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Global Climate Change and Human Security Nexus: A Case of Pakistan

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Abstract: *Pakistan is susceptible to climate variations such as floods, droughts, heat waves, and the glaciers melting have all had devastating effects on human security. Furthermore, people are forced to leave their homes due to continuous floods, making them more vulnerable to disease and economic collapse. The international cooperation needs to adopt policy responses and adaptation plans to develop resilience and reduce vulnerability to the effects of climate change. The Universal Declaration of Human Rights and the Paris Agreement, adopted under the United Nations Framework Convention on Climate Change are two landmark international legal instruments when it comes to addressing the human security implications of climate change. Despite these legal frameworks, climate change implications on human security are not being adequately addressed. Effectively human security crisis needs meaningful participation of affected communities that prioritize the most vulnerable populations and promotes the protection and fulfilment of human needs.*

Key Words: Climate Change, Human Security, International Law, Pakistan, Adaptation and Mitigation

Introduction

Currently, climate fluctuations are among the most pressing global challenges that pose threats to human security (Kibugi, 2013) and happen to be irreversible in the future. It is dangerous for the common future and existence of mankind and will transcend physical boundaries (Weitzman, 2007). The developing nations are facing new challenges as a result of climate change including economic, social, and environmental viability, particularly where people lack the resources for climate-resilient policies that are adaptation and mitigation. South Asian region faces problems of greater rainfall variability, unpredictable monsoon patterns, rising sea levels and temperature swings have far-reaching implications for human security, including the rights to life, health, food, water, and shelter and causing farmland to disappear, intensified competition over shrinking resources and the spread of waterborne diseases (Schrijver, 2011).

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Pakistan is a frontline state that is suffering from century-breaking climate variability. The country has experienced frequent and devastating floods in recent years, resulting in the large-scale displacement of people. Natural disasters such as earthquakes, floods, droughts, cyclones, glacier lake outbursts, flooding, landslides, and avalanches have occurred constantly (Rasheed, Ainuddin & Faiz, 2022). It is among the states most at risk from climate change, with extreme weather patterns causing frequent and devastating disasters due to its unique location and topography at the confluence of three major rivers, the Indus, Jhelum, and Chenab. The other reason is global carbon emissions that impacted Pakistan's economy and social structure even though it is not a responsible state because it contributes less than 1% of the world's greenhouse gas emissions (Tariq, & Van De Giesen, 2012). It contributed to institutional, social, and economic vulnerability (Rasheed, Ainuddin & Faiz, 2022) that has put individuals, societies, and nations at risk.

Pakistan has experienced significant climate variability in recent years. German Watch Report since 1999 has warned that Pakistan is one of the most affected countries. Each region of Pakistan is dealing with different effects of climate change. As per the Global Climate Risk Index, in the year 2020, Pakistan took the fifth spot having worse impacts of climate change and forced and unplanned migration in different regions mostly rural to urban (Arif, Riaz, & Faisal, et al. 2019).

Climate change will have serious consequences for Pakistan's economy. Pakistan's agricultural sector, the country's economic backbone, has been severely impacted by climate change including increased temperatures and changes in rainfall patterns, which have been linked to lower harvests and crop failures. Many people's livelihoods, particularly in rural areas, rely on agriculture, which has been severely impacted by the recent weather disasters (Ali, Liu, Ishaq, Shah, Ilyas, & Din, 2017).

Water scarcity is another way in which climate change is threatening human security in Pakistan. Due to climate change-induced glacier melting and over-extraction and depletion of groundwater, Pakistan is experiencing a serious water crisis. Climate change has altered precipitation patterns and accelerated the rate of glacial melting, both of which endanger the country's ability to continue to rely on its rivers as a primary source of water. The competition for water could lead to hostilities between farmers and city dwellers, neighbouring regions, or even countries.

The research is going to explore the following questions.

1. How the climate variability brought with it the human security dilemma in Pakistan?
2. What are the policy and institutional frameworks to address climate change?
3. What measures Pakistani government should adopt to prevent the climate crisis from becoming a future disaster?

The paper tries to explore how climate change has imperilled human security in Pakistan and the policy and institutional frameworks to address climate change, decrease emissions of greenhouse gases and increase resilience, mitigation and adaptation in Pakistan. The paper further argues that climate change is a major threat to Pakistan's sustainable development using the lens of Green Theory in IR. This research will adopt a qualitative case study design of the recent wave of floods in Pakistan in 2022 and explore the human security implications and international law in Pakistan to provide an in-depth analysis of relevant legal frameworks, policies, reports, and other documents. The paper concludes

by offering potential recommendations in the context of Pakistan to address the climate change crisis.

Argument of Study

At the global level, climate change-induced human security crisis emerged as a significant issue. Changes in weather patterns due to global carbon emissions raised the earth's average temperature and torrential monsoon rains in 2022 caused devastating floods in Pakistan, resulting in loss of life, property damage, and dislocation. The floods in Pakistan have killed countless people and forced millions to migrate, and wrecked entire communities. Water-borne infections further aggravated the situation for those who needed medical attention but couldn't get it. The country's infrastructure, food security, and healthcare facilities were all severely impacted by the floods that demonstrate the need to critically address the effects of climate change on human security within the framework of international law calling for joint action and taking appropriate measures to safeguard fundamental freedoms for all people. The governments that contribute to climate change and its impacts on human security should be held accountable under international law. Several accords to combat climate change have been agreed upon by world leaders including the Paris Agreement in 2015 but states are failed to comply with these obligations to cut their emissions of greenhouse gases and provide security.

Theoretical Underpinnings

The proponents of the Green theory, a reflectivist approach, challenged the conventional understanding of state, security and development (Eckersley, 2013: 267) that has ecological blindness. Due to industrialization, globalization and technological and economic boom, serious energy and resource consumption, the earth's biodiversity has been eroded.

Security became an essentially contested concept arising from the 'tragedy of the commons'. In 1960, public consciousness was developed that the world was confronted with transnational anti-ecological effects due to global warming, carbon emissions, thinning of the ozone layer and overuse of natural resources. Social and intellectual movements against industrialization began in the 1970s focusing on preservationism and resource conservationism. Greens were transnational and cosmopolitan in their orientation (Connelly, Smith, Benson, & Saunders, 2012).

Green Theory is borrowed from the normative international relations theories of new social movements (environmental, peace, anti-nuclear, and women's) and the neo-Marxist-inspired International Political Economy (IPE) theory presents an eco-centric worldview that perceives humans are a part of the ecological system, therefore, a holistic approach "globe" instead of the earth was taken (An & Gokpinar, 2019). "Green Political Theory can be seen as an attempt to bring humanity and the study of human society down to earth." (Barry, 2014: 2).

In the post-Cold War, environmental problems were hard to cope with because of the arms race, nuclear weapons proliferation and bipolar world order. Ecological responsibility, social justice, nonviolence, cosmopolitan orientation, and bottom-up democracy are the "four pillars" of green politics.

Transboundary environmental issues require global solutions that brought Green theory to the IR discipline. Green political parties and non-governmental organizations (NGOs) started to establish in Western Europe. While Greens argue that these structures are the primary cause of environmental problems and that they should be challenged. Goodin (1992)

expounded the moral vision of Green Theory that gives value or primacy to eco-centrism means the need to preserve non-human nature. It is built on the idea that there must be a healthy ecosystem that is to balance the growth narrative concerning the environment. To protect non-human nature, human material development should be slowed down. Humans must restrict their ability to consume (Dyer, 2017). Greens are critical of human domination and question anthropocentrism. "Respect all form of life" remained their main idea.

Conversely, the environmentalists advocated maintaining a status quo to resolve the issue within existing political, social, and economic structures. Humans exploit, destroy or overuse natural resources injudiciously for their betterment and development. The environment must be protected. There must be a "Limit to Growth" or sustainable development without compromising the environment and future needs because the survival and continuation of the human race are linked with nature. Due to economic competition, it is a difficult task to solve ecological problems for individuals or governments. Territorial rivalries do not promote environmental cooperation or inspire "green" ideas (Dyer, 2017). According to Green theorists, humans are the most advanced species on the planet. Therefore, they are bound with a moral duty to protect other species which is crucial to human survival.

Impacts of climate change on Pakistan

Heatwaves

In Paris Agreement 2015, the phenomenon of global temperature rise to 1.5 to 2.0° Celsius from pre-industrial levels has been discussed. As per the Intergovernmental Panel on Climate Change (IPCC) Report 2021, human activities—particularly the burning of fossil fuels-coal, oil, and natural gas are the main contributors to rapid global warming by trapping heat and greenhouse gases primarily carbon dioxide in the atmosphere. Long-term estimates between the years 2081-2100 are expected between a 3.3°C to 5.7°C rise in temperature (Warner, & Laczko, 2006). Moreover, the government of Pakistan itself calculated and submitted the data in Paris Agreement that by 2030, there will be a 300 per cent increase in carbon emissions in Pakistan alone (Arif, Riaz, & Faisal, et al. 2019).

Pakistan is confronted with frequent, intense and prolonged droughts and heatwaves, with the most severe one in 2015. The heatwave killed over 2,000 people and caused widespread power outages and water shortages. Recently, Tharparkar, in southwestern Pakistan, has been hit hard by the drought. In 2022, several deadly heatwaves and severe droughts had serious impacts on agriculture and food security. Temperatures in Sindh increased to such high levels (over 52 degrees Celsius) that they exceeded the threshold of "too hot for human tolerance." (Prescia, July 30, 2021) Crop failures, livestock losses, food and water scarcity, and the subsequent economic crunch had devastating effects on millions of people.

Glacial lake Outbursts

Pakistan is home to one of the largest glaciers in the world, the Siachen Glaciers in the Karakoram Mountains. Due to global warming and rising temperatures, the melting of these glaciers has accelerated increasingly, threatening the country's water supply and causing catastrophic floods (Khan, Gul, & Khan, 2015).

Floods

As a result of glacial lake melting, the sudden release of water causes catastrophic floods. The country has been hit by numerous floods, most severely occurring in 2010 and 2011. These floods caused widespread damage, displacement, and loss of life. About 1.1 million homes were

destroyed or damaged in Pakistan's 2010 flooding, which turned into one of the nation's worst humanitarian disasters and enforced mobility between 11 and 20 million people from their homes. While many of the displaced communities went back to their homes, a sizable portion of people chose to remain in big cities (Rehman, Jingdong, Du, Khatoon, Wagan, & Nisar, 2016).

The year 2020 again witnesses heavy monsoon rains that resulted in urban flooding, approximately 305,151 homes were partially or fully damaged only in Sindh. After two months of unprecedented rainfall, rapid glacial melt and landslides caused flooding in one-third of Pakistan that killed over 1,700 people and 1.2 million livestock. Around 33 million people in the country have been affected– or 1 in 7 people in the country and 8 million are internally displaced (Hussain, Shuai, Moawwez, Umar, Iqbal, Kamran, & Muneer, 2023). Families lost their homes, livelihoods, and their loved ones. People were compelled to live under open skies. They can't reinvent lives. Around 2 million houses were damaged. 8330 km of roads washed away. 439 bridges were destroyed. 3127 km of railway tracks were damaged. The entire infrastructure is paralyzed. The highest level of reconstruction is in the transportation and communication sectors. Flood affectees were in critical need of reconstruction of health infrastructure. More than 8 million people require a medical examination. Large crops have been destroyed threatening the country's food supply including agriculture, livestock, forests, fisheries, industries and transport. Due to impoverishment and malnutrition, people were desperate for food, shelter and clean drinking water. As a result, Pakistan has to depend more and more on imports, and rising food prices. Reviving agriculture, food, livestock, and fisheries need PKR 854 billion (Ministry of Planning Development & Special Initiative, 2022). Restoration of assets at the individual and community levels as well as assistance for the public and private sectors (poultry and dairy industries), which were also impacted by the floods. The government needs short-term initiatives to take care of urgent needs by ensuring rabi season readiness. The Sindh province alone is one of the hardest hit by floods. Poor districts of Baluchistan, KP and Punjab are flood-affected. The real magnitude and scale of tragedy in Pakistan are unimaginable.

Federal and provincial governments with the help of armed forces provided a humanitarian response to monsoon rains and floods by conducting search and rescue operations. The government with the help of local, national, and international partners has been working around the clock to coordinate the massive relief efforts including the building of makeshift shelters in schools and mosques. They provided food parcels, mosquito nets, hygiene kits, and safe drinking water to fulfil the immediate needs of the people. Waterborne diseases are spreading due to inadequate resources, especially in rural areas, access to safe drinking water and proper sanitation. The government provided critical health care through medical health units, medical sites, and continued first aid due to the increased risk of waterborne diseases, free medicines and treatment for diseases like dengue, cholera and diarrhoea (Ministry of Planning Development & Special Initiative, 2022).

The Post-Disaster Needs Assessment (PDNA) was conducted by the Government of Pakistan with support from the Asian Development Bank (ADB), the European Union (EU), the United Nations (UN), and the World Bank (WB) to provide an initial estimate of 3.5 trillion (US$16.3 billion) in damage, loss, recovery, and reconstruction needs following the disaster. The Ministry of Climate Change in Pakistan also recommends that the country needs to adopt a more comprehensive "National Action Plan" to reduce the likelihood of

future climate crises through disaster planning (Ministry of Planning Development & Special Initiative, 2022).

Sea-level rise

The coastal areas of Pakistan face many threats from rising sea levels, including floods, erosion, and saltwater intrusion. Coastal communities in Sindh and District Badin and the entire Baluchistan province have seen sea intrusion (Memon, 2016). Due to the increased occurrence of cyclones and storms and the subsequent rise in sea levels, the inhabitants of coastal communities in the Sindh and Balochistan provinces have been compelled to evacuate.

Climate Change and Individual Security

One of the biggest dangers to individual security in the 21st century is climate change. Individual security, on the other hand, is the safeguarding of people from dangers to their food, water, energy and personal security. Poverty in Pakistan is a pre-existing major challenge that worsens by climate change. Individual security is threatened by the escalation of social and political turmoil that follows poverty and food insecurity. Disasters caused by climate change exacerbate poverty, especially for the most marginalized members of society, such as children, the elderly, and the poor. Individual health can be negatively impacted by climate change due to the proliferation of disease vectors and the intensification of air pollution. It can also have a major effect on biodiversity, causing the extinction of species and the collapse of ecosystems.

Food Security

In Pakistan, the agricultural sector has been severely disrupted due to climate change, which has had a major impact on human security. Pakistan is an agricultural country that relies heavily on irrigation for its farming industry, which accounts for a significant portion of the country's economy. The agricultural sector in Pakistan has felt the negative effects of climate variability. Temperature rise, droughts, floods, heat waves and precipitation shifts threaten food supplies through crop failure including cotton and wheat, livestock loss, and loss of income. Because of this, food costs may rise and people in need may have scarce access to food.

Water Security

According to a report by the International Monetary Fund (IMF), Pakistan is third on the list of countries experiencing water shortages (Zhang, Sial, Ahmad, Filipe, Thu, Zia-Ud-Din, & Caleiro, 2020). The entire country particularly Sindh and Baluchistan has been experiencing drought conditions due to prolonged dry spells. Thar is completely dried from water. People had to migrate when they face a lack of water, food, healthcare, or economic stability.

Pakistan's water resources are under severe stress due to climate change, population growth, and inadequate water management practices which is an already scarce resource in many parts of Pakistan, and agriculture relies heavily on it. The inefficient use of water in agriculture is brought on by the poor management of water resources. As a result of over-drawing from aquifers due to agriculture and population growth, Pakistan is also dealing with the problem of rapidly depleting groundwater resources.

Pakistan is experiencing water scarcity due to its rising population and increasing demands for irrigation, manufacturing, and household consumption. The economy, food, and public health of Pakistan are being severely impacted by the country's water crisis. Farmers are additionally under stress as a result of the water shortage, which is making it challenging for them to maintain their livestock and crops. As temperatures

rise, glaciers melt and precipitation patterns shift at an accelerated rate, climate change is predicted to make water scarcity worse by reducing water supply and rising demand. This is especially concerning for water-intensive crops like wheat and rice. Adaptation solutions to climate change's effects on water security are necessary for countries to solve these problems. Water-supply methods and conservation efforts can protect future generations' access to clean water is important.

Energy Security

Pakistan's economy is vulnerable to both the direct and indirect effects of climate change. Food shortages, increased pricing and economic crunch may result from climate change and other factors that reduce agricultural output as temperatures rise and precipitation patterns shift brought on by natural disasters like droughts and floods. Natural disasters caused by climate change can also devastate essential infrastructure like roads and bridges, which can halt commerce and slow economic expansion.

Economic sectors like energy generation, industry, and tourism can be negatively impacted by droughts and water scarcity because of the reduced availability of water for irrigation, industrial usage, and domestic use. Economic losses and disruptions in economic operations can result from the destruction of infrastructure, and residences, brought on by extreme weather events like floods, and storms.

To combat climate change and ensure reliable energy supplies, Pakistan must integrate renewable energy sources such as solar, wind, and hydropower into its energy mix. Greenhouse gas emissions have increased due to the country's significant usage of fossil fuels, especially coal. Pakistan will need to make substantial financial expenditures in renewable energy sources and energy efficiency improvements to meet this challenge. Transitioning to a low-carbon economy is a challenge that Pakistan too is faced with. Investing in renewable energy could help Pakistan decrease its dependence on imported fossil fuels and contribute to mitigating the impact of climate change by reducing greenhouse gas emissions. Long-term economic advantages can be achieved from the shift towards a low-carbon economy, due to the creation of new jobs and opportunities, the acceleration of innovation, and the enhancement of energy efficiency (Hao, Shah & Nawaz et al., 2020).

Community Security

IPCC warned that the "greatest single impact of climate change could be on human migration" (Warner, & Laczko, 2006). Till 2050, the number of climate refugees will be 400 million people minimum globally, who will cross the border (Black, Kniveton, Skeldon, Coppard, Murata, & Schmidt-Verkerk, 2008). In regions where conflicts or political instability already exist, climate change can amplify social and political tensions. The unequal distribution of the repercussions of climate change, with poorer and more marginalized populations generally suffering the brunt of the effects, can amplify these conflicts. People may be forced to relocate or uproot their lives due to climate-related factors such as rising sea levels, drought, and other weather extremes. As a result, shelters for refugees and migrants may be more vulnerable to acts of violence and instability.

Displacement of people, intensification of conflict over scarce resources, and disruption of economic operations are only some of how these shifts threaten international stability. Extreme weather and rising sea levels can force millions from their homes in low-lying and coastal locations for mass migration and possible resource disputes. Migration due to climate change can raise tensions within neighbourhoods, overwhelm public services, and put financial pressure on entire nations.

The impacts of climate change have led to an increase in human displacements within a country's territory. Numerous individuals are compelled to migrate to urban areas due to the devastation of their residences, agricultural lands, and domesticated animals. As a consequence, there is more competition for access to water supplies and more people are being forced to relocate. Affectees lost their homes, livestock as well as livelihoods. People take the difficult decision to move towards safe locations to own their own. It is also a cultural issue for them. They fear the loss of identity and feel humiliated. Moreover, they encounter language and cultural barriers. Tharparkar, a desert region in the Sindh province, saw climate-related migration as a result of drought and water constraints. Over the past few years, many families have moved to larger nearby cities in search of access to clean water and other basic services. The social, economic, and political consequences of climate-induced migrations in Pakistan include heightened pressure on urban infrastructure, resource competition, and possible land and water conflicts. To prevent further displacements and reduce the impact of climate change on vulnerable populations, the government must prioritize the implementation of adaptation strategies. Immediate action is needed to address both the short and long-term impacts of climate change on vulnerable populations.

Health Security

Human health is negatively impacted by climate change due to the proliferation of disease vectors and the intensification of air pollution. Biodiversity is affected including the extinction of species and the collapse of ecosystems that offer essential services like pollination and lower carbon emission. Heatwaves and temperature rise lead to dehydration and heatstroke and other illnesses. Food insecurity leads to malnutrition. Vector-borne diseases such as dengue and malaria are the worst impacts of climate change.

National Security

There are serious risks to national and global economies from climate change. Agriculture, water availability, energy production, infrastructure, and other economic sectors are all negatively impacted by climate change, which in turn causes supply chain disruptions, higher production costs, and slower economic growth. Food shortages and increased pricing may result from climate change and other factors that reduce agricultural output as temperatures rise and precipitation patterns shift. Economic sectors like energy generation, industry, and tourism can be negatively impacted by droughts and water scarcity because of the reduced availability of water for irrigation, industrial usage, and domestic use. Climate change also raises the prospect of social and political unrest, which can have a negative impact on the economy. Migration due to climate change, for instance, can raise tensions within neighbourhoods, overwhelm public services, and put financial pressure on entire nations. Economic growth and stability may be harmed by climate change because it exacerbates preexisting imbalances, which in turn can spark social unrest and political instability.

Displacement of people from their homes in low-lying areas and coastal locations leads to the intensification of conflict over scarce national resources, and disruption of economic activities are only some of the ways in which these shifts threaten national security.

Ecological Security

The security of our planet is seriously threatened by climate change. Sea level rise, increased frequency and severity of extreme weather events, ocean acidification, and

changes in weather patterns are only some of the environmental effects of the continuing increase in global temperatures caused by the accumulation of greenhouse gases in the atmosphere.

Climate Crisis and International Law

International law has addressed climate catastrophes in various ways, primarily through the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement. The first UN conference, an addendum to the Vienna Convention, on environment versus development was held in 1992 in Stockholm in which 114 countries participated to prevent potentially catastrophic human interference with the climate system (Mace, 2005). It is argued that developed countries have historically released more greenhouse gases and they need to shoulder the cost because they were able to expand their economies unchecked. The United States and the European Union (EU) are the two largest emitters worldwide along with China and India who have recently joined. Almost every country in the world has now ratified the international agreement that laid the groundwork for action against climate change.

The Vienna Convention for the Protection of the Ozone Layer was signed in Vienna, Austria, in 1985 which is a major international environmental agreement. To preserve Earth's protective ozone layer, it regulates the creation and consumption of ozone-depleting substances (ODS) (Parson, & Greene, 1995). The Montreal Protocol was ratified on January 1, 1989, after being signed on September 16, 1987, in Montreal, Canada. Since then, 197 nations have ratified it aimed at protecting the environment from consuming the harmful substances affecting the ozone layer, such as chlorofluorocarbons (CFCs) and other ozone-depleting substances (Rowlands, 1993). The Kyoto Protocol was the first legally binding agreement on climate change; it was adopted in 1997 and entered into force in 2005 that required developed nations to reduce emissions by 5% below their average 1990 levels (Bodansky, 2010).

At COP 21 in Paris 2015, a pinnacle of international law on climate change, world leaders 194 Parties (193 States plus the European Union) inked a collective agreement to avert catastrophic climate change by adapting to low-emission economic development strategies It orchestrates global climate action for future generations (Centre for Climate and Energy Solutions, 2015). To reduce their emissions and cooperate to adapt to the effects of climate change, countries must regularly report on their emissions and progress toward achieving their climate goals.

According to the Environmental Justice Foundation (EJF), extreme weather events, such as floods, storms, heat waves, and droughts, are already forcing the displacement of 41 people every minute. As temperatures rise, climate variability will worsen, sea levels will rise, and the most vulnerable people in the world will suffer. EJF urges all nations to support initiatives to gradually reduce their carbon emissions in line with the agreement's objectives (Bhowmik, 2020. IPCC was established in 1988 as a United Nations (UN) body to conduct regular assessments of the scientific basis of climate change, its effects, and options for adaptation and mitigation (Warner, & Laczko, 2006).

Conclusion

Climate change is a major risk to human security. Rising temperatures, shifting precipitation patterns, sea level rise, glacial melting, water scarcity, agricultural impacts, and a resulting human rights crisis are just some of the effects of climate change that have recently hit Pakistan. It makes things worse for people who are already vulnerable, escalates conflicts, endangers

access to clean water and food, and makes natural catastrophes more frequent and destructive. To ensure the security of people, the international community must act swiftly and firmly to lessen the impact of climate change and prepare for its consequences. Sustainable land use and agriculture, better catastrophe preparedness and response, and lowering emissions of greenhouse gases all fall under this category. Protecting human security and securing a more sustainable future for all depends on taking action to mitigate climate change that needs urgent action to address the causes and effects of climate change. The rights of local communities, migrants, indigenous peoples, children, people with disabilities, and those in vulnerable situations are all incorporated in the preamble of the Peace Agreement, and each party is expected to uphold, advance, and consider their respective responsibilities in these areas.

Recommendations

- There is a critical need to enhance provincial departments' capabilities for coordination, communication, and information management for it is necessary to establish early warning systems, safety precautions, state-of-the-art infrastructure, disaster risk reduction and evacuation procedures for vulnerable areas during high-risk periods (such as the monsoon).
- To prevent future disasters, inaction is not a policy. The government, civil society, and the private sector must work together to develop and implement a comprehensive climate adaptation strategy to be incorporated into Pakistan's national sustainable development program to protect the country's people, economy, and environment.
- The government should also prioritize adapting to climate change by developing and implementing plans to improve water management and reduce the likelihood of flooding, supporting drought-resistant agriculture and depleting groundwater resources. This entails putting policies into place to cut down on water waste in agriculture, enhancing irrigation systems, investing in water-saving technologies, and encouraging the use of rainwater harvesting and other alternative water sources to ensure the nation's long-term viability. Building more flood canals (there are exiting 57 flood canals, 12 linked canals, 19 barrages and 3 large dams and 85 small dams) to evacuate raised levels of water to prevent the destruction of populous regions is a dire need.
- Emergency relief, restoring farmland, and providing livelihood opportunities to affected communities is the need of the hour. Floods devastate farmland, affecting crop yields and livelihoods. The government and aid organizations need to help farmers restore their land and get back to their livelihoods.
- To mitigate the impacts, emergency employment services, skill-building programmes, and capital-intensive investments in livelihoods and jobs after a disaster prior to upcoming rains. The short-term recovery strategy will require restoring irrigation works and repairing canal and drainage banks.
- Rebuilding flood-resistant housing and resettlement of millions of internally displaced is the centre of long-term plans. The estimated cost of damaged houses in post-2022 floods is 592 billion to rebuild to a fitting and cost-effective climate-resilient housing standard to prevent

dangerous human-induced disruption of the climate system.

- Rebuilding climate-smart infrastructure is a high priority. The majority of the roads and railroads that were damaged have been temporarily repaired so that traffic can resume.
- Thousands of schools have washed away which has put more loss and harm to the public educational institute. There is a need to resume learning through alternative or temporary learning spaces throughout all recovery phases.
- Restoring power where it can be done. The majority of the affected people lived in southern Punjab, Sindh, KP and Balochistan and they all experienced power outages. As a result of distribution network failures. Damage was also observed at a large number of micro and mini-hydro electric power generation facilities.
- In Pakistan, droughts and floods are being made worse by climate change. Key strategies for addressing these problems include ecosystem-based adaptation and natural solutions. To lessen the severity of climate change, Pakistan must take action to cut the release of greenhouse gases. The energy and agricultural sectors are the most crucial targets for mitigation efforts aimed at reducing GHG emissions to keep up with environmental pollution and degradation. Carbon dioxide can be absorbed by a billion-tree and similar projects and mangrove forests. By planting trees, the effects of climate change can be mitigated. To lower carbon emissions and increase biodiversity, the government should support reforestation initiatives and safeguard existing forests.
- Climate financing denotes financial resources that are mobilized to address climate change, including mitigation and adaptation measures. Pakistan, like many other developing countries, is particularly at risk of climate change impacts, and climate finance is crucial to help the country address these impacts. Pakistan needs to mobilize support from the international community and NGOs because the gap between needs and resources is too huge.
- Empowering communities, especially women and marginalized groups, is crucial in preparing them to tackle the climate change effects. By doing so, Pakistan can protect its citizens and guarantee a prosperous future.
- Floods negatively impacted the country. Fiscal stability is highly imperative to implement these plans. It is expected to become a huge challenge given massive support and slow progress of tax bases owing to a fragile economy. A tight monetary policy should be adopted. Pakistan may become overly dependent on foreign aid to finance its climate change efforts, need to build its capacity to effectively implement climate change projects and develop a diverse range of funding sources to reduce its dependence on foreign aid.
- The transition to renewable energy has the potential to provide millions of people with access to energy as well as reduce carbon emissions. Today, energy is a top concern in the climate action plans of many nations. The nation's reliance on fossil fuels can be lessened, and carbon emissions can be reduced, by promoting renewable energy sources like solar, wind, and hydropower. The government of Pakistan has already taken steps to promote renewable energy.
- Education and Awareness campaigns aimed at educating people about climate change impacts and steps can

be taken to lessen the carbon footprints that can assist both individuals and communities.

- International Cooperation is a prerequisite to addressing the global issue of climate change. Pakistan should collaborate with other nations. This entails taking part in international agreements like the Paris Agreement and collaborating with other nations to create and put into practice efficient climate change policies. Pakistan can lessen the effects of climate change and keep it from causing future disasters by implementing measures identified in these agreements.

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