Impacts of Climate Change on Human Security in Pakistan (2018-2022)

Dr Shabnam Gul[1]
Ehsan Ahmed Khan[2]

Abstract

Human security has emerged as a non-traditional security threat (NTS). Developing countries like Pakistan are confronting this issue. According to the UN, human security is a concept that enables nations to address issues that undermine human life, sources of income, and the dignity of populations, regardless of the realist perspective of state and military power. One of the most critical (NTS) threats is climate change, which is manifested through ongoing temperature increases and irregular patterns of rainfall, as well as existing environmental issues like droughts, floods, glacier melting, and worsening environmental pollution. This research examines the relationships between climate change and human security in Pakistan from 2018 to 2022. This study reveals that climate-induced phenomena have significantly undermined the various dimensions of human security, e.g., economic security, food and water accessibility, public health, and community stability. For example, smog, a product of environmental pollution, appears in the form of thick, hazy air in several cities like Lahore (Pakistan), causing high respiratory ailments, reduced economic productivity, intermittent lockdowns, and the suspension of educational and business activities. Therefore, this study examines the combined effects of climate change that heighten the risks of marginalisation and pose a challenge to the Sustainable Development Goal (SDG 13). In this research, an attempt is made to advocate for the implementation of comprehensive strategies to address the impacts of climate change, as well as the development of policies based on factual evidence during the period of 2018-2022.

Keywords: *Climate Change, Human Security, Economic Insecurity, Migration, Health Risks.*

Introduction

Human security has become a prominent dimension of non-traditional security. This study discusses aspects of human security, such as economic, food, health, and migration issues due to natural disasters. It challenges traditional realist assumptions that are based on the idea of the state as the centre of gravity and power as a force. The concept of non-traditional security was introduced by Mahbub ul Haq, a former Pakistani finance minister, who was also recognised at UNDP in 2019 for his significant role in cultivating this holistic

[1] Chairperson/ Professor, Department of International Relations, Lahore College for Women University, Pakistan. She can be reached at shabnam.gul@lcwu.edu.pk.
[2] PhD Scholar, School of Integrated Social Sciences, University of Lahore, Pakistan. He can be reached at ehsanahmedkhan471@gmail.com.

paradigm of human development, based on the concept of human security. Climate security addresses the effects of climate change on human existence. It is based on factors that increase existing vulnerabilities and create new challenges. It includes resource scarcity, displacement, and weakened governance. Climate change acts as a threat multiplier to social and political tensions. It potentially leads to uncertainty. Pakistan is the country facing a human security lapse due to climate change. According to a report by ActionAid, Bread for the World, and the Climate Action Network-South Asia (CANSA), Pakistan is among the top ten countries most affected by climate change, with frequent occurrences of extreme weather events, floods, droughts, and heat waves. Climate change has created human security issues in Pakistan, including economic security, food security, climate-induced migration, and health security (Ibrahim, 2023).

Climate change has also caused a lot of people to move, which is a problem called climate-induced migration. According to the Internal Displacement Monitoring Centre (IDMC), Pakistan has one of the highest numbers of internally displaced individuals (IDPs) due to natural disasters, with millions displaced annually. The 2005 earthquake and the 2010 and 2022 floods displaced millions of people in Pakistan, highlighting the magnitude of forced displacement caused by extreme weather events (IDMC - Internal Displacement Monitoring Centre, 2022). Due to the impacts of climate change, health security is another aspect of human security in Pakistan that is at stake. Due to climate change, vector-borne diseases such as dengue fever, malaria, polio, and chickenpox spread in Pakistan. According to the World Health Organisation (WHO), Pakistan is among the top ten countries most affected by dengue fever. Climate change is causing an increase in the frequency and severity of various disease outbreaks. The most common cause is the increase in temperature and humidity. High temperatures and humid environments create favourable conditions for the breeding and proliferation of disease-carrying mosquitoes. It leads to a rise in cases of dengue during the summer rainy season.

As far as the winter season is concerned, smog has persisted as a problem in Lahore, Faisalabad, Gujranwala, and other urban and rural areas of Pakistan for the past few years. Smog is a by-product of man-made climate change. It has far-reaching impacts that hinder industrial activities, transportation, agriculture, and certain weather conditions, which are far beyond environmental damage. As far as its impacts are concerned, it harms public health, disrupts economic activities, and interrupts education. During peak smog periods, provincial governments have had to impose lockdowns or school holidays. As a result, informal markets and agricultural productivity suffer the most. Due to smog, respiratory and heart diseases are rising among children, the elderly, and people with low immunity. Considering the various threats to human security in Pakistan, climate change presents challenges that include severe weather events, health risks, displacement, and economic vulnerabilities. This research highlights the complicated link between climate change and human security in Pakistan by examining the diverse and interconnected impacts on the people and counter-strategies by the government of Pakistan to mitigate the NTS threat from 2018 to 2022.

This research is qualitative and descriptive in nature. Descriptive research is used to detail observable trends in climate phenomena (e.g., floods, smog, heatwaves) and their socio-economic and health-related consequences during 2018–2022. In this research,

thematic analysis is being used. Evaluation research is also opted to focus on critically appraising governmental responses, adaptation mechanisms, and mitigation frameworks aimed at reducing climate vulnerability. In thematic analysis, core themes were identified using qualitative data sources to provide an integrative understanding of the climate-human security nexus. The principal themes are climate change, forced displacement due to natural disasters, rising temperatures and heatwaves, frequent floods, droughts and water scarcity, malnutrition and food insecurity, the spread of vector-borne diseases, economic vulnerability, and infrastructure loss. The study is based on secondary sources of data, including peer-reviewed academic articles, government publications, international climate reports, policy briefs, and media analysis from 2018 to 2024.

HUMAN SECURITY AND CLIMATE CHANGE RELATIONSHIP

Human security is getting affected concerning climate change in Pakistan in the following ways:

➢ CLIMATE CHANGE AND ECONOMIC SECURITY

Pakistan has been incurring a costly impact of climate change over the past years. As per estimates from the Asian Development Bank, for the period 2010–2014, around 6 out of every 100 rupees of its federal budget is allocated for climate change. The energy and transport sectors experience significant impacts. However, there is still uncertainty about the costs associated with this phenomenon. In August 2022, devastating floods hit Pakistan. These flooding events resulted in an estimated amount of damage of around Rs 3.2 trillion (USD 14.9 billion). The repair amount rose to Rs 3.5 trillion (USD 16.3 billion). Various reasons contributed to this devastation, including melting ice from the Himalayas and changes in land use. The collapse had a severely detrimental effect on core sectors, including living, agriculture, and transport. On an economic stand, the damage so far has been estimated at an amount of Rs 1.2 trillion (USD 5.6 billion), Rs 800 billion (USD 3.7 billion), and Rs 701 billion (USD 3.3 billion), respectively (DAWN, 2024).

Additionally, smog has economic aspects too. The cost incurred by the Government of Pakistan of over $20 billion per annum is due to smog-related problems. The Government of Pakistan currently has to rely on the imports of fuel-related products, as some factories have been sealed due to environmental protocols. Smog is degrading the quality of living. The main cities in Punjab and Khyber Pakhtunkhwa (KPK) are increasingly becoming unlivable (Ahmad, 2024). For the reduction in the intensity of smog, the need is to opt for the SDGs implemented by countries around the world to attain economic prosperity, with the advancement of countries on the social front, too. But smog is proving to be a major concern for countries to attain economic prosperity on the sustainable front, affecting countries' economic prosperity by harming the public, people's health, agricultural production, and overall production (Tackling Smog in Pakistan: Causes, Impacts, and Way Forward, 2025).

- **Change and Food Security**

Climate change also affects food security. The recent floods in Pakistan caused various problems and challenges, e.g., damaged seasonal crops. As a result, Pakistan is now facing a serious food crisis due to storms. This situation affects approximately 78,000 square kilometres. 81 districts experienced flooding across 30,000 square miles of cropland. Over 80% of the country's crops have reportedly suffered damage. Floods are thought to have impacted more than 15 million people, including farmers and workers who depend on agriculture. Food crops like rice, onions, tomatoes, and others that were grown on many hectares are now destroyed. The few remaining crops are severely affected because more than 6000 km (3728 miles) of roads and bridges have been damaged. According to the World Bank's 2021 Climate Risk Country Profile, Pakistan is expected to see a decrease in yields of key crops such as cotton, wheat, sugarcane, maize, and rice over the next ten years. Currently, Pakistan ranks 92nd out of 116 countries on the Global Hunger Index. Before the floods, 38 million people already faced moderate to severe food insecurity. In Pakistan, many went to bed hungry, especially women and children. The WHO reports that 18% of young people in Pakistan are not getting enough nutrition.

Climate change is a major threat to food security in Pakistan. Being a large country with an agrarian economy makes this problem further worse due to the effects of climate change. Pakistan's economy heavily relies on agriculture, so disruptions in farming are particularly damaging. The government needs to develop swift and effective policies. The current government prioritises draining water from rural farming areas to facilitate the planting of winter crops. This procedure would help prevent a prolonged food shortage (Malik, 2023).

- **Climate Change and Climate-Induced Migration**

In Pakistan, around 2 million people are expected to become climate migrants by 2050 due to climate-related disasters. Another report from ActionAid (2020) stated that even if we reduce emissions, 600,600,000 people will still be forced to leave their homes because of climate events by 2030. The patterns of displacement caused by climate change happen all across Pakistan, in every region, but for different reasons. People in KPK and Gilgit Baltistan (GB) often leave temporarily or permanently because of Glacial Lake Outburst Floods (GLOF), sudden river floods, or flash floods. In 2010, northern Pakistan experienced severe flooding caused by rapid river rise, displacing over 20 million people and resulting in approximately 22,000 deaths. The following year (2010), heavy rains led to floods in southern Sindh, as well as nearby Sindh, Punjab, and Baluchistan, affecting 9.6 million people. About 4.5 million people in Sindh and Baluchistan were affected by the 2012 monsoon floods. Coastal areas in Sindh are also threatened by sea intrusion, prompting residents to migrate. Furthermore, farmland is destroyed due to deforestation. Reports indicate that cities like Thatta and Badin in Sindh could be submerged by 2050, causing significant internal displacement of climate refugees.

Agricultural land destroyed as a result of deforestation has resulted in a low water level, thus increasing water scarcity. Drought and water scarcity are also factors for migration, particularly in Baluchistan and Sindh. Droughts that began in 2000 drew a bad living experience. Water scarcity threatens livestock, on which most people rely for a means

of survival. Moreover, water scarcity poses a major threat. Pakistan is projected to face a water crisis by 2040 unless concrete measures are taken, as it ranks among the top three countries facing significant water shortages. Consequently, in some areas, seasonal migration patterns have developed. First, entire families move to areas where they can find essentials and work. A severe drought forced 33,000 residents of Noshki village in Baluchistan to relocate in 2018. Recently, the United Nations Convention to Stop Deserts (UNCCD) reported that Pakistan is among 23 countries experiencing emergencies caused by droughts over the past two years. The situation has deteriorated due to poor land management practices. This has turned large areas into desert and harmed the environment (Nisar, 2022).

- **Climate Change and Health Security**

Health security is one of the dimensions of human security, which is also affected by climate change. In Pakistan, it has adverse impacts on its healthcare system. The emergent effects include rising temperatures and increased heat waves, which are leading to more frequent cases of respiratory and cardiac illnesses, along with various waterborne diseases. Malaria and other strong variant diseases, such as the flu, are spreading due to favourable conditions for the microorganisms to replicate and produce new variants. Air pollution is another pressing issue in Pakistan. SMOG is contributing to a rise in respiratory problems. Additionally, the use of solid fuels for cooking in rural areas is linked to higher mortality rates from ischemic heart disease, stroke, lung cancer, and chronic obstructive pulmonary disease (COPD), disproportionately affecting women. Furthermore, temperature fluctuations increase health risks. In the summer season, due to high temperatures, dehydration and heatstroke cases have become more common. According to PDMA, by May 10, 2025, 235 cases were reported in only Sindh and thousands of cases in the whole of Pakistan (Gabol, 2025). To address these challenges, Pakistan conducted a review of its climate change policies and strategies of 2011, leading to the development of a new National Climate Change Policy in 2012 and an operational framework in 2014. The current strategy in place, 'Pakistan Vision 2025', provides details about development that aims at countering climate change. Nonetheless, there is an understanding that there is still a need for improvement in the sectors of infrastructure development, renewables, and incorporating climate change into health facilities (Riaz, 2022).

Impacts of Climate Change on Human Security (2018-2022)

From 2018 to 2022, Pakistan's government developed climate-related policies and objectives. The most prominent and successful project in this regard was the 10 billion Tree Tsunami project. It was part of the Clean and Green Initiative in addition to other afforestation projects such as WASH. It aimed to secure clean water, adequate sanitation, and hygiene education. The government also prioritised transitioning to renewable energy sources and addressing issues like deforestation and waste disposal.

➢ Climate Change

The Global Climate Risk Index 2021 ranked Pakistan among the ten most vulnerable countries to climate change (Eckstein, Künzel, and Schäfer, 2021). From 2018 to 2022, the country faced severe weather phenomena, such as floods, heatwaves, and droughts. It can be mentioned that the catastrophic floods that happened in 2022 after unprecedented monsoon rains displaced well over 33 million people, killed over 1,700 individuals, and estimated the economic loss to be 30 billion dollars. This action is not unusual; rather, it is a common recurrence that highlights the worsening of the climate crisis. One sector particularly prone to such events was agriculture, which contributed approximately 19% of GDP to Pakistan and employed 42% of the Pakistani labour force. Climatic and weather-related issues, such as the varying rains, temperature changes, and seasonal changes, had reduced harvesting during this era. The projections of the Pakistan Meteorological Department showed that the productivity of staple crops would decline significantly by 2050, with the yield of wheat and rice reducing by 8-10% and 15-20%, respectively (Asian Development Bank, 2017). Direct consequences of such threats led to food insecurity, which further increased socio-economic weaknesses in the country.

Table 1: Climate Exposure & Extreme Events

Indicator	Data	Notes
Global Climate Risk Index Ranking	Top 10 most affected	Pakistan ranked 5th most vulnerable
Floods in 2022	33 million affected	1,700+ deaths; $30 billion loss
Rainfall Extremes	6–7× average rainfall	Particularly in Sindh & Balochistan

Source: NDMA (Annual Report 2022; World Bank. Pakistan Floods 2022: PDNA)

➢ Forced Movement and Natural Catastrophes

Pakistan has seen massive displacement due to natural disasters caused by climate change. The 2022 floods alone displaced well over 8 million people on a temporary or permanent basis. IDPs (Internally Displaced People) are frequently within marginalised communities where poor and marginalised individuals are exposed to insecure living conditions and inaccessibility to clean water, sanitation, healthcare, and education, thus enhancing human insecurity. This kind of displacement also increases the vulnerabilities to exploitation, social atomisation, and inter-ethnic tension within the host communities.

Table 2: Forced Displacement Due to Climate Disasters

Disaster Type	Year	Displaced Persons	Regions Affected
Floods	2022	8 million	Sindh, Balochistan, Punjab
Droughts	2018-2022	Thousands	Tharparkar, Balochistan

Source: (World Bank. *Pakistan Floods 2022: PDNA Report*, 2022)

➢ Increasing Temperatures and Heatwaves

There has been a persistent increase in average temperatures in Pakistan over the last decade. In the period between 2018 and 2022, cities such as Jacobabad and Sibbi had

experienced temperatures of over 50°C, one of the highest temperature records worldwide. The impact of these extreme heatwaves was not limited to human life; it also had implications for healthcare systems, labour productivity, and a disproportionate number of effects on the elderly, children, and outdoor workers. The Pakistan Climate Change Council stated that the number of deaths associated with heat has been on the rise, especially in the urban slums with little to no access to basic cooling systems.

TABLE 3: HEATWAVE & TEMPERATURE PEAKS

LOCATION	MAX TEMPERATURE	AFFECTED POPULATIONS	HEALTH IMPACT
Jacobabad	>50 °C	Outdoor workers, the elderly, and children	Heatstroke, deaths
Sibbi	>50 °C	Urban slum dwellers	Increased hospital admissions
Lahore	>48 °C	Outdoor workers, elderly, children	Heatstroke, deaths

Source: NDMA. (*Climate Hazards Report 2021–2022*; Pakistan Climate Change Council. *Brief on Heat Impacts*, 2022).

- **REGULAR FLOODS**

Monsoon patterns have shifted, and the level of intensity and frequency of floods has skyrocketed recently. In addition to the widespread floods of 2022, there have been increasingly frequent localised flash floods in the provinces of Balochistan and KPK, along with cloudbursts in Pakistan. This damage caused homes, schools, hospitals, and crops to be destroyed, compromising physical as well as socio-economic security. Such repeated catastrophes demonstrate the inefficiency of the current mitigation system and the necessity of climate-resilient urban and rural development.

TABLE 4: FLOOD & FLASH FLOOD IMPACTS

EVENT TYPE	REGION	IMPACT
Flash Floods	KPK, Balochistan	Destruction of homes & crops
Monsoon Floods	All provinces (2022)	Major displacement, economic loss

Source: (Khyber Pakhtunkhwa Climate Change Action Plan, 2022; NDMA. *Monsoon Report 2022*).

- **WATER SCARCITY AND DROUGHTS**

Another impact of climate change includes long spells of drought. Repeated droughts started in 2018 in the southern and western parts of Pakistan. Tharparkar and some areas of Balochistan were among the most affected. These droughts decreased the amount of potable drinking water, agricultural water, and drinkable water for livestock. It increased resource conflicts and posed a threat to human health. The per capita availability of water in Pakistan has declined below the scarcity definition, which puts a long-term strain on water security.

Table 5: Water Scarcity and Drought Impacts

Region	Climate Issue	Key Impact
Tharparkar	Drought	Water shortages, malnutrition
Balochistan	Drought	Livestock loss, crop failure
National	Water Decline	Per capita water below the scarcity level (1,000m^3)

Source: (Ministry of Climate Change. National Climate Change Policy, 2021; NDMA, Drought Risk Management Strategy).

- **Malnutrition and Food Insecurity**

Malnutrition, caused by the impacts of climate change on agricultural production, has also escalated. Moreover, the worst sufferers are children and women. The 2022 flood has caused damage to agricultural lands spanning over 4 million acres. This damage included essential food products such as wheat, rice, and vegetables. The destruction had resulted in a rise in the prices of these products. The World Food Programme claims that the number of people experiencing extreme levels of food insecurity had escalated to almost 9.6 million. The rate of malnutrition also rose, and thousands of children required urgent nutrition assistance.

Table 6: Food Insecurity & Crop Loss

Indicator	Data	
Crops Damaged (2022)	4+ million acres	Wheat, rice, and vegetables
People Food-Insecure	9.6 million (late 2022)	Mostly in Sindh and Balochistan
Malnourished Children	Thousands needing intervention	Emergency nutritional aid

Source: (World Food Programme. Food Security Snapshot 2022; World Bank. Post-Disaster Needs Assessment, 2022).

- **Spread of Vector-Borne Diseases**

Climate change has further resulted in economic vulnerabilities for Pakistan. It has harmed essential areas like the agricultural sector, infrastructure, and the healthcare system. The floods that occurred in 2022 had resulted in a loss of $30 billion for the economy. This situation has significantly impacted the informal sector, particularly women who depend on it. Moreover, climate change-induced economic vulnerabilities have weakened government finances.

Table 7: Vector-Borne Disease Outbreaks

Disease	Cause	Affected Region	Peak Period
Dengue	Floodwater, poor drainage	Sindh, Punjab	Sep–Nov 2022
Malaria	Warm, stagnant post-flood water	Rural Balochistan	Sep–Oct 2022

Source: (Ministry of Health. Vector-Borne Disease Surveillance Report, 2022; NDMA, Health Risk Bulletin: Post-Flood Edition).

➢ Economic Vulnerabilities

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Table 8: Economic & Infrastructure Losses

Sector	Loss (USD)	Description
Total Economic Loss	$30 billion	2022 floods' impact
Homes Destroyed	2 million+	Mostly in Sindh & Southern Punjab
Roads & Bridges	13,000 km, 400+	Damage to critical transport routes

Source: (World Bank. Pakistan Floods 2022: PDNA Report; Ministry of Planning. Post-Flood Infrastructure Damage Summary, 2022).

➢ Infrastructure Loss

Climate change-induced frequent natural disasters have caused immense damage to the country's infrastructure in Pakistan. In 2022, the floods affected over 2 million houses. It damaged 13,000 kilometres of roads. The flood destroyed more than 400 bridges. This natural disaster also adversely impacted the educational and healthcare infrastructure. It adversely affected major internet and transport facilities accessible to millions of people. The catastrophe happened because of the absence of climate-resilient construction and improper early warning systems in the country (World Bank, 2021).

Climate Change Adaptation and Resilience Strategies

Between 2018 to 2022, Pakistan's government intensified its efforts to address climate change, opting for a combination of policy interventions, ecosystem restoration initiatives, and international cooperation. Despite financial and institutional constraints, significant progress was made in adaptation and resilience strategies aimed at protecting human security across vulnerable regions.

➢ National Climate Change Policy and Implementation Framework

This period (2018-2020) saw the revision and formulation of the National Climate Change Policy, abbreviated as NCCP, by the federal government of Pakistan. During this time, there was synchronisation with the dynamic changes taking place internationally regarding threats posed by climate change, along with the national vulnerabilities faced by Pakistan. The NCCP still focused on climate-resilient development, disaster risk preparation, agricultural development, and conservation of water resources. The "Framework for Implementation of Climate Change Policy (2014–2030)" was identified as the guiding document operational between 2018 and 2022, incorporating changes due to the growing risks of climate change. Within the framework of policy established through

the Pakistan Climate Change Act, the Pakistan Climate Change Council and the Pakistan Climate Change Authority were formed. These played important roles in providing advisory services on integrating policies on climate change to the federal ministries and provincial authorities. The National Climate Change Policy was also modified to incorporate global climate change variations. However, the implementation has remained slow and lacking in funding. The Pakistan Climate Change Authority was created by the Climate Change Act 2017. This authority has not yet started operating because of delays by the bureaucracy and a lack of operational procedures (Ali & Akbar, 2021). There was no coordination between the federal and provincial authorities.

- **Clean Green Pakistan Index**

The Clean Green Pakistan Index (CGPI) initiative has been introduced. Its goal was to create a plan to improve city services provided by local government in five areas of the Clean Green Pakistan Index, which are water, sanitation, hygiene, solid waste management, and planting trees, all at the same level. Likewise, the Green Stimulus Package offers the recovery of employment opportunities during the COVID-19 crisis. It supported environmental sustainability. This programme had attracted worldwide admiration for its eco-friendly and socially inclusive features.

Table 9: Summary of Pakistan's Green Stimulus Package

Feature	Details
Initiative Name	Green Stimulus Package
Launched Under	10 billion Tree Tsunami Project (TBTTP)
Main Objectives	-Increase green cover - Create jobs (green employment)
Target Groups	Communities, especially youth and women
Key Activities	- Tree plantation - Setting up nurseries - Forest protection
Jobs Created (FY2020)	~65,000
Target Jobs by Dec 2020	200,000
Special Context	Launched in response to COVID-19 to provide both environmental and job relief
International Recognition	Acknowledged by the World Economic Forum as a win-win for people and nature

Source: (Government of Pakistan, Ministry of Climate Change; World Economic Forum Report: COVID-19: Pakistan's 'Green Stimulus).

The Clean Green Pakistan Index introduced a practiful framework for municipal level performance tracking. However, it largely remained symbolic due to poor data transparency and low capacity at local government levels (World Bank, 2022). Several local bodies reported challenges in collecting data and fulfilling the five pillars due to funding constraints and a lack of training.

➢ Ten Billion Tree Tsunami Programme (TBTTP)

The Government of Pakistan launched the TBTTP to combat climate change through nationwide afforestation across all provinces and regions, including AJ&K and Gilgit-Baltistan. The programme involved youths, students, and farmers in plantation activities. In FY 2019–20, Rs. 7.5 billion was allocated, with Rs. 6 billion released for implementation (Government of Pakistan, 2020).

- "Apni Shahrah": Plantation along highways in collaboration with the Ministry of Communications.
- Ghazi Barotha Project: Tree plantation on spoil banks with the Ministry of Water Resources.

➢ Seasonal Tree Planting Campaigns

To improve tree cover in the country, seasonal tree plantation campaigns were held each year. The government departments, private sector organisations, defence organisations, and NGOs were involved in planting activities throughout the year. Though the TBTTP is Pakistan's most publicised environmental success, independent audits and reports have revealed discrepancies in plantation data, low survival rates, and weak post-plantation monitoring, especially in remote areas (Imran et al., 2022). Moreover, fast-growing exotics sometimes replace indigenous tree species, thereby affecting biodiversity.

Table 10: Seasonal Tree Plantation Status (2019–2020)

Season	Target (M)	Achieved (M)	Survival Rate
Monsoon 2019	110.14	93.3	78%
Spring 2020	240.89	--	--
Total	**351.03**	--	

Source: (Ministry of Climate Change, 2022)

➢ Citizen Engagement Programme

The MoCC has also launched a citizens engagement programme titled 'Clean Green Champions' under the CGPM. People could register themselves as champions and share the voluntary activities under five pillars of Clean Green Pakistan, i.e., Plantation, Safe Water, Safe Sanitation, Hygiene & Liquid Waste Management, and Solid Waste Management. For each pillar of CGPM, the Clean Green Champions will come forward to lead three types of activities. Firstly, extending basic services on a self-help basis, like water supply, sanitation, and solid waste collection, etc. Secondly, helping the local governments in providing essential services and handling citizens' complaints. Finally, awareness-raising for inspiring real change in community behaviour towards the environment. Under this program, 120,000 champions had been registered to voluntarily contribute to a clean and healthy Pakistan (Government of Pakistan, 2020). While 120,000 citizens registered as Clean Green Champions, there is little evidence of impact measurement, follow-up, or sustained community engagement. The voluntary nature of the program limits long-term commitments, and many efforts remain untracked (MoCC, 2020).

➢ Participation in Reducing Emissions from Deforestation and Forest Degradation (REDD+)

Reduced Emission from Deforestation and Forest Degradation (REDD+) is related to the absorption of atmospheric carbon through forest resources. The REDD+ Readiness Preparation Proposal (R-PP) has been implemented in Pakistan with a grant of $3.8 million since July 2015.

Table 11: REDD+ Readiness Activities and Grants in Pakistan

Component	Details
Funding Organization	Forest Carbon Partnership Facility (FCPF), World Bank
Initial Grant	Awarded through a competitive process
Additional Grant (2018)	USD $4.01 million (to support readiness until June 2020)
Implementation Support	International and national consultants hired
Key Outputs	Preparation of four REDD+ readiness elements
Monitoring Meeting	9th National Steering Committee held on 6 Feb 2020
International Submission	Forest Reference Emission Level (FREL) submitted to UNFCCC

Source: (Government of Pakistan, 2020)

Pakistan's progress on REDD+ had been slow and procedural. While grant funding was secured and FREL was submitted to UNFCCC, implementation of systems for measuring forest carbon and benefit-sharing mechanisms remains incomplete (FAO & MoCC, 2021). The community engagement was limited, and unclear in REDD+ areas.

➢ Strengthening Disaster Risk Management Institutions

Early warning systems were improved for the National Disaster Management Authority (NDMA) and the Provincial Disaster Management Authorities, especially due to the rise in monsoon intensity and glacier melt. Community-based risk reduction initiatives were increasing, especially in Sindh, KPK, and GB. But it can be argued that the catastrophic floods that occurred in 2022 had revealed how vulnerable this institutional framework is, despite progress being achieved concerning early warning systems. Nevertheless, the NDMA was unable to coordinate a collective response to the situation, and there was a significant lack of resilience in the infrastructure, particularly during the flood events of 2022 (NDMA, 2022). According to a report released after flooding that touched flood-sensitive infrastructure, over 2 million homes, 13,000 kilometres of roads, and 439 bridges had been damaged or destroyed.

➢ International Partnerships and Climate Finance

There had been an increase in international collaborations for Pakistan. In this respect, some of the most notable ones include UNDP, ADB, and GCF. There had been a number of projects; for instance, Glacial Lake Outburst Floods II (GLOF-II), a project from

2018 to 2023, through which people in GB and KPK were assisted in coping with glacial risks through early warning systems and capacity building, according to UNDP (2022). Pakistan collaborates with organisations such as the UNDP, ADB, and GCF, yet the majority of projects, such as GLOF-II, originate from external donors. Local people don't really own these projects, and once the funding stopped, so did the work. There was no strong line-up of homegrown, practical climate projects coming from Pakistan itself.

Conclusion

Climate change significantly impacted Pakistan between 2018 and 2022. There were record heatwaves, destructive floods, more people struggling to procure enough food, and choking air pollution in the cities. All of this chipped away at people's security, health, shelter, jobs, and access to clean water and food, which took big hits. The government tried to fight back with new policies, ecosystem recovery, and disaster management efforts. But the challenges just kept piling up. It is important to note that the increase in political and societal awareness of the climate emergency was reflected in the Ten Billion Tree Tsunami Program and the strengthening of climate institutions like the NDMA. The devastation of the 2022 floods was, however, like nothing that has taken place before, exposing gaps in implementation, insufficient adaptation finance, and poor governance structures at the local level. To protect human security in the next few decades, Pakistan should immediately:

- Mainstream climate resilience across all development sectors.
- Invest in climate-smart agriculture, water infrastructure, and urban planning.
- Promote community-based adaptation with a special focus on gender-sensitive strategies.
- Leverage international climate finance for mitigation and adaptation.

In other words, 2018-2022 is a wake-up call and a window of opportunity. Although the climate crisis is intensifying day by day, there is a chance of change. National and international attention can create the conditions for transformational, inclusive, and sustainable climate action. We still need to make more efforts to address the problem of climate change and human security. It is evident from the criticism of the policies of the PTI's government that the efforts to minimise vulnerabilities induced by climate change will only become fruitful if all upcoming governments continue the climate-related policies of the previous government, irrespective of political differences. Moreover, this research highlights that more attention is required to fulfil Sustainable Development Goal 13 (Climate Action), which is related to climate change, its impacts, and human security. It poses significant threats to human well-being, including food security, water resources, health, and displacement, to save future generations from the destruction of climate change.

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References

Ahmad, M. (2024, November 18). Smog's economic toll: why action remains elusive. *The Express Tribune*. Https://tribune.com.pk/story/2510245/Smogs-economic-toll-why-action-remains-elusive

Ali, N., & Akbar, M. (2021). Institutional Gaps in Pakistan's Climate Policy Implementation. Sustainable Policy Review, 5(2), 45–56.

Asian Development Bank. (2017). *(2017). Climate changeprofile of Pakistan.* Asian Development Bank.

Asian Development Bank. (2017). *Climate changeprofile of Pakistan.* Asian Development Bank.

Asian Development Bank. (2017). Climate Change Profile of Pakistan. ADB. Https://www.adb.org/sites/default/files/publication/357876/climate-change-profile-pakistan.pdf

DAWN. (2024, April 28). CAN CLIMATE CHANGE PAKISTAN’S ECONOMY? *DAWN*.

Eckstein, D., Künzel, V., & Schäfer, L. (2021). Global Climate Risk Index 2021. Germanwatch. Https://germanwatch.org/en/cri

Eckstein, Künzel, & Schäfer. (2021). *The global climate risk index 2021.* Germanwatch.

FAO & Ministry of Climate Change. (2021). Pakistan REDD+ Readiness: Status Report. Food and Agriculture Organization.

Government of Pakistan. (2020). *Pakistan Economic Survey 2019–20: Chapter 17 – Climate Change*(pp. 309–310). Ministry of Finance. Retrieved from http://www.finance.gov.pk/survey_1920.html

Green Climate Fund. (2017). *Pakistan Country Programme*. Retrieved from Green Climate Fund: https://www.greenclimate.fund/document/pakistan-country-programme

Ibrahim, S. (2023, December 22). *Safeguarding Human Security amidst Climate-Induced Displacement and Afghan Refugee Influx in Pakistan*. Retrieved from Centre for Strategic and Contemporary Research: https://cscr.pk/explore/themes/energy-environment/safeguarding-human-security-amidst-climate-induced-displacement-and-afghan-refugee-influx-in-pakistan/

IDMC - Internal Displacement Monitoring Centre. (2022). *Displacement, disasters and Climate Change*. IDMC - Internal Displacement Monitoring Centre.

Imran, H., Khan, R., & Farooq, S. (2022). Evaluation of the Ten Billion Tree Tsunami Program in Pakistan. Journal of Environmental Management, 308, 114598.

IPCC. (2019). *Chapter 5 : Food Security — Special Report on Climate Change and Land*. IPCC.

Malik, R. (2023, January 1). Impact of Climate Chang eon Food Security in Pakistan. *Pakistan today*.

Ministry of Climate Change(mocc). (2020). Clean Green Pakistan Movement – Annual Progress Report. Islamabad: Government of Pakistan.

Ministry of Climate Change. (2022). Ten Billion Tree Tsunami Programme Progress Report. Government of Pakistan.

National Disaster Management Authority (NDMA). (2010). *National Disaster.* National Disaster Management Authority (NDMA).

National Disaster Management Authority (NDMA). (2022). Post-Flood Damage Assessment Report. Government of Pakistan.

Nisar, N. (2022, June 10). *Climate-Induced Migration in Pakistan*. Retrieved from Centre for Strategic and Contemporary Research: https://cscr.pk/explore/themes/energy-environment/climate-induced-migration-in-pakistan/

Pakistan Information Department. (2024, April). Pakistan ranked 5th most vulnerable country to Climate Change. Tirmizi. Pakistan.

PCRWR. (January-March, 2024). *QUARTERLY REPORT BOTTLED WATER QUALITY.* PCRWR.

Rannard , & Georgina. (2022, September 2). How Pakistan floods are linked to Climate Change. *BBC*.

Riaz, K. (2022). Climate Changeand its implications on health and the healthcare system: A perspective from Pakistan. *Annals of medicine and surgery*. Doi:10.1016/j.amsu.2022.104507

UNDP. (2022). GLOF-II Project Report – Enhancing Resilience in Glacial Areas of Pakistan. United Nations Development Programme.

United Nations Development Programme (UNDP). (2022). GLOF-II Project Summary. UNDP Pakistan. Https://www.pk.undp.org

World Bank. (2021). *Pakistan Country Water Resources Assistance Strategy.* World Bank.

World Bank. (2022). Clean Green Pakistan Index: Mid-Term Assessment Report. Washington, DC: World Bank.
Gabol, I. (2025, June 12). Extreme heat sears cities across the country. *Dawn*. https://www.dawn.com/news/1916657.