious that climate change is worsening the conditions in the country ever before. (Atkın, 2013) "*The pre-existing poor health indicators in Yemen coupled with its vulnerability to natural disasters such as floods and drought, poverty, water scarcity, food insecurity, high population growth rate, severe malnutrition, conflict in the North and refugees in the south, and the recent problem of access and security of health-care providers and donor fatigue, presents the humanitarian community with many challenges for relief efforts"* (Meleigy, 2010)

Yemen had been experiencing the social and economic changes since the 1970s and the government implemented some measures to address water scarcity in the 1990s-2000s. The practices included *"increases in the diesel price (that were rapidly overtaken by inflation); elimination of credit subsidies for agriculture; modification of the fruit and vegetable ban; regulation and taxation of groundwater; and projects to support increased water productivity in agriculture"* (Douglas, 2016) In the food crisis in 2007-2008, the existing government-regulated a group of policies which can soothe the negative affect of global picked food prices. The actions mainly included *"Short-term actions have included training bakeries to produce bread from mixed cereals, standardizing the weight and size of bread loaves, drafting plans to increase the number of beneficiaries of*

the social welfare fund to reach more than one million, and raising government and staff salaries by US$15 per month." (Wiebelt, et al., 2011)

U.S. Department of Defense planning documents state that "*future water supply challenges could affect food production, and cause resource competition ... that will aggravate existing stressors such as social tensions – conditions that enable terrorism and other forms of violence."* (King & Burnell, 2017) According to research, water has been a crucial weapon in the conflict. Reports also exemplify the bomb attacks of Saudi aircraft over the drinking water reservoirs and blocking attempts of Saudis and Houthis to the humanitarian food and water aids. In addition to these attacks over the clean water, Houthis controlled the water sources in the city of Taiz and residents could reach only limited food, water, and medical supplies since 2015. (Mohammed, et al., 2019) Militants have been weaponizing natural resources in Yemen. Al-Qaeda controlling water distribution and repairing wells in Yemen can be taken as an example of that. ISIS (Islamic State group) also employed the same strategy to recruit supporters in Iraq and the Taliban and Osama bin Laden also took advantage of climate threats in their propagandas. (Bodetti, 2019)

4.2. DROUGHT AND MIGRATION: SYRIA AND LIBYA

Syria

Syria is divided into four geographic zones: "mountainous east of the coast, steppe east of the mountains with northern border, the Mediterranean coast and the desert in southeast bordering Jordan and Iraq". (USAID, 2017)

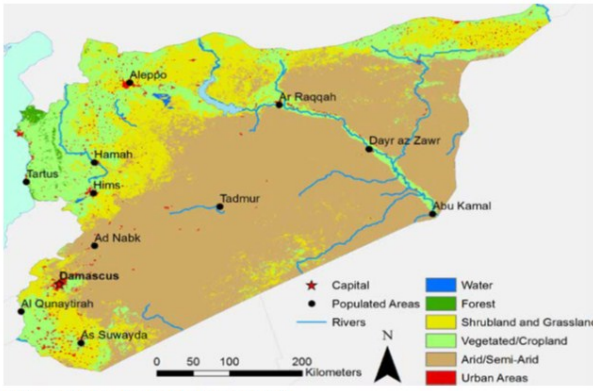

Figure 6: The physical feature of Syria
Source: USAID, 2017

Syria is under the influence of the Mediterranean climate; winters are characterized by cold and rainy weather and summers are hot and dry with 30 - 40 Celsius and above. The country is under the pressure of Siberia and the Mediterranean Sea in winters, while in summers, it is under the effect that comes from the Arabian Gulf, Red Sea, and North Africa. (Meslmani, 2010)

Syria is one of the parts of what is called 'Fertile Crescent' and has been known by its rich, fertile soils for the cultivation of wheat and barley particularly and animal herding accordingly. Syria is a net oil and petroleum product importer country, which also makes the country more fragile to global food price changes. Additionally, Syria is an importer of rice, maize, barley, soybeans, fish, and poultry while exporting olives, fruits, and vegetables. (Verner & Breisinger, 2013)

The country has different agricultural regions. In the Southern part including Damascus, Dara, Suweida, Al-Qunaytirah, production is based on fruits such as apples, apricots, grapes, and crops as chickpeas, tomatoes, and cattle-raisin. The Central part is known for the plantation of sugar beets, onion, potatoes, and irrigated wheat. The Coastal zone of the country, Lattakia and Tartous are famous with citrus, olives, tomatoes, and tobacco plantation, and the Northern region, which covers Aleppo and Idleb, is known for chickpeas, olives, pistachio

plantation, and sheep breeding. The Eastern region is the largest part of the country with the greatest production of cereals, cotton, and irrigated wheat. (FAO, 2017)

Climate Change and the Political Unrest in Syria

Syria as a country which is labeled with poor governance, mismanagement in water policies, inefficiency in agricultural sustainability, and the country that still suffers from the devastating consequences of civil war. Although the underlying factors of civil war have been seen from economic, political, and social policies, climate-induced reasons also paved the way for conflict. As Richard Seager who is a climate scientist at Columbia University will state that:

"We're not saying the drought caused the war. We're saying that added to all the other stressors, it helped kick things over the threshold into open conflict. And a drought of that severity was made much more likely by the ongoing human-driven drying of that region." (Stacey, 2019)

Therefore, the key role of drought over agriculture, increasing demands for water with the population growth, migration, increasing rate of unemployeds led to a devastative conflict when combined with the climate-induced factors in Syria.

Syria's agricultural productivity is highly dependent on rain and groundwater which also stimulated Syria's fragility to drought. (USAID, 2017) Between 2006-2011 as experts stated that more than half of Syria's land experienced "the worst long-term drought and most severe set of crop failures since agricultural civilizations began in the Fertile Crescent many millennia ago". (Femia & Werrell, 2012) As a result of climate-induced rainfall decline in the Al-Khabour river, which is one of the main tributaries of the River Euphrates, the river dried up and increased people's dependency to groundwater in 2008 (Erian, et al., 2010) Before the uprisings began in Syria, the rainfall dropped 66 percent across the region, in particular, the drastic decline in precipitation was observed in the governorates of Hassakeh, Deir ez-Zor, and Raqqa. (Erian, et al., 2010)

The severe drought was also observed in Israel, Jordan, Lebanon, and Palestine in the same period. (Châtel, 2014) However, for the western part of the country, Aleppo, Damascus, and Homs, the precipitation rate was above the average annual rate, while Dar' a received the lowest amount of rainfall. (Selby, et al., 2017) Tel Hadya, a plateau also experienced the worst drought and crop failures in the last thirty years due to lack of precipitation and an increase in temperatures specifically, during the wheat planting periods. (Oweis, 2007)

Syria's water resources do not only depend on precipitation but also watersheds and rivers. All countries in the Middle east share the major rivers, the Tigris, the Euphrates, the Orontes, and the Yarmouk/Jordan through their borders. There has been a debate between Syrian and Jordan over building a water dam over the Yarmouk river and water management over the Euphrates between Turkey and Syria. (Gleick, 2013) Despite the debates over the rivers, Turkey and Syria have recently cooperated on the increased water flow to Syria, specifically in the drought period. The other water resource of Syria, the Orontes, located in the Ghab region, rising from Lebanon, passing through Syria, and flowing into the Mediterranean Sea in Turkey, also has become a concern for Syria due to the precipitation changes, population growth, and overuse of water by drilling wells illegally as well as a high level of evaporation. (Hamade & Tabet, 2013)

The other triggering effect of the Syrian conflict is the massive 'agricultural collapse' especially in the northeast governorate of Hasakah, which is called "the breadbasket" of the country since it produces more than half of the demand for crop yields. (Kelley, et al., 2014) Wheat is the most important and prevalent cereal crop in the country with 60 percent of total cultivation lands, which made Syria a self-sufficient country in wheat production. However, wheat absorbs a great amount of water and the production depends on rainfall and irrigation systems mostly. Irrigated wheat is planted in almost every region aside from the country's non-irrigated cropping lands in Al-Hasakah, Ar-Raqqah, and Aleppo. Inappropriate climate conditions, the contribution of irrigated wheat to annual wheat production is more than rainfed lands. (Shean, 2012)

As a result of severe drought in the 2007-2008 season, crop yields dropped by 32 percent in irrigated areas and 79 percent in rain-fed areas than the previous years. In the same period, wheat harvest dropped to 2.1 million tons, while the yield was 4.7 million tones in the previous year. The absence of wheat for internal consumption forced Syria to import wheat for the first time in the last two decades. (Châtel, 2014) Since 2007, Syria has become one of the main wheat importers. The price of wheat and barley increased by 28 percent compared to the same period of previous years in the domestic markets. (Verner & Breisinger, 2013)

Crop failure led to internal migration particularly in the governates of Hassakah, since farmers have lost 85 percent of their livestock and suffered from crop failure by 75 percent which affected 1.3 million people in 2008 and 2009. (Femia & Werrell, 2013) As a result of the devastating circumstances, farmers and agricultural workers moved from rural areas to metropolises, Aleppo, Damascus, Dara'a, Deir ez-Zour, Hama, and Homs. (Gleick, 2013)

According to the research of Chatel, the precipitation rate is recovered in the 2008-2009 season and exceeded the annual level of rainfall in the 2009-2010 season, which eventually led farmers from north and east migrate to this province to find jobs after 2008. (Châtel, 2014) In contrast to Chatel's claim, research states that the first protests in Syria began not in Dara'a, but in Al-Hariqa, the center of Damascus, on 17 February after a police officer assaulted the son of a shop owner. The following protests took place on 22 and 23 February again in Damascus with a group of young people who oppose Mohammad Qadhafi and a few small-scale protests were held in Kurdish areas of the northeast. (Selby, et al., 2017)

Drought also exacerbated poverty by losses of income and higher food prices. The service sector was also affected due to the decrease in demand. However, the industrial sector may have benefited from drought owing to lower costs of labor that migrated from rural areas to city centers. (Verner & Breisinger, 2013) It is estimated that due to the drought between 2006-2010, nearly 800,000 people lost

their livelihoods, almost 1 million people remained food insecure and 200,000-300,000 people migrated from farmlands to city centers. (UNDP, 2018) Similarly, drought has caused a decrease in vegetation and feed resources for herders and, as a result, herders had to sell their animals for a low price and the small-scaled herders mostly lost 50-60 percent of their livestock. (OCHA, 2008) In the same period, the poverty rate increased in rural areas at the most since the household's income depends on sheep herding and camel herding as in the Bedu population. It is estimated that nearly 1.5 million Bedu people live in Syria and 70-80 percent of which has 200 sheep or less left their lands due to the impacts of drought on households and communities that resulted in low nutrition levels, losing income sources, and mobilities. (Zhu, et al., 2011) The provinces of Aleppo, Deir ez-Zour, Hassakeh, Idleb, and Raqqa have the highest number of people in poverty with 58.1 percent of Syria's overall population and these people make their living with less than two dollars per day. (Châtel, 2014)

The regional population growth was the other environmental factor of the Syrian conflict. The population of Syria increased rapidly from 3 million in 1950 to over 22 million in 2012, which also led to a decrease in water availability. (Gleick, 2013)The population in 2007 was over 19 million because of the rapid increase in population in Syria. Drought was also worsened by population growth and improper planting and herding practices. (Erian, et al., 2010) Rapid population growth and over-grazing accelerated the land desertification process and once-fertile lands turned to dust, herders and farmers had to move elsewhere or demand change. (Femia & Werrell, 2012) As a consequence of overpopulation and immigration to urban cities along with the lack of adequate access to social services, increasing the unemployment rate, the conflict remained inevitable.

In 2000, Bashar al-Assad's new economic program was established on liberalization through the privatization of state institutions.The important point of this policy was the removal of food and fuel subsidies. (Kelley, et al., 2014) In this regard, the cut in fuel in May 2008 and in fertilizer subsidies in May 2009 led to peaks in prices respectively by 342 percent and 200-400 percent. The economic

liberalization policy between 2000-2005 led to a sharp increase in prices and mass rural migration, which was roughly 135, 000 people. (Selby, et al., 2017) Assad's 'the Five-Year Plans' of 2001-2006 aimed at the protection of water resources, food security, and settlement of the nomad population through proposing a new cultivation steppe area. On the other hand, the plan banned summer crop cultivation by using groundwater and restructured a new fee regulation on winter irrigation by hectare whereas using modern irrigation techniques is proposed. (Hole, 2009) The plan also heavily supports the cultivation of water-intensive wheat and cotton and as a consequence of that, an increase in wells tapping aquifers was observed to reach twofold by tapping 135,000 in 1999 compared to 213, 000 tapping in 2007. This pumping caused a significant decrease in water resources as well as water quality. (Femia & Werrell, 2012)While Syria was known for its high repletion of groundwater resources compared to neighboring countries, Turkey and Iraq, climate change, and inefficient water and agriculture policies created a water crisis in Syria. (USAID, 2017)

In addition to the water mismanagement policy, the regime's waste mismanagement policy was also poor and ineffective. The reuse of water without decontaminating especially in the industrial areas caused surface pollution to decrease the quality of drinking water and contaminated the rivers that are being used for agriculture irrigation. Other than that, most of the rural areas in Syria were not connected to water purification facilities. Additionally, Syria's olive oil industry contributed to soil and water pollution since the wastewater of the olive oil process was being used for irrigation. (Zwijnenburg & Pas, 2015) It should be noted that climate change has more impact on air, water, and food. For instance, there was a concern that climate change can cause endemic diseases in Syria such as Leismoniosis (the Aleppo boil), which has been an epidemic in Syria since the 19th century, or malaria being increased due to floods or break of dams. (Meslmani, 2010)

In addition to climate change, the persistence of the regime on the integration of the liberal economy despite the drought, led to a dramatic increase in

malnutrition-linked diseases, particularly among children in the northeast provinces. Before the conflict in 2007, almost 204,000 families in north-eastern Syria remained food insecure due to the lack of income to meet the expenses for foodstuff and, losing crops and livestock. Diseases related to malnutrition doubled in 2008, in comparison with the same timeline in 2007 and 50 percent of deaths were children under five-year-old. (OCHA, 2008) In some governorates, waterborne diseases such as diarrhea, typhoid fever increased, as the quality and availability of water were extremely weak and inadequate. (Meslmani, 2010)

The link between climate change, drought, and conflict remain controversial among academicians. For Selby, who revised the Syrian conflict with the contribution of other academicians, there is no clear evidence that supports the idea of climate change was a driving factor in terms of uprisings in Syria. The primary contributor to the conflict was insufficient economic liberalization, as the protests began with demands for democratization, release for political prisoners, civil rights, and political freedom. Two main slogans, ‘al-sha'ab as-souri ma biyinthal’ (‘the Syrian people will not be humiliated’), and ‘yalli bi-eqtul sha'bo khayen’ (‘he, who kills his own people, is a traitor’) was adopted by rioters. (Selby, et al., 2017) However, some researchers claim that water shortages, migration, food price rises, and crop failures also played a key role in the conflict when combined with other political and social stressors. For King, Syria’s environmental degradation created an opportunity for ISIS (Islamic State) to recruit their fighters as ISIS possessed the municipal services in Aleppo and provided electricity and transportation services. (King, 2016)

Libya

Libya is framed by the Mediterranean Sea to the north, Egypt to the east, Sudan to the southeast, Chad to the south, Niger to the southwest, Algeria to the west, and Tunisia to the northwest. Ninety-five percent of the lands in the country are desert areas. (Aquastat-FAO, 2016)

Figure 7: The physical feature of Libya

Libya is known as one of the driest countries in the world receiving less than 2 percent rainfall for total lands of the country and 5 percent of the annual rainfall amount is more than 100 mm. The climate features of the country are mainly characterized by the Mediterranean Sea and the Sahara Desert. While the highlands close to Tripoli and Benghazi has cooler weather conditions, the interior lands have scorching hot temperatures with extreme fluctuations during the day. Compared to other regions, Tripoli and Benghazi regions receive the highest level of rainfall with a minimum of 250-300 mm of rain which at least provides some cultivation opportunities to the local people. The country is mainly dry with 56 mm rainfall averagely for the whole country. (Aquastat-FAO, 2016) It is under the control of dust winds that exacerbate dryness of the weather and short the visibility. (Buru, et al., 2020)

Libya's economy particularly depends on oil, gas, and some minerals such as iron, silicate, and limestone. It is clear that Libya's economy is highly dependent on oil rather than agricultural production. (Aquastat-FAO, 2016) In terms of income per capita, Libya has the highest level of income rate among other African countries. (Buru, et al., 2020) The agricultural productivity of the country is low since the plantation is possible for only about 1 percent of the total lands, through irrigation systems that can be observed in Al-Jifarah and Barce plains. In general, cereals,

wheat (the eastern and western plateaus), and barley are the crops mostly cultivated in the country, while in the east, apricots, figs, fruit, peanuts, broad beans can be grown in a small oasis, in addition to a small-scale olive farming. Tobacco farming is also observed in Tripolitania. (Buru, et al., 2020) As a consequence of limited natural conditions and low productivity, Libya is called as a net importer of food with a 75 percent rate of total foodstuff. It is anticipated that natural hazards such as floods, sandstorms, dust storms, salinization of soil, and sea level rises will likely damage agricultural lands and irrigation systems which will lead to a significant reduction in crop yields. (USAID, 2017)

Libya ranked 94th with a high human development rate among 188 countries in 2014. In 2003, the poverty rate was 13 percent of the population. However, the unemployment rate was 26 percent, and labor in the agriculture sector remained 19 percent of the overall population in 2010. Since oil rose globally, the workforce in agriculture declined by around 6 percent of the total population. (Aquastat-FAO, 2016)

Climate Change and the Political Unrest in Libya

On the 15th anniversary of the government that is responsible for the killing of 1,200 prisoners, a group of people gathered on the streets of Benghazi and Bediya. The day of the protests was also the 60th anniversary of the Italian massacre of Libyans that was marked as national day and people on the streets on that day demanded the release of an imprisoned human rights activist who had been campaigning against the ones who were responsible for the massacre and them to be punished. After the violent response to protesters, the National Front for the Salvation of Libya (NFSL) called people to “day of rage” for the following days in a nationwide manner. The “Day of Rage” resulted in mass protests and caused clashes between anti-Qaddafi and pro-Qaddafi groups in addition to violent police repression. (Siebens & Case, 2012) Libyan opposition was rallying on streets with the slogan ‘Libya Hurra (Free Libya)’ in March 2011. The regime of Qaddafi was

toppled with the involvement of NATO after the 40-year reign. (Femia & Werrell, 2013)

In Benghazi where the anti-government protests started, which is in the eastern part of Libya and the historical name of which is Cyrenaica, semi-autonomy was declared by protest leaders in March 2012. However, this decision was not recognized by the National Transitional Council (Europostnews, 2012) which was based in Tripoli, and declared itself as the representative of the people and remained active for ten months during and after the civil war. (NTC, n.d.) After the first secular elections since the fall of the Qaddafi regime, the current government, politicians, and academicians worked on to address the main reasons for Libya's uprising. The triggering impact of climate change and water management policies are still on the agenda of the government due to the potential risk for future conflicts.

Almost all of the population lives nearby the coastal regions where water accessibility is available. Since Libya is an extremely arid country, water scarcity has always been a concern for the people of Libya. The groundwater refills approximately 250 million cubic meters while the local water demand is annually around one billion. (USAID, 2017) Libya's water source is a "finite cache of 'fossilized' groundwater" mainly being consumed for irrigation of croplands and coastal aquifers have been increasingly invaded by seawater. (Femia & Werrell, 2011)

Qaddafi regime attempted to solve the problem of water scarcity through the project of "Great Man-Made River Project" which is also known as 'one of the largest and the most expensive water engineering projects in the world' and still on the process. The project was initiated in the 1960s and the aim of which was to pump " water from the vast, underground Nubian Sandstone Aquifer System in the south and takes it via a network of pipelines, to the populated coastal areas in the North, where most of the country's six million citizens live and work." (Aulakh, 2013) However, Nubian Aquifer System, which is "the oldest and largest

aquifer in the world" and lengthening under the Sahara Desert, is shared by Libya, Egypt, Chad, and Sudan. Even though the aquifer is filled with plentiful usable groundwater that is fed from fossil reserves, it is non-replenished and can be used once only. (Wood, 2010) The system is also nourished by desert lakes connecting to oases, which means desert lakes will be dried up as the time passes by and this makes the project unsustainable. (Femia & Werrell, 2011)

Qaddafi's "Eight Wonder of the World" is built on 1,300 wells and meets 6.5 million cubic meters daily need of freshwater for the urban cities of Tripoli, Benghazi, and Sirte. (Aulakh, 2013) The entire project consisted of five phases. Phase one received water from the eastern pipelines at As-Sarir and tazerbo to Benghazi and Sirte; phase two was conducted by supplying water in Tripoli and western pipelines in Jeffara from the Fezzan region; and phase three aimed to make an integrated system that improves the total daily capacity to aproximately four million cubic meters and provide 138,000 cubic meters of water per day to Tobruk. (Russeau, 2011)

The main purpose of the project was to supply water for agricultural lands. According to the report in 2000, while 83 percent of the water supply was allocated to the agriculture sector, 14 percent was allocated to municipal services and 3 percent was for industrial purposes. (Aquastat-FAO, 2016) However, due to the fact that the groundwater is not being recharged; it means that it is unsustainable, as Femia said "Water insecurity is a huge threat to the country." According to an article written by Aulakh, Libyan workers on the project claimed that the aquifer would have a hundred years of life span and for climatologists, water availability would run off in 50 years. (Aulakh, 2013) According to the report of FAO, the water demand will most likely increase based on the potential population growth in 2025 and thus, almost the whole amount of groundwater in aquifers will be used for domestic consumption rather than aimed agricultural use. (Aquastat-FAO, 2016)

Furthermore, it is estimated by climatologists that the drought days of Libya will double from ‘101 days to 224 days per year’ in the future. Accordingly, water shortage may cause international tension between the countries that share the groundwater resources since these countries have already been facing water insecurity and prolonged drought days. Therefore, it can be summed up with Famia's words “Water could cause great insecurity there.” (Aulakh, 2013)

The new transition government plans to tackle climate threats, particularly drought and water scarcity. The delegation of the new government attended to the UN climate summit in Durban promoting the *“Libyan Climate Change Initiative”* plan that aimed to establish ‘dozens enormous greenhouse-like structures’ across the Sahara and Arabian deserts and mentioned the other part of the plan; building solar-wind power turbines that will be financed by oil revenues. (Clark, 2011) Libya’s transition government will work on Qaddafi’s wrong policies as his ‘iron hand’ extended to all parts of the life and environment; disregarding human rights and management of natural resources by implementing inefficient projects. Those all remind Libyans of the brutal attempt of Qaddafi's to protesters by ‘shutting off water supplies’. (Femia & Werrell, 2011)

Conclusion Remarks

In this chapter, the direct and indirect impact of climate change on the political unrest in MENA countries has been evaluated. As it is obvious in the evolution that climate change cannot be a direct and single reason to lead a political tension, however, once it combined with the other political and social stressors, climate change may have provoked people to take the streets. In this regard, it was also important to address the past and current political and economic situations of the countries. Therefore, in the chapter, the political, social, and environmental aspects of the countries have been briefly evaluated and the impacts of climate change over those aspects have been detailed.

CONCLUSION

All things considered, the primary goal of the study was to analyze the direct-indirect relation between climate change and Arab uprisings in the MENA region. By doing so, the study also aimed at considering climate change as one of the triggering factors along with the other socio-political factors. While providing related evidence, the background of uprisings has been investigated in the approach of "invisible factors led to violence and conflict"[24]

In the first chapter, the study tried to present a comprehensive definition of climate change and the concept of climate threat that currently undermines life sustainability and expected to be more devastative in the future. In that regard, the chapter investigates climate consequences on human security historically and statistically. By doing so, the dimensions of climate threats have been examined.

Lastly, I have described the importance of rivers in the context of water security and environmental security. The evidence showed that rivers and groundwater reserves have under the threat of climate change since the temperature is getting increase and cause high evaporation. Additionally, state capacity is one of the most important parts to cope with climate threats. In the chapter, I have argued the state's mismanagement policies regarding drought, water reserves, and climate measurements and as a result of the climate migration.

The question of how climate change consequences are one of the triggering factors of Arab uprisings in the MENA region is complex. The impacts of low precipitation rate and increase in temperature have a greater impact on resource scarcity, natural hazards as well as economic and sociological part of life. It is

[24] Halvard Buhaug, Nils Petter Gleditsch and Ole Magnus Theisen, "Implications of Climate Change for Armed Conflict," in *Social Dimensions of Climate Change: Equity and Vulnerability in a Warming World*, ed. Robin Mearns and Andrew Norton (Washington DC, The World Bank: 2010), 82.

obvious that due to the temperature rising food security and thus human security is at the first risk factor of the climate threat.

In the second chapter, I have discussed food security, crop failure, and human security that are also defined as the main contributor to the outbreak of conflict in the MENA region. Undoubtedly, climate change has a devastative impact on all parts of the world however, climate change has acted as a threat multiplier in the MENA which caused destructive violence and conflict. In other words, rising temperatures caused drought and significant failure of crop yields that lead to human insecurity in the region.

Furthermore, the research provides statistical data to show how climate change results can affect people's life. Especially for economically dependent countries, the rise in global food prices caused high inflation and employment that are also considered as the main triggering factors of conflict in the region. It has been observed that basic foodstuff in the Arab countries is highly dependent on wheat and flavor products and this also makes these countries more vulnerable to economic food prices. In the chapter, a rise in food prices before uprisings has been linked to drought as a consequence of climate change.

In the third chapter, I examined the importance of international and national cooperation to cope with climate consequences. Especially, major international organizations such as the UN and NATO's political arrangements are highly important to bring all states together and control the state's implementation in this sense. In addition to that, the regulations of the Kyoto Protocol and Paris Agreement are also explained in terms of applicability.

Finally, I have tried to mention the action plans of regional and *ad hoc* organizations to decrease the damage of climate change. It was also important to emphasize their goals and strategies for human, food, and water security. However, as it is seen that these organizations remained insufficient in the context of decreasing the negative impact of climate change since current regimes were not willing to provide efficient cooperation and have already been suffering from

other socio-political issues such as economic inflation and unemployment. In other words, it is well known that without international cooperation, mitigation of climate threats could not be possible in any way.

It is so important to note that, climate change has not been identified as a potential security issue by international initiatives and organizations. International organizations generally consider the consequences of climate change as an environmental issue that needs to be solved with the cooperation states and organizations. Mostly, they cannot cope with the conflict that could be triggered by climate change consequences. So far, the international initiatives do not provide proper solutions to cope with climate conflict which has recently been defined as the new global security issue. Also, it does not mean that all climate change consequences could cause conflict, climate change is a process and the consequences over food and human security could be seen after a long period. Additionally, it is important to note that, all-climate consequences do not cause conflict rather, can be one of the driving factors in the occurrence of conflict once the social unrest emerged.

The last chapter has been devoted to making a comprehensive approach to the link between climate change and Arab uprisings by analyzing the most vulnerable countries in case bases. I have picked five countries in the MENA region that have experienced conflict and violence in the most destructive way and regime changes in conclusion. This chapter also provides clear evidence in the response of how climate change can be a triggering factor for conflict and violence through case base studies. Even though in some cases, we cannot see the obvious impact of climate change on the occurrence of conflict, still statistics and researches present the possible linkage as examining drought, unemployment rate, economic inflation, global food prices, water scarcity deeply and comparatively by years.

Overall, this study aimed to investigate the link between climate change and Arab uprisings while looking at its impacts on all parts of the world. It appears in the cases that climate change has a potential risk to life sustainability. This is why

climate change and its impacts need to be examined comprehensively. As a result of the research, I can support the idea of climate change could lead to violence and conflict whether directly or indirectly.

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