# Improve Climate Resilience in Areas Affected by Conflict

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**Abstract:**

Climate change, driven by human activities such as burning fossil fuels and deforestation, is causing significant global warming and leading to profound environmental and human impacts. Key environmental effects include shrinking glaciers, thawing permafrost, and increasingly severe weather events. Human populations are facing increased risks from extreme weather, spreading diseases, declining crop yields, and water shortages. Particularly vulnerable are poorer communities, with climate change now recognized as a major global health threat by the World Health Organization.

Azad Jammu and Kashmir (AJK), due to its geographical location in the Himalayan-Karakoram-Hindu Kush mountain ranges, is especially sensitive to climate change. The region is experiencing rising temperatures, glacial melt, and unpredictable rainfall, which threaten agriculture, water resources, and human livelihoods. AJK faces increased natural disasters such as flash floods, landslides, and Glacier Lake Outburst Floods (GLOFs). The region's agriculture, which depends heavily on rainfall, and its biodiversity are also at high risk, necessitating urgent political and diplomatic efforts to mitigate climate change effects.

## Introduction:

Climate change is the long-term change in globalor regional weather patterns, mainly caused by human activities like burning fossil fuels and cutting down forests. This leads to more greenhouse gases, causing global warming, which is the rise in average temperatures worldwide. Some major impacts include:

## Environmental Effects:

a. Permafrost is thawing, glaciers are shrinking, and sea ice in the Arcticis melting.
B. Storms, droughts, and other extreme weather events are getting more intense.

c. Many species are being forced to move or face extinction due to rapidenvironmental changes.

d. Oceans are getting warmer, more acidic, and sea levels are rising.

## Impacts on Humans:

- There's a higher risk of injury, illness, and death from extremeweather events.
- Diseases carried by insects, like malaria and Zika, are spreading tonew areas.
- Crop yields are decreasing, leading to food shortages, especiallyfor children.
- Water is becoming scarcer in some regions.
- People are being displaced and conflicts may arise due to climatechange impacts.
- Mental health is suffering from climate change anxiety anddistress.

The World Health Organization says climate change is the biggest threat to global health in the 21st century. Poorer communities and developing countries, which contribute the least to greenhouse gas emissions, are themost vulnerable. Reducing future warming and adapting to current changes are crucial to minimizing the severe risks to people and ecosystems worldwide.

## Overview of AJK's geographical location and vulnerability to climatechange:

Azad Jammu and Kashmir (AJK) is one of the most at-risk areas in Pakistan when it comes to climate change, mainly because of its location and natural features. AJK is part of the Himalayan-Karakoram-Hindu Kush Mountain ranges, which are very sensitive to climate change. The region's glaciers, water sources, forests, and wildlife are all at risk from rising temperatures and changing weather patterns.

Climate change is causing more frequent and severe weather events in AJK, such as flash floods, landslides, and storms. These events damage infrastructure and disrupt the livelihoods of people who depend on farming, forestry, and other natural resources. Rising temperatures and changing rainfall patterns are melting AJK's glaciers faster, increasing the risk of glacier lake outburst floods (GLOFs), which threaten the region's water supply and hydropower generation.

Since 92% of AJK's farmland relies on rainfall, the agricultural sector is highly vulnerable to climate change impacts like irregular rainfall and droughts. AJK's forests and wildlife are also at risk, with rising temperatures and changing rainfall affecting forest ecosystems.

## Thesis statement:

Climate change in AJK is a pressing issue that requires effective political and diplomatic efforts to mitigate its effects.

## Impact of Climate Change in AJK:

a) Rising temperatures and changing precipitation patterns

b) Glacial melting and water scarcity

c) Increased frequency and severity of natural disasters (e.g. floods,landslides)

d) Effects on agriculture, biodiversity, and human health

a) Azad Jammu and Kashmir (AJK) is feeling the effects of climate change with rising temperatures and shifting rainfall patterns. Over the past few decades, average temperatures have gone up by about 1.5°C, leading to more heatwaves and droughts. Rainfall has become unpredictable, with some areas getting more rain and others facing longdry spells.

b) One major impact in AJK is the faster melting of glaciers. These glaciers are crucial for providing water to the local people and for agriculture. As they shrink, water availability decreases, threatening the region's water security.

c) Climate change has also led to more frequent and severe natural disasters in AJK. There are now more floods, landslides, and other extreme weather events, which cause significant damage to infrastructure, agriculture, and communities.

d) The effects of climate change in AJK go beyond just the environment.Agriculture, which relies on stable water and climate conditions, has suffered. Crop yields have dropped, and farmers struggle to adapt. The region's rich biodiversity, including unique plants and animals, is also atrisk as their habitats are disrupted. Additionally, local health has been impacted, with more cases of heat-related illnesses, diseases spread by insects, and other climate-related health problems.

## Key Measures to Address Glacier Melting and Water Shortagein AJK

### Developing Plans and Policies:

AJK has a Climate Change Policy that focuses on creating plans to deal with water shortages and droughts in the short term. It also looks at working with neighboring countries to manage water resources andprotect Pakistan's water rights.

### Promoting Integrated Water Management:

The policy highlights the need for managing water resources, including conservation efforts in mountainous areas. It also aims to create and enforce rules for managing industrial and household waste to prevent water pollution.

### Improving Monitoring and Forecasting

Efforts are being made to improve the ability to monitor changes in glaciers and snow cover using advanced technology like remote sensing and GIS. There is also a push to enhance the network for tracking river flows and issuing flood warnings.

### Implementing Water-Efficient Technologies

The policy encourages developing and using technologies for water recycling and preventing water waste. It also focuses on measuring andmonitoring irrigation water to improve planning and management.

### Raising Public Awareness Public awareness

Campaigns are being conducted to emphasize the importance of waterconservation and sustainable use of water resources.

### Supporting Small-Scale Farmers

There are initiatives to help small-scale farmers in AJK by providing them with weather-resistant crops and water-efficient irrigation methodsto better cope with climate change and glacier melting.

## POLITICAL FACTORS AFFECTING CLIMATECHANGE IN AJK:

There are not enough policies and regulations in AJK to tackle climate change. The AJK Climate Change Policy emphasizes the need to update laws and regulations to better address climate change and take necessaryactions. There is a need to improve data collection and institutional capacity to address climate change. The policy suggests setting up a network to manage and analyze climate change information.

AJK has limited technical and financial resources to dealwith climate change. This makes it difficult for the government to implement effective measures to adapt to its impacts. The policy highlights the need for better coordination among various stakeholders, including the government, civil society, local communities, and the private sector, to effectively implement climate change initiatives.

Several sectors in AJK, such as water resources, agriculture, forestry, and biodiversity, are highly vulnerable to climate change. The policy calls fortargeted political actions to address these vulnerabilities.

## Overview of International climate change agreements and framework Paris Agreement, UNFCCC:

International climate change agreements and frameworks have evolved over the past few decades as nations recognize the urgent need to addressglobal warming and its impacts. This overview focuses on key agreements, including the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, and the Paris Agreement, highlighting their objectives, mechanisms, and challenges.

### United Nations Framework Convention on Climate Change (UNFCCC):

The UNFCCC, adopted in 1992 and ratified by 197 countries, was the first global treaty aimed explicitly at addressing climate change. It established a framework for international cooperation to stabilize greenhouse gas concentrations in the atmosphere. The Convention set the stage for subsequent negotiations and agreements, including the Kyoto Protocol and the Paris Agreement. It also introduced the annual Conference of the Parties (COP) meetings, where nations discuss and negotiate climate action strategies.

### Kyoto Protocol:

Adopted in 1997 and entering into force in 2005, the Kyoto Protocol was the first legally binding international treaty requiring developed countriesto reduce greenhouse gas emissions. The Protocol aimed for an average reduction of 5% below 1990 levels during the commitment period from 2008 to 2012. However, it faced criticism for not imposing binding targets on developing countries, including major emitters like China and India. The United States signed the Protocol but never ratified it, later withdrawing its signature, which undermined the treaty's effectiveness.

### Paris Agreement:

The Paris Agreement, adopted in 2015 at COP21, represents a significantadvancement in global climate governance. It is a legally binding treaty that requires all signatory countries to set and update their Nationally Determined Contributions (NDCs) voluntary emissions reduction targets that reflect each

country's capabilities and ambitions. The primary goals of the Paris Agreement are to limit global temperature rise to well below 2°C above pre-industrial levels, with efforts to limit the increase to 1.5°C, and to achieve net-zero emissions in the second half of the century.

## Key Features of the Paris Agreement:

Nationally Determined Contributions (NDCs): Each country must submit its NDCs, which are to be updated every five years to reflect increased ambition. Global Stock take: Starting in 2023, a global stock take will assess collective progress toward achieving the Agreement's goals, fostering transparency and accountability among nations. Financial Support: Developed countries are expected to provide financial assistance to developing nations to help them mitigate and adapt to climate change. The target is to mobilize $100 billion annually by 2020, although this goal has faced challenges. Technology Transfer and Capacity Building: The Agreement emphasizes the importance of transferring technology and building capacity in developing countries to enhance their ability to combat climate change.

## Challenges and Critiques

Despite the establishment of these frameworks, significant challenges remain. The effectiveness of the Kyoto Protocol was limited by the lack of participation from key emitters and the absence of binding commitments for developing countries. The Paris Agreement, while more inclusive, still faces hurdles in ensuring that countries meet their NDCs and provide the promised financial support. The recent global stock take highlighted the need for increased ambition and action to meet the 1.5°C target, underscoring the urgency of the climate crisis.

## Proposals for Successful Political and Strategic Activity onEnvironmental Change in AJK

## Lay out and Enable Environmental Change Establishments:

Operationalize and enable the Environmental Change Authority and different establishments set up under the Environmental Change Act to drive environment incorporation across bureaucratic and common legislatures. Guarantee these organizations hold institutional memory andcommitted assets to actually deal with environmental change matters.

## Take on a 'Entire of Society' Approach:

Welcome public and master support in environment arranging and decision-production to make purchase in and further develop executionpossibilities.

Follow a 'entire of government' approach as environment issues require between ecclesiastical and between departmental coordinated effort.

Coordinate Environment Viewpoint in Venture Plan and Planning Coordinate environment contemplations in project arranging, planning, and assessment involving proper devices for environment examination and execution survey structures.

Lay out uniform environment spending answering to energize likeness, reward better execution, and make a learning criticism circle across offices.

Improve Straightforwardness and Trustworthiness in Environment Administration Lay out open data sets on environment money to facilitate, screen and oversee in general environment activity.

Focus on benchmarking environment administration respectability in light of worldwide accepted procedures and territorial friends.

Give available complaint strategies, defilement announcing channels, and informant assurance with regards to environment finance usage.

## Fortify Limit and Coordination

Evaluate limit assembling necessities of partners, all kinds of people, inenvironmental change.

Guarantee institutional reinforcing of the current Environmental Change Place and pertinent establishments managing environmental change andREDD+ matters.

Lay out a state-level clearing-house for routinely refreshed environmental change related information sharing and systemsadministration.

## Prepare Money and Assets

Track prospects of public, territorial and worldwide help for environmental change and plan projects for asset assembly.

Investigate global and territorial linkages for asset preparation to assist with building orientation delicate reactions.

Seek after creative funding components like obligation for-nature tradesand nature execution securities to speed up admittance to environment finance.

## Future Exploration Headings

Survey the advancing example of rainstorm to assess environmental change weakness and incorporate environmental change transformationwith catastrophe risk decrease.

Embrace concentrates on the effect of environmental change on water, food and energy security, and foster medicinal plans.

Advance understudy trade programs among SAARC colleges in theenvironmental change discipline.

# Climate Change in Gilgit-Baltistan (GB): The Role of Politicsand Diplomacy

## Introduction:

Gilgit-Baltistan is an uneven district situated in the northernmost piece of Pakistan, lining Afghanistan, China, and the Indian-managed territory of Jammu and Kashmir. The district covers an area of north of 72,971 km2 and had an expected populace of 1.8 millions of every 2015.

Gilgit-Baltistan is known for its awesome normal excellence, various social legacy, and verifiable importance. The district is home to a portionof the world's most elevated mountains, including K2, the second-most noteworthy top on the planet. The Karakoram, Himalayas, and Hindu Kush Mountain ranges unite in Gilgit-Baltistan, making it a center point of mountain the travel industry. The locale is additionally plentiful in regular assets, including minerals, gemstones, and woodlands.

## Significance of Tending to Environmental Change in GB:

Gilgit-Baltistan is exceptionally defenseless against the effects of environmental change because of its delicate mountain biological systemand reliance on agribusiness and the travel industry. The area has encountered an expansion in the recurrence and force of catastrophic events, for example, cold lake explosion floods, avalanches, and dry seasons, which have made critical harm framework and livelihoods.

Environmental change is additionally influencing the locale's biodiversity, with numerous types of plants and creatures confronting the danger of annihilation. The dissolving of ice sheets and snow cover is prompting water shortage, which is affecting agribusiness and

hydropower age.

## Legislative issues and Strategy Assume a Critical Part inTending to Environmental Change in GB:

Given the complex political circumstance in Gilgit-Baltistan and its essential area, tending to environmental change in the district requires a diverse methodology that includes legislative issues and discretion. The locale's status stays questionable, with Pakistan conceding it a temporarycommon status in 2018.

Worldwide participation and tact are essential in tending to environmental change in Gilgit-Baltistan, as the locale imparts lines to Afghanistan, China, and India. Coordinated effort between these nations is important to create and carry out approaches and techniques to relieve and adjust to the effects of environmental change. At the public level, the public authority of Pakistan needs to focus on environmental change in itsadvancement plan and distribute assets for variation and moderation measures in Gilgit-Baltistan.

This remembers financial planning for foundation, for example, flood security measures and environmentally friendly power projects, as well as supporting nearby networks in adjusting to environmental change.

## Climate Change Impact In GB:

Gilgit-Baltistan (GB) is one of the areas generally impacted byenvironmental change in Pakistan.

The fast dissolving of glacial masses, expanding recurrence of blaze floods and chilly lake eruptions (GLOFs), and changing atmospheric conditions are seriously affecting the district's fragile environment andweak networks.

## Icy mass Liquefying and GLOFs:

GB is home to the biggest mass of non-polar glacial masses on theplanet, including the Siachen, Baltoro, and Hesper ice sheets.
Nonetheless, an unnatural weather change is making these ice sheets dissolve at a disturbing rate. It's assessed that regardless of whether worldwide temperature increase is restricted to 1.5°C, 30% of the locale'sicy masses will evaporate before the century's over.

As the icy masses liquefy, they structure cold lakes which can explode and cause obliterating streak floods known as GLOFs. There are more than 3,000 cold lakes in GB, with 33 distinguished as high-risk for perilous GLOFs. As of late, various GLOF occasions have caused deathtoll, harmed framework like extensions and streets, and obliterated homes, ranches, and plantations.

## Changing Atmospheric conditions:

The typical temperature in GB has expanded by 1.4°C throughout recent years, twofold the pace of the remainder of Pakistan. This is upsetting typical atmospheric conditions, with additional capricious and seriousclimate occasions like weighty precipitation, floods, avalanches, and blizzards.

These changing atmospheric conditions are mentally affecting GB's occupants, who live in consistent trepidation. They likewise compromisethe area's principal type of revenue - the travel industry - by making the climate less unsurprising and making perilous circumstances for voyagers.

## Environment Effects:

The climbing temperatures and extreme weather conditions are upsettingthe normal natural surroundings of plants and creatures in GB. Many imperiled species like the Himalayan ibex, Markhor, and snow panther are undermined. Deforestation and soil disintegration are additionally harming the environment.

The changing environment is influencing water sources and vegetation designs. Floods and GLOFs crush horticultural grounds, plantations, and yields. This, joined with waning monetary open doors, is driving individuals to relocate to different pieces of Pakistan.

## CHALLENGES & OPPORTUNITIES:

### Political and Discretionary Difficulties inTending to Environmental Change in Gilgit-Baltistan (GB)

Environmental change presents huge difficulties for the bumpy area of Gilgit-Baltistan (GB) in Pakistan. The perplexing idea of environmentalchange influences requires a planned, multisectoral reaction that can be challenging to accomplish strategically and carefully.

A few key difficulties include: Mainstreaming environmental change transformation and moderation into provincial advancement plans requires purchase in from different government services and offices. Adjusting needs and guaranteeing environment activity is vital can politically challenge.

Reinforcing human and institutional abilities to adjust to environmental change requires huge interest in preparing, framework, and projects.

Getting adequate subsidizing and assets is a continuous test. Organizing with public and worldwide accomplices on environment strategy is basichowever can be perplexing. Exploring various needs, courses of events, and subsidizing instruments requires gifted discretion.

Offsetting monetary improvement with environment activity is a sensitive political equilibrium. Non-renewable energy source projects and impractical practices might offer momentary financial gains however compound environment gambles.

### Open doors for Environmental Change Moderation andVariation in GB:

Despite the difficulties, GB has huge chances to fabricate flexibility anddiminish emanations:

#### Environmentally friendly power:

GB has massive potential for hydropower, sun oriented, and wind energy. Fostering these assets can give clean power while making greenpositions.

Drawing in confidential area interest in environmentally friendly power projects is fundamentally important.

#### Eco-the travel industry:

GB's shocking regular scenes and biodiversity are a significant draw forvacationers. Advancing eco-the travel industry that limits natural effect can produce supportable occupations.

Safeguarding normal resources like backwoods, rangelands, and untamedlife is basic for eco-the travel industry.

#### Practical Farming:

Presenting environment shrewd agrarian practices like water-effective water system, agroforestry, and manageable touching can help food security.

Reestablishing corrupted lands and executing installment for biologicalsystem administrations plans can turn out revenue for ranchers.

## Catastrophe Hazard Decrease:

### Working on early advance notice frameworks, crisis arranging, andcalamity reaction limits can save lives and lessen misfortunes from outrageous climate.

Nature-based arrangements like reforestation and wetland reclamation can improve security from floods, avalanches, and frosty lake explosions.

Understanding these open doors will require supported political responsibility, hearty organizations, and compelling environment tact to assemble assets and associations. With the right techniques and activities, GB can fabricate an environment tough, low-discharge future.

## Models To Predict Climate Impact And Manage Resources:

Climate change refers to long-term alterations in the average conditions, such as temperature and rainfall, in a region. To study and predict climate change, scientists use mathematical models that simulate the Earth's climate system.

### General Circulation Models:

(GCMs) One of the key mathematical tools for studying climate changeis the General Circulation Model (GCM). GCMs use mathematical equations to simulate the general circulation of the atmosphere and oceans.

They apply the Navier-Stokes equations, which describe fluid motion, toa rotating sphere, incorporating various energy sources like radiation and latent heat. These models are essential for predicting future climate conditions and understanding complex climate processes.

### Components of a Climate Model:

A comprehensive climate model typically includes the followingcomponents:

- Atmosphere
- Ocean
- Sea Ice
- Land Surface
- Marine Biochemistry
- Ice Sheets

These components are coupled together in Earth System Models toprovide a holistic view of climate dynamics and interactions.

### Impact of Climate Change:

Climate change can lead to significant impacts, including:

- Changes in rainfall patterns, resulting in more frequent floods,droughts, or intense rainfall.
- Increased frequency and severity of heatwaves.

### Mathematical Representation:

To create a basic model of Earth's temperature, we use the energy balance equation. The model assumes that the Earth absorbs solar energyand radiates some of it back into space. The global mean temperature T can be modeled using the energy balance equation:

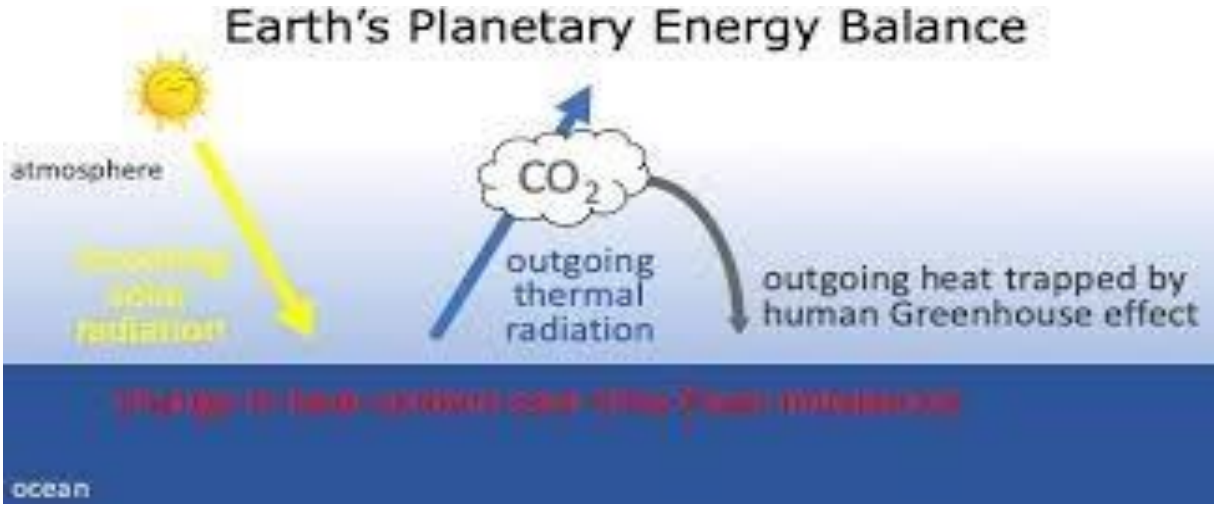
$$R\, dT/dt = Q(1 - \alpha) - \sigma T\, 4$$

where:

- T is the average temperature of Earth's surface (in Kelvins).
- R is the heat capacity of the Earth-atmosphere system.
- Q is the annual global mean solar radiation per square meter.
- α alpha is the planetary albedo.
- σ sigma is the Stefan-Boltzmann constant.

This equation is an ordinary differential equation (ODE) that describes the rate of change in Earth's temperature based on incoming solar energyand outgoing thermal radiation

**Zero-Dimensional Energy Balance Model:**




**In a "zero-dimensional" energy balance model, we combine all subcomponents into a simplified ODE to describe Earth's globallyaveraged surface temperature(Walsh, 2015):**

$d(Ctemp)/$ dt = $S(1-a)/4-(A+BT)+a\cdot \ln(CO2)CO2,PI/CO2,PI$where:

- Ctemp represents the heat content.
- S is the incoming solar radiation.
- α alphaα is the albedo.
- A and B represent coefficients in the outgoing longwave radiation(OLR) model.
- a is a coefficient related to the greenhouse effect.
- CO2 is the concentration of carbon dioxide, and CO2, PI is its pre-industrial level.

This equation captures the evolution of Earth's globally averaged surface temperature, incorporating solar radiation, outgoing thermal radiation, and the effects of greenhouse gases. Mathematical models are crucial for understanding and predicting climate change. They allow scientists to testhypotheses, explore parameter changes, generate predictions, and design new experiments. They also help students and researchers grasp the underlying equations and functional relationships in climate science.

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