

An Overview of Climate Change in Afghanistan: Causes, Consequences, Challenges and Policies

Author: Najibullah Zaki

Supervisor: Professor. Dr. Markus Lederer

Technical University of Darmstadt, Germany

Institute of Political Science

Working Group International Relations

January 2023

Abstract

The current research is particularly significant and is titled “An Overview of Climate Change in Afghanistan: Causes, Consequences, Challenges and Policies.”

Climate change is investigated in this research using a descriptive method. The results of this research demonstrate that although Afghanistan contributes relatively very little to the production of greenhouse gases, which is the main cause of climate change, it is one of the most susceptible countries to climate change and its adverse effects. Afghanistan is particularly vulnerable due to several factors including a high rate of poverty, a low ranking on the Human Development Index, a dry climate, its dependence on agriculture, its sensitivity to natural disasters and to droughts as well as its status as a landlocked country.

Additionally, this paper demonstrates that emissions of greenhouse gases, particularly carbon dioxide, are the primary cause of climate change in Afghanistan. Adverse effects of climate change in Afghanistan include floods, droughts, rising temperatures, threats to food security, rising rates of poverty, threats to human rights, etc.

Based on these findings, if Afghanistan cooperates and coordinates with other members of the IPCC, UNFCCC, Kyoto Protocol, and Paris Agreement and if it implements specific policies to reduce climate change and its adverse consequences, it can benefit from a series of benefits listed in international treaties such as financial, technical, and capacity building benefits. Regrettably, Afghanistan has not been able to benefit from these international treaties.

Keywords: Climate change; greenhouse gases; carbon dioxide; energy; UNFCCC; Kyoto Protocol; Paris Agreement

Acknowledgments

I would like to express my gratitude to my supervisor, Prof. Dr. Markus Lederer, for sharing his thoughts, experiences, and knowledge as well as supporting me with guidance throughout this research. Professor Lederer, despite being busy, particularly scientifically and academically, made time for this research, and I learned a lot from him during the research. I am really grateful to him, and I wish him all the best in his future endeavors.

In addition, I would like to thank the members of the research team, especially Ms. Verena Lasso Mena, Miss Luise Knobloch, and Ms. Fakhria Latifi for their continuous support and for sharing ideas, expertise, and knowledge.

Additionally, I would like to express gratitude to Ms. Martina Dingeldein for her administrative support during the research. Her administrative support enabled this research to move forward without any problems.

Finally, I would like to thank my family, especially my kind parents who have always motivated, supported, and encouraged me.

I dedicate this research to my parents who have always been a source of pride for me.

Acronyms

ANDMA	Afghanistan National Disaster Management Authority
ANSA	Afghanistan National Standards Authority
CO ₂	Carbon Dioxide
COP	Conference of the Parties
CRED	Centre for Research in the Epidemiology of Disasters
EC	European Commission
EU	European Union
FAO	Food and Agriculture Organization
FWCC	First World Climate Conference
GDP	Gross Domestic Product
HDI	Human Development Index
HFCs	Hydrofluorocarbons
IARCSC	Independent Administrative Reform and Civil Service Commission
IFAD	International Fund for Agriculture Development
IFRC	International Federation of Red Cross
IPCC	Inter-Governmental Panel on Climate Change
IRENA	International Renewable Energy Agency
CH ₄	Methane
NDC	Nationally Determined Contribution
NEPA	National Environmental Protection Agency
N ₂ O	Nitrous Oxide
OCHA	Office for the Coordination of Humanitarian Affairs
OECD	Organization for Economic Cooperation and Development
PFCs	Perfluorocarbons
SF ₆	Sulfur Hexafluoride
UNDP	United Nations Development Program
UNEP	United Nations Environmental Program
UNFCCC	United Nations Framework Convention on Climate Change
WFP	World Food Program
WMO	World Meteorological Organization

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1. Climate Change, Causes and Consequences

1.1. Introduction

Climate change is one of the most important international challenges in the 21st century and is considered a serious concern for all countries of the world. The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.” (UNFCCC, 2012, p. 7)

Climate change is the result of human economic activities, particularly industrial activities, which happened since the industrial revolution. Since the industrial revolution, industrial activities have increased the consumption of fossil fuels or nonrenewable resources (coal, oil, natural gas and their derivatives) and have caused an increase in the emissions of greenhouse gases into the atmosphere.

The Kyoto Protocol considers carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆) as greenhouse gases (United Nations, 2018, p. 19). The emissions of greenhouse gases¹ are the most significant drivers of climate change. The following table provides information on the composition of greenhouse gases in the Earth's atmosphere:

Table 1: World Greenhouse Gas Emissions in 2016 (49.4 GtCO₂e²)

Sectors	Gas	Percentage
Energy, industrial processes, agriculture, land use change and forestry, waste	CO ₂	77 %
	CH ₄	14 %
	N ₂ O	8 %
	HFCs, PFCs, SF ₆ , NF ₃	1%

(Baumert, Herzog, & Pershing, 2005, pp. 4–5)

The greenhouse gases, particularly CO₂, the most significant greenhouse gas, have contributed to climate change and the warming of the earth's surface, also known as global warming. Since the

¹ The main emphasis of this research paper is on greenhouse gases as the biggest contributor to climate change.

² Stands for Gigatons of CO₂ equivalent.

industrial revolution, this process has been taking place, also known as the greenhouse effect. The harm that greenhouse gases do to people, the environment, and natural ecosystems are serious and significant (E.Kula, 1994).

At both national and international level, climate change has unfavorable consequences, including droughts, floods, storms, tornados, untimely cold, decrease in rainfall, untimely rainfall (for example, rain in winter and snow in summer), landslides, snow slides, rise in average temperature, heat waves, wildfires, premature melting of natural glaciers, rise in sea level, increase in diseases, increase in migration, decrease in agricultural products, etc. Since human economic activity is the main driver of climate change, efforts to slow it must be made on a global scale. Governments and international organizations must work together to reduce the effects of climate change because it is a significant global challenge. These efforts must take place within the framework of approaches such as conventions and conferences.

Afghanistan's climate change is the subject of this research. The causes, consequences, challenges and policies of climate change in Afghanistan have been researched. Afghanistan has been chosen because it is particularly vulnerable to climate change and lacks the possibility to support itself, despite having a very minor contribution to greenhouse gas emissions as a driver of climate change in the world.

This research is structured into four chapters. The first chapter is about climate change, causes and consequences. It includes an introduction to climate change, Afghanistan's vulnerability to climate change and climate change, its causes and consequences in Afghanistan. The second chapter addresses climate change in the light of international agreements and the role of Afghanistan. It covers the Inter-Governmental Panel on Climate Change (IPCC), UNFCCC, Kyoto Protocol, Paris Agreement, the role of Afghanistan and its energy sector. The third and fourth chapter cover climate change during the Taliban rule and the future challenges and policies of climate change.

1.2. Afghanistan's Vulnerability to Climate Change

Afghanistan is a country in South Asia with 34 provinces, and Kabul as its capital. It is a mountainous, landlocked, poor and developing country. This country with an area of about 647,500 square kilometers is bordered by China (76 km), Iran (936 km), Pakistan (2430 km), Tajikistan (1206 km), Turkmenistan (744 km) and Uzbekistan (137 km) (Torge Tünnermeier &

Georg Houben, 2005). In 2020, the population of Afghanistan was estimated 38.9 million people and the Gross Domestic Product per capita (GDP per capita) was estimated 512.7 dollars (World Bank, 2021).

Afghanistan is one of the most vulnerable countries in the world to the adverse effects of climate change and its consequences. According to the German Watch 2021 Climate Risk Index, Afghanistan is classified as the sixth most climate-vulnerable country in the world, after Mozambique, Zimbabwe, the Bahamas, Japan, and Malawi. As seen in the table below:

Table 2: The most affected countries in 2019

Ranking 2019 (2018)	Country	CRI Score	Fatalities	Fatalities per 100000 inhabitants
1 (54)	Mozambique	2.67	700	2.25
2 (132)	Zimbabwe	6.17	347	2.33
3 (135)	The Bahamas	6.50	56	14.70
4 (1)	Japan	14.50	290	0.23
5 (93)	Malawi	15.17	95	0.47
6 (24)	Afghanistan	16.00	191	0.51
7 (5)	India	16.67	2267	0.17
8 (133)	South Sudan	17.33	185	1.38
9 (27)	Niger	18.17	117	0.50
10 (59)	Bolivia	19.67	33	0.29

Source: (David Ecktein, Vera Kunzel, Laura Schafer, 2021, pp. 7–10)

Afghanistan, from 2000 to 2019, was one of the ten countries most vulnerable to disasters, according to a different report by the International Federation of Red Cross (IFRC) in 2020.

The countries with the highest average number of natural catastrophes are included in the following table from 2000 to 2019:

Table 3: Disasters related to natural hazards and climate change

All disasters triggered by natural hazards		
2000 – 2009	2010 – 2019	2019
122 countries/year	115 countries/year	128 countries/year
China 279	China 289	Philippines 23
USA 191	Philippines 173	India 18
India 182	India 166	USA 16
Indonesia 146	USA 155	Indonesia 13
Philippines 142	Indonesia 129	China 12
Bangladesh 82	Japan 79	Japan 10
Viet Nam 81	Viet Nam 65	Viet Nam 7
Afghanistan 81	Mexico 62	Uganda 7
Pakistan 66	Afghanistan 57	Pakistan 7
Japan 66	Pakistan 56	Nigeria 7
Climate and weather-related disasters		
2000 – 2009	2010 – 2019	2019
107 countries/year	107 countries/year	116 countries/year
China 226	China 238	India 16
USA 183	India 157	USA 15
India 154	USA 150	Philippines 12
Philippines 130	Philippines 142	Japan 9
Indonesia 90	Indonesia 92	China 9
Viet Nam 76	Japan 68	Indonesia 8
Bangladesh 71	Viet Nam 64	Viet Nam 7
Mexico 57	Mexico 57	Uganda 7
Afghanistan 55	Afghanistan 52	Bangladesh 6
Pakistan 51	Bangladesh 48	Afghanistan 6
Source: (Alison Freebairn et al, 2020, p. 128)		

The question may arise, why is Afghanistan one of the most vulnerable countries to the adverse effects of climate change? Afghanistan is susceptible to climate change for many different reasons.

The first reason is that Afghanistan is a poor country with a high rate of poverty, making it significantly vulnerable to climate change. In 2020, Afghan households experienced poverty at a rate that ranged from 47.3 to 54.5%, according to a UNICEF report published in 2021 (UNICEF, 2021). The findings of numerous types of research show that poor countries and poor communities

suffer more from climate change consequences (Fankhauser & McDermott, 2014). Poverty makes the government unable to respond to the needs of the people, but at the same time, it makes people unable to access the resources and facilities they need. Therefore, Afghanistan’s vulnerability to climate change increases people’s suffering from the consequences of climate change.

Afghanistan's low Human Development Index (HDI)¹ contributes to the country’s climate change vulnerability. In its 2001 report, the IFRC published data from United Nations Development Program (UNDP) and Centre for Research in the Epidemiology of Disasters (CRED) that compares the effects of natural disasters in countries with low, medium, and high HDI levels. Between 1991 and 2000, they gathered data on 2,557 natural disasters. The data showed that half of the natural disasters occurred in middle HDI countries, but two-thirds of deaths occurred in low HDI countries and only 2% of deaths occurred in high HDI countries. The following table shows data on mortality and financial costs associated with each natural disaster and how they relate to the HDI level:

Table 4: HDI level and Disaster Impacts

	Number of deaths per disaster	Monetary loss per disaster (\$ Million)
Low HDI	1,052	79
Medium HDI	145	209
High HDI	2	636
Source: (Wisner et al, 2003, p. 25)		

Afghanistan is a country with a low HDI score. The Bertelsmann Stiftung’s Transformation Index (BTI) report for 2020 states: “Afghanistan’s HDI score (0.498 in 2017) remains below the average (0.504) for countries in the low human development group. However, when adjusted for inequality, Afghanistan’s HDI score falls to 0.350”(BTI, 2020, p. 17). Since Afghanistan has a low HDI level, this is another reason for Afghanistan's vulnerability to natural disasters, especially climate change and its unfortunate consequences.

According to parts (c), (d), (e), (f), and (i) of paragraph 8 of Article 4 of the UNFCCC, the adverse effects of climate change especially include countries that have the following

¹ Measuring the development of the national economy using the GDP has shortcomings, given that only a small portion of the macroeconomic activity is represented by this measure. Therefore, additional significant information such as economic, social development and quality of life should be considered in addition to GDP. The HDI is a measure that achieves this objective. Instead of focusing on the means, the HDI concentrates on the development's objectives. This index summarizes human development and has three important dimensions such as healthy and long life, education and dignified living standards Jawad Tahmasebi (2012).

characteristics: (c) Countries with arid and semi-arid areas¹, forest areas and areas subject to forest decay; (d) Countries with areas prone to natural disasters²; (e) Countries with areas prone to drought and desertification; (f) Countries with areas of high urban air pollution; (i) Landlocked and transit countries (UNFCCC, 2012). When looking at the above characteristics, all of these characteristics can be found in Afghanistan. Hence, based on the components of paragraph 8 of Article 4 of the UNFCCC, it can be claimed that Afghanistan is one of the most vulnerable countries to the adverse effects of climate change.

Afghanistan's climate is arid, which contributes to its susceptibility to climate change. In addition to the increase in temperature, the amount of annual rainfall in these areas can further decrease. In Afghanistan, for most parts of the country, an increase in temperature up to 4 °C and a decrease in rainfall up to 30% is possible considering different scenarios. Therefore, due to its climate, Afghanistan is exposed to severe damage from climate change.

Since Afghanistan is an agricultural country, it is vulnerable to climate change and its consequences. The agriculture sector accounts for the largest share of GDP (30.6% in 2020) after the service sector (53% in 2020) and is a large part of Afghanistan's economy (World Bank, 2021). According to the International Fund for Agriculture Development (IFAD): “Agriculture remains the foundation of Afghanistan’s economy and employs 40% of the national labor force. Almost 70% of the rural population depends mostly on agriculture.” (Melissa Preen, 2020, p. 1) The agriculture sector is important not only for domestic needs but also for the country's exports (fresh and dried fruits, vegetables, etc.). According to the findings of scientists, the agricultural sector is more sensitive to climate change and its adverse effects (FAO, 2015). Changes in temperature, rainfall, and humidity have reduced water resources and caused serious damage to agricultural products, and due to the fact that the majority of people in Afghanistan are employed in agriculture, they are strongly impacted by water shortages.

¹ “The Afghan climate is arid to semi-arid with major daytime and night-time temperature fluctuations. The winters are characterized by low temperatures of down to – 10 °C and moderate precipitation. The summers are dominated by high temperatures of up to 50 °C in part combined with drought conditions. The temperature at the ground surface fluctuates in summer by more than 50 °C during one day whilst temperature fluctuations of up to 30 °C are possible during the winter. The annual precipitation ranges from less than 50 mm/year in the south – west of Afghanistan to 1000 mm/year in the north – eastern highland” Torge Tünnermeier & Georg Houben (2005, p. 2).

² Afghanistan is a country prone to natural disasters. IFRC report in 2020, listed natural disasters as storm (hurricane), flood, landslide, wildfire, heatwave, drought, disease outbreak, earthquake, and volcano (Alison Freebairn et al (2020). The data show that almost all types of natural disasters occur in Afghanistan during the year and cause loss of life and huge financial and non-financial losses. The data is presented under related topics.

Afghanistan does not have the necessary capacity and ability to deal with the negative effects of climate change, and this has not been an important priority for governments in Afghanistan. On this note, it can be claimed that Afghanistan is vulnerable to climate change and climate change prevents Afghanistan from achieving its economic and social development goals (BBC, 2016).

1.3. The Causes and Consequences of Climate Change in Afghanistan

As mentioned earlier, Afghanistan is highly vulnerable to climate change and it is essential for Afghanistan to understand and analyze climate change and related challenges. One of the main factors contributing to climate change in Afghanistan, as well as in other countries, is the emission of greenhouse gases, mainly CO₂.

The following table displays Afghanistan's annual CO₂ emissions along with the relevant sectors from 2015 to 2019:

Table 5: Afghanistan's CO₂e emissions from 2015 to 2019

	2015 MtCO ₂ e ¹	2016 MtCO ₂ e	2017 MtCO ₂ e	2018 MtCO ₂ e	2019 MtCO ₂ e
Agriculture	15.11 Mt	15.32 Mt	15.22 Mt	14.85 Mt	15.54 Mt
Energy	8.09 Mt	7.42 Mt	6.94 Mt	8.23 Mt	8.27 Mt
Waste	3.28 Mt	3.37 Mt	3.45 Mt	3.53 Mt	3.61 Mt
Industrial Processes	601.66 kt	789.34 kt	910.72 kt	1.08 Mt	1.21 Mt
Land-Use Change and Forestry	-246.22 kt	154.66 kt	154.66 kt	154.66 kt	154.66 kt
Total	26.84 Mt	27.05 Mt	26.68 Mt	27.84 Mt	28.79 Mt
Source: (ClimateWatch, 2022)					

The table displays the CO₂ emissions in million tons in Afghanistan from 2015 to 2019 and notes that these emissions are attributed to the sectors agriculture, energy, waste, industrial processes, changing land uses, and forestry. With the emission of only 28.79 million tons of CO₂ equivalent (0.06% of global emissions) in 2019, Afghanistan was the 116th largest producer of greenhouse gases in the world (ClimateWatch, 2022).

Afghanistan's lower CO₂ emissions do not necessarily indicate that Afghanistan has made efforts to reduce them. This means it should not be assumed that Afghanistan lowered its

¹ Stands for CO₂ emission in million tons.

CO₂ emissions by switching from non-renewable to renewable resources. Afghanistan has not yet made any remarkable investments in renewable resources. In general, it can be claimed that Afghanistan's lower CO₂ emissions are bad news for its population. Because Afghanistan's economy will grow more slowly, there will be a high unemployment rate and the poverty rate will rise if there are fewer CO₂ emissions. Climate change has dire consequences for Afghanistan, some of its important consequences are specifically discussed below.

1.3.1. Floods in Afghanistan

The occurrence of devastating floods is one of the consequences of climate change in Afghanistan. Floods as disasters are not only the product of natural events but also related to several other factors. As Wisner points out: “the crucial point about understanding why disasters happen is that it is not only natural events that cause them. They are also the product of social, political and economic environments (as distinct from the natural environment), because of the way these structures the lives of different groups of people.”(Wisner et al, 2003, p. 4)

Afghanistan is a flood-prone country and is very vulnerable to devastating floods. Heavy and unseasonal rains and resulting devastating floods caused by them occur dozens of times in Afghanistan every year and cause huge economic losses (destruction of residential houses, loss of agricultural land, loss of animals, loss of plants, damage to infrastructure, etc.) and non-economic losses (death, injury and disappearance of people). According to a report by Reuters, the floods in March 2019 were among the most devastating floods in Afghanistan in which at least 63 people were killed, approximately 19,600 people were affected and more than 12,000 houses were either destroyed or damaged (Reuters, 2019).

Since the Taliban regained power in Afghanistan in 2021, devastating floods have occurred dozens of times in different parts of Afghanistan. In June 2022, such floods occurred in different provinces such as Kabul, Parwan, Panjshir, Kapisa, Logar, Maidan Wardak, Paktia, Ghazni, Nangarhar, Nuristan, Zabul, Kandahar and imposed huge economic and non-economic losses. According to a reference from the United Nations, untimely rains and flash floods in the northern and eastern provinces of Afghanistan have resulted in huge financial and human losses. Local media in Afghanistan have reported the death of about 70 people, while the Afghanistan National Disaster Management Authority (ANDMA) has only confirmed the death of at least 21 people and

the injury of 25 others. The deputy of this organization told the BBC that there are also a number of missing persons, but their numbers are not known (BBC, 2022).

On the one hand, devastating floods have caused enormous economic and non-economic losses to the people of Afghanistan, but on the other hand, there is no necessary and urgent assistance such as water, food, medicine, shelter and cash for the victims. Because after the fall of the republic government in Afghanistan (2021), nearly 9.5 billion dollars of the Afghan government's asset remained frozen in the United States (it was not given to the Taliban administration) and the Taliban administration itself does not have a strong financial foundation that can be used in urgent and necessary cases such as floods (Al Jazeera, 2021). In such cases, the necessary assistance is mostly provided by international organizations and non-governmental organizations (NGOs) that are funded by the international community. Since the Taliban regime has reached an impasse with the international community on some conditions such as the formation of an inclusive government, human rights and especially the rights of women and girls, cutting ties with terroristic groups, eliminating drug cultivation and trafficking, etc., the international community lost interest in the normalization of relations with the Taliban regime. This sometimes causes delays in dealing with humanitarian crises such as floods.

In addition, since the resumption of the Taliban regime in Afghanistan, most of the appointments by the Taliban regime in specialized positions have been made by clerics affiliated with this group and the likelihood of appointing independent and impartial experts is very low. This means that besides the severe marginalization of women and girls, also male professionals experience marginalization, which has made the situation worse. Considering the question of the hiring process for government employees before the Taliban regime during the republic era, the IARCSC needs to be mentioned. IARCSC stands for Independent Administrative Reform and Civil Service Commission which was in charge of hiring employees for specialized positions during the last years of the republic (mainly in the fields of water, energy, engineering, technology, finance and administration, agriculture, judicial and legal, gender, health, etc.).

However, for proper management of destructive floods, comprehensive planning, competent people (experts and professionals), capacity building, etc. are necessary, and Afghanistan needs to consider climate change as a serious threat.

1.3.2. Droughts in Afghanistan

Another adverse effect of climate change is drought and a decrease in rainfall. According to a report by Matthew et al. (2009), the average monthly rainfall in Afghanistan has decreased by a rate of 0.5mm, or 2%, every decade since 1960. This is primarily due to a decrease in spring rainfall of roughly 2.7mm each month (6.6% each decade). The fraction of rainfall that occurs during heavy occurrences has not trended over time since 1960 (Savage et al, 2009). Additionally, according to the IFRC report on the world disaster in 2020, the drought in Afghanistan from April 2018 to July 2019 harmed 10.6 million people (Alison Freebairn et al, 2020, p. 9). Furthermore, 80% of Afghanistan's land and over 9 million people in 20 provinces are at risk of water shortage, and the population is struggling, as stated in a documentary by Tolo News television (2018) titled “The effects of climate change in Afghanistan” (Tolonews, 2018).

In some provinces, people are facing a severe shortage of safe drinking water, and therefore they use unsafe water (salty water, bitter water, impure water, etc.) to drink and give to their animals. This favors the spread of diseases and even death (Tolonews, 2018).

Afghanistan has experienced drought at various points throughout time and even in 2022, the country faces the challenges posed by drought. The proper amount of rain and snow is less than the specified limit and the amount of precipitation in spring has decreased in almost the entire country. This has a severe impact on the water resources, which has raised people's concerns in this regard. When rainfall decreases, water resources also decrease. In order to compensate for the lack of water resources, especially in drinking, agriculture, livestock, industry, ecosystems, environmental diversity, etc., people make excessive use of water from underground sources. This will cause permanent damage to the country's water resources, which will not be compensated in the future. Droughts occur in different ways in Afghanistan. A local drought happens every 3 to 5 years and a national drought happens every 20 to 30 years (Vincent Thomas, 2016).

The effects of drought are very wide and usually, drought leaves adverse effects in various sectors such as agriculture, livestock, water resources, industry, energy, migration and business, income. For instance, Afghanistan is an agricultural country, thus drought and deficit in precipitation have a negative impact on the quantity and quality of agricultural products, pose a serious threat to livelihoods, impede efforts to eliminate poverty, and increase the need for humanitarian aid.

The prevention of drought and its effects in Afghanistan is crucial. Managing water resources and promoting water conservation are two of the inevitable focus points. In Afghanistan, water resources serve different purposes, including drinking, washing, cleaning, agriculture, animal breeding, energy production, industry, services, etc. Due to the fact that water is used for so many different purposes, there is actually intense competition for it. Therefore, the way water is used needs to change. In case of excessive water consumption, water resources will decrease and people will face one of the biggest problems. The facts lead to the conclusion that drought affects people in many ways and that the government needs to create a comprehensive plan to address the problem.

1.3.3. Temperature Rise in Afghanistan

Human activities, especially human industrial activities require fossil fuels, the extraction and use of which increases the emission of greenhouse gases, resulting in climate change and global warming, which raises many concerns.

Numerous types of research, IPCC reports, and greenhouse gas emission scenarios all show that the earth's temperature has increased since 1850. For instance, according to the Sixth Assessment Report (AR6) of the IPCC “global surface temperature will continue to increase until at least mid-century under all emissions scenarios considered. Global warming of 1.5 °C and 2 °C will be exceeded during the 21st century unless deep reductions in CO₂ and other greenhouse gas emissions occur in the coming decades.” (IPCC, 2021, p. 14)

A rise in temperature, one of the effects of climate change, results in the melting of natural glaciers (raising the ocean's water level), a decrease in water supplies, an increase in natural disasters such as droughts and fires, heavy rains and flash floods and acid rain (IPCC, 2021).

Unfortunately, Afghanistan has experienced a considerable rise in temperature over the decades. According to a joint report from the World Food Program (WFP), the United Nations Environmental Program (UNEP) and the National Environmental Protection Agency (NEPA) “temperatures have been increasing all over the country over the past thirty years, especially in the spring and fall” (WFP, 2016, Page 46). Another NEPA report found that between 1950 and 2010, Afghanistan's temperature increased by 1.8 °C, which is twice the rate of the world as a whole (Chatham House, 2022).

Due to the high temperatures that millions of Afghans are currently experiencing, there are disruptions in many aspects of their daily lives, including work, earning potential, access to energy, agricultural products, and even the spread of various diseases, etc. Afghanistan is a poor country with scarce resources for its citizens. For people, especially women and children who work outdoors, the rise in temperature will be very hard. Afghanistan needs to seriously take into account the climate change induced temperature rise and create detailed preparations for it.

1.3.4. Food Security in Afghanistan

Agriculture sector is an important part of every country's economy and makes up 1 to 60% of the GDP in many countries (Cheikh Mbow et al, 2019). In Afghanistan, agricultural sector contributed 30.6 percent of GDP in 2020, according to a report from the World Bank from 2021 (World Bank, 2021).

The food security of a country is influenced by climatic factors (such as temperature increase, change in rainfall, drought, floods and storms) and non-climatic factors (such as population growth, income and technology). Climatic and non-climatic factors of a country effect the four pillars of food security - availability, accessibility, exploitation and stability (Cheikh Mbow et al, 2019).

Unfortunately, food security in Afghanistan has been severely affected by climatic and non-climatic factors in the last five decades and this process will continue in the future (Peter Sloane, 2001). Given that a significant percentage of Afghanistan's population works in the agriculture sector (agriculture and livestock), this sector is particularly vulnerable to climate change since it depends on rainwater (increase in temperature, decrease in rainfall and drought, etc.). This in turn will intensify poverty in society and increase the possibility of displacement and migration. According to a United Nations forecast, at least 24 million people in Afghanistan will need humanitarian assistance in 2022. With nearly 9 million people on the brink of famine, Afghanistan is fast becoming the most food-insecure country in the world (Chatham House, 2022).

In addition, food security in Afghanistan is highly dependent on international food prices. Any change in international food prices can change food prices in Afghanistan. Since food prices have increased in international markets this year (2022) for various reasons, above all, due to the Ukraine crisis or Russia's war with Ukraine, food prices may continue to increase in the coming years. Adding to this, economic models also predict 1 to 29% increase in food prices by 2050 due

to climate change. Since Afghanistan imports part of its food needs from other countries, as a result, with the increase in food prices in the international markets, automatically food prices in Afghanistan also increase and Afghanistan's consumers suffer more. This in return increases food insecurity and adversely affects the country's food system (Chatham House, 2022).

Food security has strong gender and equity dimensions. All over the world, women and girls play a key role in food security and the food system. The effects of climate change are different among different social groups depending on age, gender, ethnicity, income, etc. Empowering women can have a positive effect on food security and the food system of families. In Afghanistan, mostly in villages, women and girls play a key role in food security and the food system, and there are regional differences.

1.3.5. Climate Change as a Driver of Poverty in Afghanistan

Worldwide, poverty is increasing due to climate change. It is clear that the production, distribution, and consumption of energy (nonrenewable energy), even though it benefits economic growth and development, is associated with the emissions of greenhouse gases which cause climate change and its adverse effects such as global warming.

Afghanistan is a poor country and climate change makes it more difficult for people to meet their basic needs.¹ For instance, recently, and particularly this year (2022), untimely rains—one of the consequences of climate change—have led to devastating floods in some of Afghanistan's northern and eastern provinces (BBC, 2022). The Office for the Coordination of Humanitarian Affairs (OCHA) report states that these floods have resulted in both human and financial losses. Dozens of people have lost their lives, dozens of people have been injured, many have experienced significant financial losses, and hundreds of hectares of agricultural land have been destroyed (BBC, 2022). This demonstrates how poverty has been exacerbated due to climate change and how it has become more challenging to provide people's fundamental necessities.

¹ Basic needs are defined as: “the minimum standard of living which a society should set for the poorest groups of its people. The satisfaction of basic needs means meeting the minimum requirements of a family for personal consumption: food, shelter, clothing; it implies access to essential services such as safe drinking-water, sanitation, transport, health and education; it implies that each person available for and willing to work should have an adequately remunerated job.” ILO (1976, p. 7)

1.3.6. Climate Change as a Threat to Human Rights in Afghanistan

Climate change is a great threat to human rights and can harm and destroy human rights. According to Daniel Bodansky, “climate change will severely impact the enjoyment of important human rights-the right to life, the right to food, the right to health, the right to self-determination, and so forth. Therefore, we need to prevent it.” (Bodansky, 2010, p. 519)

Former United Nations Secretary General Ban Ki-moon warns that “climate change threatens our ability to achieve sustainable development, and in some cases, our very survival” (Rosaline A. Bates Anoma, p. 5).

Flavia Pansieri, United Nations Deputy High Commissioner for Human Rights, points out that “climate change, human-induced climate change, is obviously an assault on the ecosystem that we all share, but it also has the added feature of undercutting rights, important rights such as the right to health, the right to food, to water and sanitation, to adequate housing, and, in a number of small island States and coastal communities, the very right to self-determination and existence” (Rosaline A. Bates Anoma, p. 13).

Mary Robinson, Former High Commissioner for Human Rights Council explained climate change as: “probably the greatest human rights challenge of the 21st century” (Rosaline A. Bates Anoma, p. 6).

There is a common point in the above statements which highlights that climate change is a great threat to human rights and that everyone should work together to secure human rights.

Since Afghanistan is a poor country and the resources and facilities of the people are very limited, a vulnerability in terms of economic, social, political, gender and age can be found. When looking at vulnerable groups to climate change, it is important to consider people from the perspective of rich and poor, gender groups of male and female, age groups of children, youth and adults and etc. As a result of climate change, different groups of society are more vulnerable. For example, from the point of view of gender, women, and from the point of view of age, especially children. This causes the rights of these groups to be threatened and poverty among them to increase. Because Afghanistan is a poor country, women and children who perform daily duties such as delivering drinking water or gathering wood from hillsides, suffer, particularly in rural areas. All in all, one can conclude that gender equality, access to wealth, access to new technology, access to education, access to information, etc., aggravate by climate change (Subham Mukherjee, 2021).

In this situation, it is believed that climate change is a big threat to everyone, especially people who are vulnerable in the social, economic, and political spheres such as people below the poverty line, women, children and indigenous groups (Agnes Babugura, 2010).

2. Climate Change in Light of International Agreements and the Role of Afghanistan

In Thomas Stearns Eliot's opinion, the fact that solving a problem such as climate change takes a long time, and requires the attention of several generations, cannot be a valid reason for delaying the investigation of that problem such as climate change (E.Kula, 1994).

As mentioned earlier, climate change is one of the biggest challenges of the 21st century. With the beginning of the industrial revolution in the 19th century, the economic activities of human beings such as production, exchange, distribution, consumption, trade, investment and banking increased. Changes happened in people's lifestyles, as their goal was now to achieve economic growth and development. In this way, their need for energy and its resources increased. However, it was impossible to carry out economic activities and achieve economic growth and development without energy consumption. Human beings turned to use non-renewable energy sources, namely fossil fuels which were cheap and accessible. Hence, people's use of non-renewable energy sources to provide their energy needs has increased. This intensified the increase in greenhouse gas emissions, climate change and global warming.

Due to the evidence about climate change and global warming, the First World Climate Conference (FWCC) was held in 1979 in Geneva. In 1980, the threat of global warming was raised in the United Nations. At the Toronto Conference (1988), industrialized countries were asked to reduce CO₂ emissions by 20% from 1988 to 2005. Everyone believed that CO₂ tax can be used to reach these numbers. Although in 1992 the European Union (EU) gave up proposing a CO₂ tax in the union, the governments of the United Kingdom and the United States and the European Commission (EC) were still studying and researching the practical and theoretical aspects of the CO₂ tax to propose it in the future (E.Kula, 1994).

International discourses on climate change discuss its international implications and the international solution that entails participation from all nations. Thus, the most significant international climate change agreements such as the UNFCCC, the Kyoto Protocol, and the Paris Agreement, are covered first, followed by a discussion of Afghanistan's role in these agreements.

2.1. The IPCC

The World Meteorological Organization (WMO) and the UNEP jointly founded the IPCC in 1988. In 1990, the IPCC released its first report on the climate change problem that included scientific evidence. It is the only United Nations agency with the responsibility to conduct scientific research on climate change. The decisions made by the United Nations are supported scientifically by IPCC's reports. The IPCC's headquarters is located at the WMO's permanent location in Geneva (Switzerland). The institution consists of three working groups and one special committee, as follows:

- Working group 1: Working group on scientific bases of climate change;
- Working group 2: Working group on impacts of climate change;
- Working group 3: Working group on policy to reduce the effects of climate change;
- Special committee on developing countries (IPCC, 1990).

2.2. The UNFCCC

The United Nations General Assembly noted in 1988 that some human activities can have an adverse effect on climate change and threaten the current and future generations with potentially severe economic and social consequences. Therefore, timely actions should be taken at all levels (United Nations, 1989, p. 133).

The UNFCCC, the first agreement that obligates nations to address the problem of climate change, was approved in New York in 1992 and put into effect in 1994. This agreement was based on the aforementioned point and took into account the actions and warnings of the IPCC about climate change and its effects. The UNFCCC as a legal treaty was signed in the United States. Bonn, Germany, serves as home to its secretariat. Today, 192 nations, therefore almost all the world's nations, have ratified the UNFCCC.

The UNFCCC seeks to stabilize atmospheric greenhouse gas concentrations at a level that has no harmful effects on both human activity and the climate system. This Convention offers the option of applying a number of further duties in response to changes in scientific perspectives *and* political needs through a continual process of revision, debate, and information exchange.

For its members, the UNFCCC has several commitments, both general and specific. Some of the UNFCCC's commitments are general and apply to all signatory countries, including both

developed and developing countries, while others such as those in Annex (1)¹ and (2)², are specific to developed countries exclusively (2). All member countries, both developed and developing, are subject to very generic pledges that lack concrete and quantifiable obligations. These obligations mostly include:

- Adopting national plans and policies to reduce climate change.
- Determining adaptation strategies to mitigate climate change.
- Applying the necessary management to prevent the increase of greenhouse gases.
- Observing climate change in adopting social, economic and environmental policies.
- Cooperating with other members in conducting scientific research and exchanging information (Adul Hussain Shiravi, 2011).

The industrialized countries that are included in Annex (1) of the Convention are recognized as the most responsible for climate change, hence, they have specific obligations to reduce possible consequences. These countries are obligated by the Convention to adopt specific policies to reduce greenhouse gas emissions and to report on their progress on a regular basis, but the Convention does not specify how much these reductions should be made (UNFCCC, 2012).

The industrialized countries that are included in Annex (2) of the Convention are committed to providing financial, technical, technological and capacity building assistance to the developing countries so that these countries can be able to fulfill their obligations arising from the Convention and reduce greenhouse gases. Clause (4) of Article 4 of the Convention also obliges the developed countries mentioned in Annex (2) to help offset the costs of adapting industries in developing countries and especially in countries that are vulnerable to the adverse effects of climate change (UNFCCC, 2012). Clause (5) of Article 4 has generally committed the developed countries mentioned in Annex (2) to provide financial assistance to the developing countries. Although the amount of financial assistance is not specifically determined in this paragraph, it is stated that financial aid should be to the extent that the developing countries can fulfill their obligations according to the Convention (UNFCCC, 2012).

¹ Annex (1) includes the countries of Australia, Austria, Belarus, Belgium, Bulgaria, Canada, Czech, Slovakia, Denmark, European Economic Community, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom of Great Britain and Northern Ireland, United States of America. UNFCCC (2012)

² Annex (2) includes the countries of Australia, Austria, Belgium, Canada, Denmark, European Economic Community, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, England, Northern Ireland and United States. UNFCCC (2012)

In addition, Clause (5) of Article 3 of the UNFCCC, while emphasizing the free international economy, has pointed to the sustainable development of developing countries: “the parties should cooperate to promote a supportive and open international economic system that would lead to sustainable economic growth and development in all parties, particularly developing country parties, thus enabling them better to address the problems of climate change” (UNFCCC, 2012, p. 10). It becomes clear that all countries have obligations in the Convention.

2.3. The Kyoto Protocol

The Kyoto Protocol, one of the most significant international agreements on climate change, was adopted in 1997 in Kyoto, Japan. This Protocol has determined a series of commitments to reduce greenhouse gas emissions to a certain amount for developed and industrialized countries in the period from 2008 to 2012. In other words, the Kyoto Protocol obliges only developed and industrialized countries to reduce greenhouse gases to a specified amount in the period from 2008 to 2012 and does not include developing countries in its period. Instead, the Kyoto Protocol encourages developing countries to use renewable energy such as solar energy, hydro energy, wind energy, bioenergy, and geothermal.

According to the Kyoto Protocol, developed countries should provide developing countries with financial, technical, and capacity-building support. Under the terms of this agreement, developed countries will reduce their greenhouse gas emissions by an average of 5.2% from 2008 to 2012 in order to get back to 1990 levels (Amir Hussian Mazzini et al, 2018).

To cut greenhouse gas emissions, new mechanisms were developed by the Kyoto Protocol. These mechanisms, often known as market-based or flexibility mechanisms, include the following: emission trading (ET); joint implementation (JI), and clean development mechanism (CDM) (Amir Hussian Mazzini et al, 2018).

There are advantages and disadvantages to the Kyoto Protocol. One of the Kyoto Protocol's most significant advantages is that it requires developed countries (in both rounds) to cut their greenhouse gas emissions. The Kyoto Protocol's primary disadvantage is that it failed to accomplish its fundamental and primary purpose, which was to lower greenhouse gases because all developing countries were excused from the first round of greenhouse gas emissions under this treaty. However, developing countries such as China and India are also responsible for the majority of global greenhouse gas emissions (Ward & Mahowald, 2014). This Protocol has therefore not

been very effective. All countries are expected to participate in the second round, which is the commitment round.

2.4. The Paris Agreement

The Paris Agreement is a legally binding global agreement on climate change. This agreement was accepted by 196 countries at the 21st Session of the Conference of the Parties (COP21)¹ to the UNFCCC in Paris, France, on December 12, 2015, and entered into force on November 4, 2016. Members to the UNFCCC “agreed at the COP20 in Lima, Peru, in December 2014 to set out their nationally determined contributions (NDCs) ahead of COP21 in Paris, France” (Boyd, Turner, & Ward, 2015, p. 3).

In order to comply with NDCs to reduce greenhouse gas emissions, the Paris Agreement requires each UNFCCC member state to establish and carry out their own plans. This agreement aims to fight climate change and accelerate the investments and actions required for a sustainable, low-carbon future. To put it another way, the agreement aims to keep global warming to less than 2 °C and preferably 1.5 °C above pre-industrial levels. It is unlikely that these aims will be accomplished without the cooperation of the governing entities, including the government, private sector, and civil society inside the nations, as well as the cooperation of the governments among themselves, the cooperation of international organizations, etc.

The Paris Agreement encourages all countries, both developed and developing countries, and especially developing countries in the design and implementation of national projects to save on greenhouse gases (Amir Hussian Mazzini et al, 2018).

The Paris Agreement is a milestone in the multilateral climate change process because, for the first time, a binding agreement brings all countries to a common goal to undertake ambitious efforts to combat climate change and adapt to its effects.

2.5. The Role of Afghanistan

Afghanistan, as a member of the United Nations, is obliged to take basic steps in collusion and cooperation with other countries to reduce the adverse effects of climate change. To achieve this goal, Afghanistan has joined many international organizations, international covenants and

¹ Those who are parties to the UNFCCC are also parties to the Kyoto Protocol.

international agreements related to climate change, especially since 2001. Afghanistan signed the UNFCCC in 1992, ratified the Kyoto Protocol in 2013, and ratified the Paris Agreement in 2017. Afghanistan can benefit as a member of the UNFCCC, Kyoto Protocol and Paris Agreement.

For instance, Afghanistan can benefit the most from Kyoto Protocol's advantages. Under the Kyoto Protocol, Afghanistan can receive financial, technical, and capacity-building assistance from developed countries. Unfortunately, Afghanistan has not yet used this Protocol to its full potential. This is due to several reasons. First, the Kyoto Protocol was ratified by Afghanistan in 2013 and has only been in effect for a short time. Second, Afghanistan was plagued with political problems, instability, and insecurity at the time. Thirdly, Afghanistan was unable to gain from the advantages of this Protocol due to the fall of the Islamic Republic of Afghanistan.

By becoming a member of the UNFCCC, the Kyoto Protocol and the Paris Agreement, the Islamic Republic of Afghanistan (the name of the previous government of Afghanistan), presented a series of obligations to the international community. To fulfill these obligations, Afghanistan has organized and implemented a number of laws, regulations, policies, etc., in relation to climate change. For instance, environmental law, mining law, water law, energy law, oil and gas law, forest affairs regulation law, environmental impact assessment regulation, air pollution reduction and prevention regulation, environmental protection policy, renewable energy policy. This shows that Afghanistan has been committed to cooperating with the international community in the direction of climate change.

2.5.1. Afghanistan's NDCs

According to UNFCCC – NDCs are “meant individual contributions from governments, but the overall objective of preparing NDCs is to ensure that we do not exceed the 1.5 °C threshold.” (Climate Action Network, p. 2)

Normally, UNFCCC member states send their NDCs to the UNFCCC. To make sure there are no problems during the implementation phase, expert teams evaluate these NDCs. One can question which important aspects of the countries' climate targets are addressed in their NDCs. To put it another way, what exactly is contained in these NDCs? In response to this question: “NDCs aim to provide a summary analysis of existing and instead country mitigation and adaptation policies and plans, commitments and targets, implementation strategies and sector priorities,

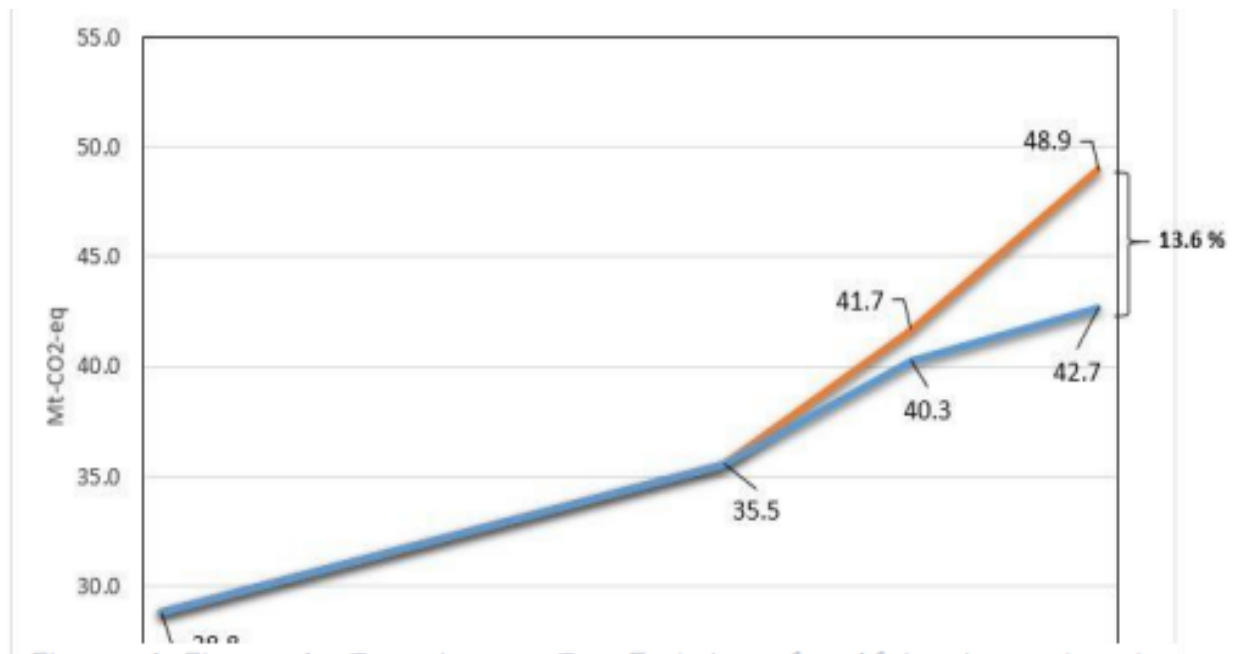
associated costs and conditionalities, and stated gaps and needs, among other issues.” (World Bank, 2016, p. 3)

In order to identify the need for financial support, technical transfer, and capacity building, NDCs help the implementing organizations comprehend the priorities of the countries, including relevant sectors in response to those priorities (World Bank, 2016).

Afghanistan's first NDC in English, with the base year of 2005 and a target year of 2020–2030, was submitted to the UNFCCC in 2015. According to the filed NDCs, which is conditional, Afghanistan pledged to reduce its greenhouse gas emissions (mainly CO₂, CH₄, and N₂O) in the energy, natural resource, agricultural, waste management, and mining sectors by 13.6% (Islamic Republic of Afghanistan, 2015).

As depicted in the subsequent figure:

Figure 1: BAU Emissions and Conditional Emissions Reduction - Afghanistan



Source: (Islamic Republic of Afghanistan, 2015, p. 1)

In relation to greenhouse gas emissions, the chart depicts two situations, namely the normal and conditional scenarios. In the normal scenario, Afghanistan would not get assistance (financial, technological, or capacity building) and would have to keep on greenhouse gas emissions. Afghanistan under this scenario produces greenhouse gas emissions as before. The conditional

scenario requires Afghanistan to control its greenhouse gas emissions and cut them by 13.6% compared to the baseline scenario while also receiving help (financial, technological, and capacity building). The question may be raised, which financial, technological, and capacity-building assistance does Afghanistan specifically require? Each of these supports is covered separately below to address the query.

2.5.1.1. Financial assistance

Afghanistan needs rapid economic growth and development to meet the demands of its people. Rapid economic growth and development can be achieved with the use of either renewable or non-renewable energy. Afghanistan's production of renewable energy is constrained by several factors such as lack of investment, and as a result, Afghanistan may switch to non-renewable energy to meet its energy needs. Afghanistan is a member of the Paris Agreement and according to the Paris Agreement, Afghanistan should not release as much greenhouse gas as it desires. This implies that Afghanistan must manage and control its greenhouse gas emissions in compliance with the Paris Agreement. Afghanistan needs financial, technical, and capacity-building support to manage and control greenhouse gases. For instance, Afghanistan requires financial support totaling 17.405 billion dollars (mitigation and adaptation) to achieve the targeted result (a 13.6 % reduction in greenhouse gas emissions by 2030) (Islamic Republic of Afghanistan, 2015).

2.5.1.2. Mitigation

Afghanistan asked the international community for \$6.62 billion of funding to reduce greenhouse gases, specifically CO₂, CH₄, and N₂O, by 13.6% by 2030. Afghanistan has promised that it could successfully implement plans to reduce greenhouse gas emissions with this financial assistance (Islamic Republic of Afghanistan, 2015).

2.5.1.3. Adaptation

Afghanistan's first NDC was filed in 2016, and it indicated that the country had very low greenhouse gas emissions. Afghanistan pledged that with this financial support, it will be able to properly implement its adaptation strategy. Of the total amounts requested, Afghanistan has allocated \$10.785 billion for adaptation (Islamic Republic of Afghanistan, 2015).

2.6. Afghanistan's Energy Sector

One of the important sectors that contribute to greenhouse gas emissions is the energy sector. This sector contributes to the production of greenhouse gas in all countries including Afghanistan.

Afghanistan is a country with a low economic growth rate and a high poverty rate. Thus, Afghanistan is in dire need of rapid economic growth and poverty reduction. The following table provides information about some economic indicators of Afghanistan from 2018 to 2022:

Table 6: Economic Indicator of Afghanistan (2018 – 2022)

	2018	2019	2020	2021 (projection)	2022 (projection)
Nominal GDP (billion dollar)	1,328	1,470	1,520	1,594	1,707
GDP Per Capita	493.8	507.1	512.7	500.3	498.8
Population (million)	37.2	38.0	38.9	39.8	40.8
Real GDP Growth	1.2	3.9	-1.9	1.0	2.6
GDP Composition (% of GDP)					
Agriculture	25.2	28.5	30.6	29.8	30.2
Industry	12.2	12.3	12.0	12.2	12.1
Services	57.5	54.6	53.0	53.7	53.4
Source: (World Bank, 2021)					

As seen in the above table, in 2018, Afghanistan has a GDP per capita of 493.8 dollars, real economic growth of 1.2%, and a population of 37.2 million people. It is clear from the table that the population growth in Afghanistan is very high and it shows high figures from one year to the next (for instance 37.2 million people in 2018 and 38.0 million people in 2019). In addition to the above table, according to the report of the Food and Agriculture Organization (FAO) in 2017, in Asia countries such as Afghanistan, Iraq, Lebanon and several small countries in the Persian Gulf have an annual population growth rate of more than 2.5% (FAO, 2017).

Combining the table numbers reveals that the population growth rate is very high while the economic growth rate is very low. A simple analysis shows that this is causing Afghanistan's poverty rate to increase. Afghanistan needs all-encompassing measures to address these problems. In other words, for Afghanistan to accomplish its economic and social development goals, rapid economic growth and the eradication of poverty are urgently required. In this situation, Afghanistan needs to produce, distribute, and use more energy to accomplish these goals.

Unfortunately, Afghanistan's ongoing wars and political instability have had a detrimental impact on all areas, including infrastructure (energy infrastructure). Despite having abundant

energy resources, Afghanistan has not yet reached full energy self-sufficiency. Afghanistan achieved self-sufficiency in energy production of 41% in 2014 and 43% in 2019, according to International Renewable Energy Agency (IRENA) report (IRENA, 2022). That is, a portion of Afghanistan's energy needs are met domestically, while the remainder is primarily met by sources outside of the country. As can be seen in the following table:

Table 7: Primary Energy Trade

	2014	2019
Imports (TJ) ¹	103880	136405
Exports (TJ)	8172	21807
Net trade (TJ)	- 95708	- 114598
Source: (IRENA, 2022)		

The primary energy trade for Afghanistan between 2014 and 2019 is depicted in the table above. As can be observed, Afghanistan has a significant trade deficit in the energy industry in both 2014 and 2019. Afghanistan will need to work hard for many years to become self-sufficient in the energy industry. In any case, Afghanistan requires the necessary energy to meet its objectives for economic growth and development.

Afghanistan's entire energy requirements are fulfilled by both renewable and non-renewable resources. What role do non-renewable and renewable resources play in Afghanistan's overall energy supply, one could question? In response to the aforementioned question, it should be noted that a small percentage of Afghanistan's total energy supply is made up of renewable resources compared to non-renewable resources. According to the IRENA report, Afghanistan only used 20% or less of renewable energy from 2014 to 2019; the remainder came from non-renewable resources (IRENA, 2022).

Alternatively, as seen in the table below:

Table 8: Total Energy Supply

	2014	2019
Non-renewable (TJ)	125979	151001
Renewable (TJ)	31203	36518
Total (TJ)	157182	187519
Renewable Share (%)	20	19
Source: (IRENA, 2022)		

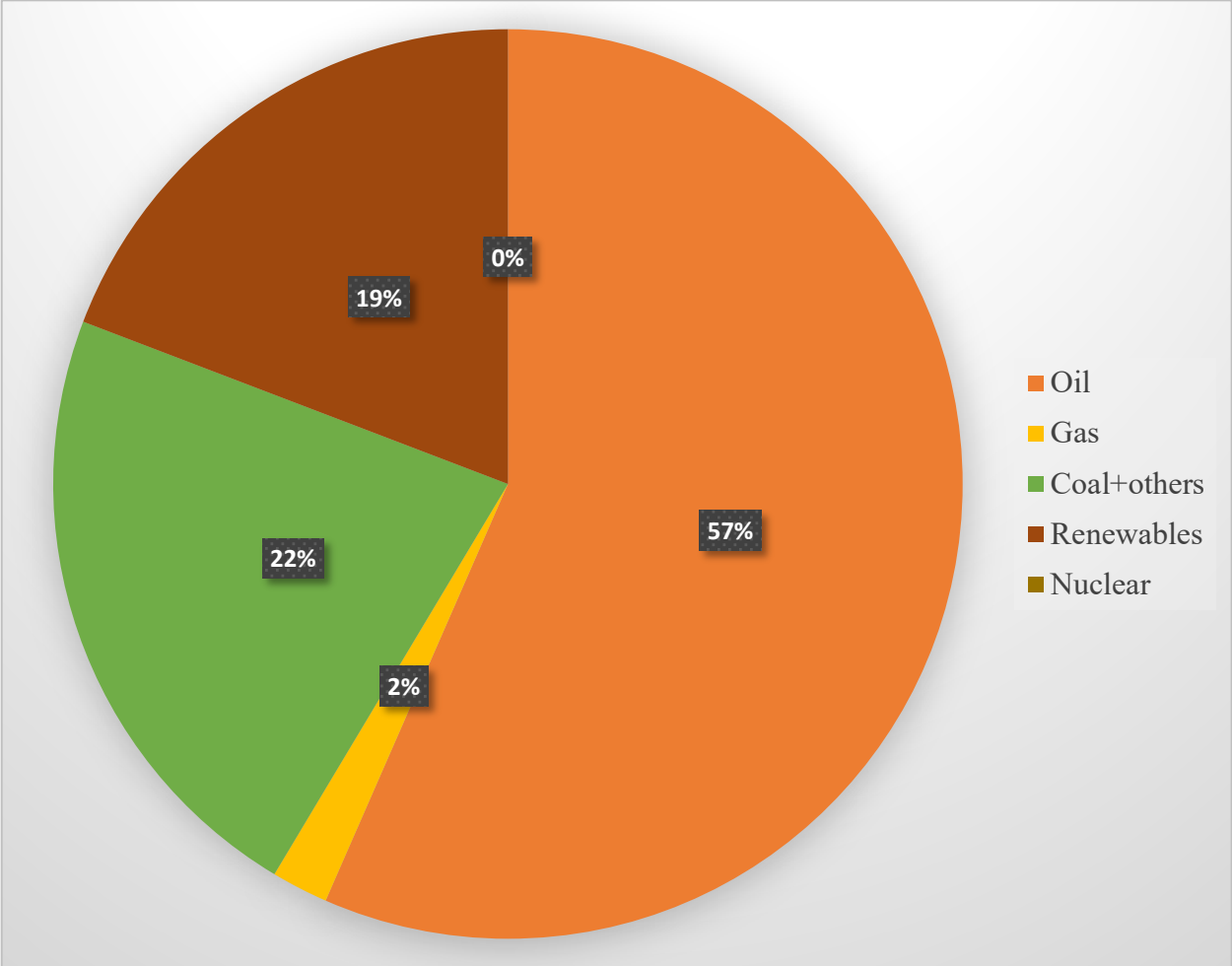
¹ TJ stands for terajoules, a unit of energy.

Afghanistan's total energy supply for the years 2014 and 2019 is displayed in the table above. As can be observed, between 2014 and 2019, Afghanistan's overall energy supply has a very low percentage of renewable energy (20% in 2014 and 19% in 2019) compared to non-renewable energy primarily derived from fossil fuels. In other words, the percentage of renewable energy in Afghanistan's total energy supply was expected to be 20% in 2014 and to be 19% in 2019. Afghanistan has a significant capacity for producing renewable energy. According to the Afghanistan renewable energy road map “Afghanistan’s renewable energy potential is estimated to be over 300,000 MW¹⁶, consisting of solar (222,849 MW), wind (66,726 MW), hydro (23,310 MW) and biomass (4,000 MW). Geothermal needs more detailed assessments to ascertain realizable potential” (ITP India, 2017, p. 21).

¹ MW stands for Megawatt.

The figure below offers details on the composition of Afghanistan's overall energy supply as well as the ratio of renewable to non-renewable energy in 2019.

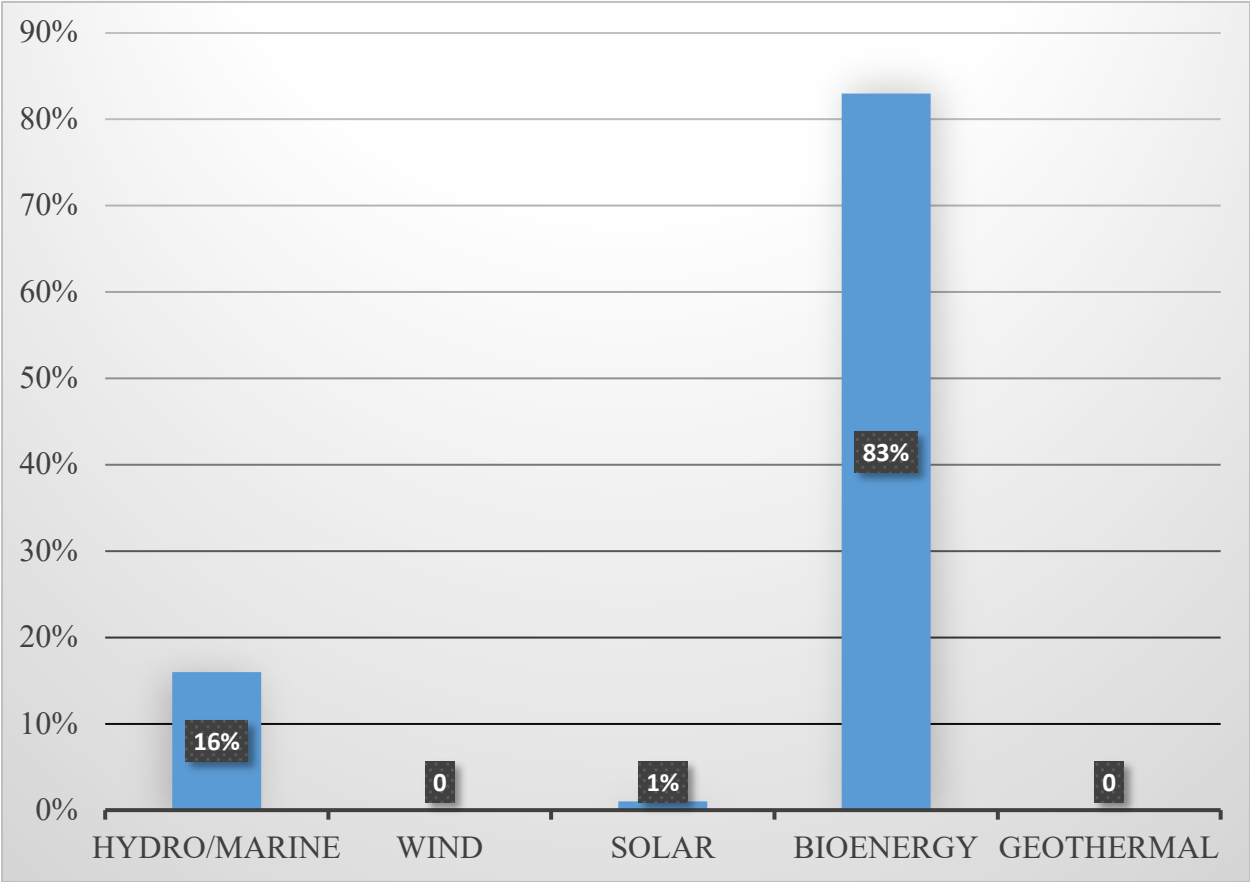
Figure 2: Total Energy Supply in 2019



(IRENA, 2022)

Also, regarding the composition of the total supply of renewable energy in Afghanistan in 2019, the following bar chart provides the information:

Figure 3: Renewable Energy Supply in 2019



(IRENA, 2022)

The above figure shows the supply of renewable energy in Afghanistan in 2019. As can be seen in the above figure, the supply of renewable energy in Afghanistan in 2019 included hydro, solar and bioenergy, and the supply of geothermal and wind energy in Afghanistan was zero this year. However, Afghanistan is also capable of producing renewable energy using geothermal and wind resources. Among the renewable energy sources in Afghanistan in 2019, bioenergy accounts for the largest share (83%) and solar energy accounts for the smallest share (1%). Given the significance of the issue, a brief discussion on bioenergy in Afghanistan is considered important.

As previously stated, bioenergy accounted for a considerable proportion of renewable energy in Afghanistan in 2019 (83%). Estimates indicate that Afghanistan can produce up to 4000 MW of energy from bioenergy. Afghanistan's population is heavily dependent on a variety of sources, including animal waste, plants, trees, grains, etc., for its bioenergy needs. Particularly in the winter,

people use biomass resources to heat their homes. This results in indoor pollution, respiratory illnesses, and fatalities (ITP India, 2017).

The energy produced by fossil fuels results in an increase in greenhouse gas emissions. One could wonder why Afghanistan should get its energy from fossil fuels. Many reasons for this exist, some of them can be found in the following list:

- In various parts of the country, there are numerous fossil fuel reserves that have already been identified and recorded.
- Afghanistan will be able to consume fossil fuels at a very low cost.
- The necessary investment in renewable energy has not yet been made.

The question of whether Afghanistan is allowed to use fossil fuels for energy production at any time and in any quantity can be raised once more. The Paris Agreement states that countries including Afghanistan should decrease their greenhouse gas emissions. Afghanistan faces a significant challenge in achieving its objectives for economic and social development. The two aforementioned scenarios put fossil fuel energy production and greenhouse gas reduction at odds with one another. Afghanistan requires international assistance to keep the two scenarios in balance. Afghanistan can invest in renewable energy to fulfill its goals of reducing poverty and accelerating economic growth, all while maintaining low greenhouse gas emissions.

3. Climate Change in Afghanistan under the Taliban Administration

Human activities, especially industrial activities, require the use of fossil fuels, and this increases the emission of greenhouse gases, climate change and global warming. Today, climate change and its unfortunate consequences are no longer a dream or fantasy, but a reality that is happening. All countries, both developed and developing countries, should make joint efforts to reduce the adverse consequences of climate change. Climate change is very important for all countries and especially for developing countries such as Afghanistan.

The Islamic Republic of Afghanistan fell on August 15, 2021, and since then, the Taliban has taken over the government in Afghanistan for the second time. By returning to power, the Taliban regime abolished all the laws and regulations of the previous government in all fields, and they themselves have not presented any specific laws and regulations, especially regarding climate change and environmental issues. It seems that the Taliban regime uses the laws and regulations of the previous government in a scattered and irregular manner. In addition, they benefit from the structures and institutions of the previous government such as the NEPA, the ANDMA and the Afghanistan National Standards Authority (ANSA) with all their facilities. In other words, it seems that the Taliban is using the soft and hard tools of the previous government in line with their desired goals, especially regarding climate change and environmental issues.

Climate change and its unfortunate consequences affect all countries including Afghanistan. The problem of climate change during the rule of the Taliban has intensified even more than before due to the lack of professional and technical capacities, and this problem should be looked at very seriously. The Taliban should perceive climate change as a real threat and in this regard, the Taliban should seek cooperation from the international community. For several reasons, climate change can be a point of interaction between the Taliban and the international community (although in a non – political, non – economical and non – security environment).

First, fight against climate change is one of the few crucial points that the international community and the Taliban agree on. For instance, “prior to COP26 in Glasgow, the Taliban urged world leaders to act on climate change and have since called on international donors to resume working on climate-related projects which have been halted.” (Chatham House, 2022)

In addition, concurrent to the COP27 in Sharm el-Sheikh, Egypt, the Taliban administration raised demands regarding climate change from the international community. According to the Taliban's foreign ministry spokesman, Afghanistan has lost more than two billion dollars this year alone because of the harmful consequences of climate change. He continued that the nation needs development aid from the international community based on national priorities in order to establish economic stability in addition to the need to compensate for damages, reduce additional potential damages, and strengthen the resistance of threatened populations (Afghanistan International, 2022).

Second, climate change worsens people's daily living conditions and is a great threat to economic and social development. Therefore, to fight against climate change, not only humanitarian aid but also aid in the technical and capacity building is necessary. For this reason, it has been favored by the Taliban and the international community may also increase its assistance in these areas.

Third, climate change causes massive migration of people to neighboring countries and the world, and in this sense, climate change is one of the interests of the countries concerned (Chatham House, 2022).

Fourth, the Taliban regime needs international aid and should interact with the international community. Without international aid, the Taliban regime cannot run the country.

Finally, climate change can cause the spread of extremism and conflicts in the country and be a future threat to the international community. According to a joint study by the WFP, the UNEP and the NEPA in Afghanistan, although agriculture is the source of income for more than 60% of people, more than 80% of conflicts in the country are related to natural resources. In this sense, there is a need for cooperation between the international community and the Taliban in relation to climate change (CBS News, 2021).

So far, the international community has only been willing to engage with the Taliban through humanitarian aid. Only a limited number of countries have been willing to engage with the Taliban beyond humanitarian assistance. After Iran, Russia is the second country that has stepped beyond others and is interested in limited trade with the Taliban. In August 2022, an official delegation of the Taliban traveled to Moscow to negotiate with their Russian counterparts regarding the contract for the purchase of oil and wheat. Taliban officials told Reuters that negotiations with Russian counterparts over the purchase of oil and wheat were in their final stages

but declined to provide further details. If the contract for the purchase of oil and wheat is signed between the Taliban and the Russia government, in this case, Russia will be the second country (after Iran) that trades with the Taliban to a certain level without recognizing them (Afghanistan International TV, 2022).

Moreover, the United Nations Security Council has put the Afghanistan's banking system under sanctions, which has blocked money transfers to and from the Afghanistan's banking system. It is not yet known how the money exchange between the Taliban regime and the Russian government will take place. However, a Taliban official told Reuters that the Taliban have considered a way to pay the price of goods imported from Russia but did not provide more details in this regard. In general, since the beginning of Russia's war with Ukraine, many Russian goods (including oil and wheat) have been sanctioned in the international markets, and Russia has lost its huge financial resources and suffered because of this. Now it seems as though the Russian government is willing to do business with the Taliban in limited areas, in order to have its own financial resources on the one hand and to achieve other goals on the other hand (Afghanistan International TV, 2022).

The Taliban had already signed an agreement with the Iranian government to buy oil in response to the increase in oil prices in Afghanistan's markets. Of course, the increase in the price of oil in the Afghan markets was due to the increase in the price of oil in the international markets (the Ukraine crisis and the Russian oil embargo), which forced the Taliban to sign an agreement with the Iranian government (Shafqna International News Agency, 2022).

Likewise, on January 5, 2023, the Taliban signed an oil extraction contract with a Chinese company. Before the Taliban regained control of Afghanistan, Chinese companies had invested in mining and oil extraction in Afghanistan. One of the investment cases of Chinese companies was investing in the extraction of oil resources in Sar-e Pul province in northern Afghanistan, which Chinese National Petroleum Corporation (CNPC) won the contract for in 2012. The mentioned company started its mining work. In the first stage, 5.000 barrels of oil were to be extracted daily, and later this figure would reach 45.000 barrels of oil per day. But due to insecurity, this plan was not implemented properly (BBC News Persian, 2022).

As can be seen, the interaction between the Taliban and the international community is mostly in the field of humanitarian aid, and in other fields, except for limited cases with limited countries (trade), there is no interaction between the Taliban and the international community.

Therefore, climate change and its consequences can be one of the topics of interaction between the Taliban and the international community. Perhaps the important question for the international community is how to interact with the situation so that the Taliban are not supported and at the same time the people do not suffer. Otherwise, a humanitarian disaster is happening in Afghanistan (DW, 2021).

4. Future Challenges and Policies

Preserving and developing the environment for current and future generations is the main goal of human beings (Louis B. Sohn, 1973).

Afghanistan needs to plan and implement specific policies to combat climate change. Policies can generally be divided into two groups, i.e., decentralized policies (private), and centralized policies (government). Decentralized policies include bargaining solutions or contracting between parties, moral codes and social sanctions, charitable organizations, and integrating different parts of the business. Centralized policies include pollution taxes, direct control, propaganda, marketable permits, public ownership, and common law solutions. Among decentralized policies such as moral codes and social sanctions, charitable organizations, and the integration of the different parts of the business can be used in Afghanistan to fight climate change. Among centralized policies, pollution taxes, direct control, propaganda, and marketable permits can be used in Afghanistan to fight climate change. Currently, policies such as direct control and propaganda are used to fight climate change in Afghanistan. Some of the policies that can be effective in combating climate change are briefly discussed below (E.Kula, 1994).

4.1. Direct Control

This policy usually takes the form of a law, and in this policy, companies are informed through public institutions that their level of pollution (greenhouse gases) should not exceed the desired and socially acceptable level.

Most of the time, Afghanistan has employed direct control policy. This policy was employed to keep pollution (greenhouse gases) at a certain and socially acceptable level both throughout the republic and even after, i.e., under the Taliban's rule.

The regulation of reducing and preventing air pollution in Afghanistan defines the desirable and socially acceptable level of pollution as the limit specified by the NEPA to determine the maximum acceptable level of pollution in the air (Islamic Republic of Afghanistan, 2009). Article 5 of this regulation also states: spreading any type of air polluting material beyond the permitted limit is prohibited. The NEPA determines and stabilizes the air pollution emission limit and informs the public through mass media (Islamic Republic of Afghanistan, 2009).

In Afghanistan, direct control is a popular policy for reducing pollution (greenhouse gases). Anyone who violates this policy will be subject to a heavy fine. This policy is stated incredibly well on paper. However, in practice, this policy has not been successful in pollution control (greenhouse gases) in Afghanistan's large cities like Kabul, particularly during the winter. It is important for Afghan governments to properly carry out their policies and accomplish their objectives.

4.2. Pollution Taxes

As the name implies, this type of tax is imposed and implemented due to pollution. There are many types of pollution, including noise pollution, land pollution, water pollution, marine contamination, and air pollution (greenhouse gases). Since air pollution (greenhouse gases) is the type of pollution addressed in this research paper, its taxes are considered here.

Air pollution (greenhouse gases) causes climate change and global warming; hence it is important to minimize this pollution. A crucial question is how to minimize air pollution. To minimize air pollution, a significant number of economists support pollution taxes or CO₂ taxation (E.Kula, 1994).

Today, pollution taxes exist and are put into place under various titles and for different purposes in a wide number of countries including OECD¹ countries and non-OECD countries such as China, India, Ukraine, Moldova, Indonesia, Thailand, Viet Nam and Uzbekistan (ESCAP, 2017).

Afghanistan's largest cities suffer from air pollution, which is brought on by several factors. Consumers use fossil fuels such as coal for heating (during the winter), cooking, lighting, washing, and cleaning their homes because of poverty. Due to this, residents of large cities are exposed to air pollution. Producers typically use coal to achieve the goal of producing more goods to increase their profits. In this instance, pollution increases, and citizens' health is also impacted. In addition to having an impact on agriculture and livestock, food security, the environment, animal life, etc., air pollution also causes an increase in a few diseases, particularly cancer.

Currently, there is no pollution tax in Afghanistan, and it did not exist before. Given the considerations, Afghanistan should begin enforcing its pollution tax right away. The question of

¹ OECD Stands for Organization for Economic Co-operation and Development.

whether Afghanistan is subject to the pollution tax may come up. There will undoubtedly be some who support and those who oppose the adoption of a pollution tax in Afghanistan. However, it appears that the government of Afghanistan can implement a pollution tax if it employs alternatives and charges its population a low price for them (subsidy). For instance, to reduce carbon emissions and air pollution, the government should work to replace non-renewable energy sources such as coal, oil, and natural gas, with clean energy sources such as wind, solar and hydro energy. The government should encourage investment in renewable energy sources and stop environmental damage and air pollution. It means that gradually, with the passage of time and with the necessary investment, this is feasible.

4.3.Awareness and Advertising Programs

While direct control is based on punishment, advertisements, and different ways to raise awareness aim to change attitudes and deal directly with the common tastes of society. The Islamic Republic of Afghanistan widely used advertisements and awareness programs related to climate and environmental issues. As it was noted in the regulations on reducing and preventing air pollution “designing advertising programs and public awareness in order to reduce and prevent air pollution is one of the duties and responsibilities of the high commission for air pollution prevention” (Islamic Republic of Afghanistan, 2009). In addition, Article 20 states that the NEPA is obliged to announce the necessary environmental standards through the relevant ministries to the license holders of the facilities listed in the Article fourteenth of this regulation (Islamic Republic of Afghanistan, 2009).

Advertisements and programs such as “Keep Kabul Clean, Our City Is Our Home, or Do Not Pollute” may be very effective. Sometimes there may not be enough time to implement direct control or pollution tax and the authorities may call on people to cooperate. For example, the air may suddenly become polluted in an area. To prevent the situation from becoming more critical, local authorities may ask people to limit the use of cars to reduce the smoke from the cars. People may respond quickly to this request but, unfortunately, their response will decrease over time. Anyway, this method was used more frequently during the republic government.

4.4. Marketable permits

Marketable permits or pollution permits (property rights) are rights that can be sold to others. Pollution control authorities issue licenses that allow only a certain amount of pollution to be spread in the market, which is also called cap and trade. The initial distribution of licenses does not affect the performance result. The government can sell pollution permits to companies, give pollution permits to companies, divide the quotas of pollution permits equally among companies, or give all the amount of pollution permits to one company.

Some economists believe that pollution permits reduce the cost of pollution and can help achieve desirable levels of pollution. In some cases, authorities decide to auction pollution permits to raise the money to be used to improve an already degraded environment. Authorities impose penalties to enforce their program and deter illegal behavior, penalties may include fines, removal of licenses, factory closures, etc.

Marketable permits as a pollution abatement policy have not previously existed in Afghanistan. But it appears that marketable permits might be used in Afghanistan, like other countries, as a policy to reduce pollution and greenhouse gas emissions and have their own advantages.

5. Conclusion

Climate change is one of the most important international challenges in the 21st century and is a serious concern for all countries in the world. Climate change is the result of human economic activities, especially industrial activities that have occurred since the industrial revolution. Since the industrial revolution, industrial activities have increased the consumption of fossil fuels or non-renewable resources and caused an increase in the emission of greenhouse gases into the atmosphere. Greenhouse gases, especially carbon dioxide, have contributed to climate change and global warming.

The current research investigates climate change, causes and consequences of climate change, challenges to prevent climate change and climate change policies in Afghanistan. The results of this research indicate that although Afghanistan contributes relatively little to the production of greenhouse gases, which is the main cause of climate change, it is one of the countries in the world that is most vulnerable to the effects of climate change.

Afghanistan's vulnerability to climate change and its unfortunate consequences is a consequence of many factors including a high poverty rate, low level of human development index, dry climate, agricultural nature, susceptibility to natural disasters, susceptibility to drought, being surrounded by land, etc.

Afghanistan is required to participate in coordination and compliance with other members of the UNFCCC, IPCC, Kyoto Protocol, and Paris Agreement to lessen climate change and its adverse effects. Afghanistan may be able to benefit from the advantages of international agreements, such as the advantages provided by the Kyoto Protocol, such as financial, technical, and capacity-building support, etc., if coordination and compliance with other members are maintained. Unfortunately, Afghanistan has not yet been able to benefit from this protocol's advantages.

The Islamic Republic of Afghanistan fell on August 15, 2021, and the Taliban came to power for the second time. Since the Taliban regained power, climate change and its unfortunate consequences have caused many problems in the livelihood of the Afghan people. So far, the Taliban have not implemented specific planning and policies to combat climate change. However, they are willing to collaborate with the international community in this area.

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