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Climate Change

Impacts and Security Implications for Pakistan

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Climate Change
Impacts and Security Implications for Pakistan

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Introduction

Climate Change is widely acknowledged as the defining challenge of our age facing humankind with profound global environmental, socio-economic and security implications. The international community has forged a consensus on exerting concerted efforts at national, regional and global levels to prevent the further destabilization of the climate and address the multifaceted negative effects of global warming through enhanced cooperation.

The United Nations Framework Convention on Climate Change (UNFCCC) adopted in 1992 serves as the essential overarching framework for actions by UN member states to stabilize the global climate. The Convention has been ratified by over 195 UN member states and its annual meetings (Conferences of Parties or COPs) consider way and means of combating climate change and assisting developing countries to adapt to the irreversible impacts of global warming in order to achieve sustained socio-economic development and poverty eradication. In 1997, a legally binding agreement- the Kyoto Protocol – was negotiated to implement the UNFCCC. A new global agreement- The Paris Climate Agreement- was agreed on December 12, 2015 at the conclusion of the Twenty-first conference of Parties (COP 21) held in the French capital.

A significant feature of the wide-ranging debate on climate change is the increasing attention being paid to the possible implications of climate change on human security within states and inter-national peace and security. The UN General Assembly and the Security Council have convened special sessions in 2008 and 2007 and 2011 respectively on the potential impacts of climate change on international peace and security and appropriate responses by the UN system and the international community. The climate change- security nexus has also figured in the initiatives of UN agencies and multilateral development and financial institutions, regional cooperation forums, and influential non-governmental organizations.

Climate change poses serious challenges to Pakistan due to a combination of geophysical and topographical features which exposes the country to recurring extreme weather phenomena likely to be exacerbated by climate change and the critical dependence of its economy and livelihoods on natural resources likely to be threatened by global warming. Pakistan has taken a number of steps to protect its economic sectors from the adverse effects of climate change apart from participating in the global and regional deliberations on this serious common threat. It seems necessary to review those efforts and offer suggestions for enhancing their efficacy in countering the negative fallout of climate change on Pakistan's human and national security.

This paper discusses the potential negative impacts of climate change on Pakistan's security landscape against the backdrop of the evolution of the global climate agenda and the discourse on climate change-security nexus with special focus on the impacts of climate change on our crucial economic sectors and our water, food and energy security.

Section-1

Evolution of the Global Climate Change Agenda

In the 1980's a consensus seemed to emerge in the scientific community that the unprecedented increase in the release and concentration of greenhouses gases (GHG) such as carbon dioxide (CO_2), methane, and nitrous dioxide in the atmosphere caused by the burning of fossil fuels (coal, oil and gas) for producing energy for transport, agriculture and industry since the Industrial Revolution (1750) had increased global surface and ocean temperature. Scientists feared that higher temperature would trigger a rapid melting of mountain glaciers and Artic sea ice leading to more frequent extreme weather events such as floods, cyclonic storms, heat waves and droughts threatening low lying coastal regions and island countries and ecosystems everywhere. The scientific community called for a robust global response to the looming climate crisis.

In 1988, the World Meteorological Organization (WMO) and the UN Environment Programme (UNEP) jointly established the Inter-Governmental Panel on Climate Change (IPCC) comprising hundreds of scientists from all over the world to assess the scientific, technical and socio-economic information relevant for the understanding of the risk of human induced climate change, its potential impacts and options for mitigation and adaptation.

The first report of the IPCC, released in 1990, corroborated the consensus in the scientific community on the causes and impacts of climate change. The report informed the inter-governmental negotiations launched by the UN General Assembly the same year to consider a possible global response to climate change. The negotiations led to the adoption of the UN Framework Convention on Climate Change (UNFCCC) at the UN conference on Environment and Development (UNCED) in Rio in June 1992. The Convention came into effect in March 1994.

The UNFCCC defined climate change as "a change of climate which is attributed directly or indirectly to human activity that alters

the composition of the global temperature…." The "ultimate objective" of the Convention is "the stabilization of the greenhouse gas (GHG) concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the global system".

The UNFCCC confirmed that climate change has been caused largely by GHG emissions, especially CO_2 mainly in the then industrialized countries and called on them to take the lead in reducing the emissions in order to stabilize the climate. Anchored in the principles of "equity" and "common but differentiated responsibilities and respective capabilities of countries at different levels of development (CBDR), the Convention stated the obligation of developed countries to provide financial, technology and capacity building assistance to the developing countries to adapt to the adverse impacts of climate change and pursue the goal of socio-economic development and poverty eradication.

Notably, the UNFCCC called for all necessary actions, including provision of funding, insurance and transfer of technology " for meeting the specific needs and concerns of developing countries likely to be adversely affected by the effects of climate change and/or the impacts of the implementation of the response measures", such as small island countries and countries with low-lying coastal areas; arid and semi-arid areas, forested areas and areas liable to forest decay; areas prone to natural disasters; areas liable to drought and desertification; areas of high urban atmospheric pollution; areas with fragile ecosystems, including mountainous ecosystems.

A new round of inter-governmental negotiations launched in 1995 led to the adoption of an agreement- the Kyoto Protocol- in 1997 during the third COP held in the Japanese city of Kyoto meant to implement the 1992 Framework Convention. Under the Protocol the developed countries (37 in all) agreed to reduce their GHG emissions by an average of 5 % below the 1990 level up to 2012. The US Government facing opposition in the Congress failed to rectify the Kyoto Protocol, later justifying its stance by pointing out that it did not require emissions reductions by China and other

industrializing developing countries. Subsequently, Japan also renounced its obligations under the Protocol.

In 2007, the IPCC issued its fourth assessment report (FAR 2007) which confirmed in unequivocal terms the occurrence of human induced climate change, warning that global warming would increase by 1.8-4 degrees Celsius based on a number of scenarios of business as usual or inaction, limited action and effective action. The IPCC listed the major impacts of climate change such as rising levels of seas and oceans, rapid and large scale melting of the Artic and high-altitude glaciers, and an increase in the frequency, duration and intensity of extreme events such as floods, droughts, storms and hurricanes and heat waves. The IPCC predicted that warmer climate, floods, droughts, tropical cyclones, and sea level rise would seriously threaten coastal regions and negatively affect agriculture, forestry and ecosystems, reduce the quality and quantity of freshwater supplies whilst increasing demand, damage crops, erode soil through water logging, pose increased risk of deaths and injuries as a result of extreme events, large scale damage to or destruction of infrastructure.

The thirteenth Conference of UNFCCC Parties (COP 13) in Bali (Indonesia) in 2007 saw an unprecedented escalation of differences between the developed countries calling for GHG emission cuts by China and several other rapidly developing countries demanding sharp reductions by the former. A collapse of the Bali Conference was avoided by the last minute agreement of developing countries to "take nationally appropriate mitigation actions in the context of sustainable development, supported by technology, and enabled by finance and capacity-building in a measurable, reportable and verifiable manner." This compromise paved the way for the adoption of a number of decisions on the launching a new round of negotiations on a new agreement on mitigation, adaptation, finance, technology, and capacity building. The new agreement was to be finalized and adopted at the fifteenth Conference of Parties (COP 15) in Copenhagen in 2009. The new agreement was to take effect from 2013 upon the expiry of the commitments period of the Kyoto Protocol.

The Copenhagen Conference (COP 15) was held against the backdrop of a spirited worldwide campaign carried out by climate related non-governmental organizations and the media calling for effective action on reversing the growing threats of climate change the world over. The meeting attracted over 40,000 representatives of governments, UN agencies, the business, NGO's and civil society organizations. Dozens of heads of state and government also participated.

Negotiations during the Copenhagen meeting were once again marked by North-South disagreements, especially over legally binding reduction commitments by developed countries. At the eleventh hour, President Obama and a clutch of other world leaders jointly crafted a document called the Copenhagen Accord. Opposition spearheaded by small island states scuttled the adoption of the Accord.

Despite its disputed legal status, the key elements of the Copenhagen Accord served as the basis for negotiations at the subsequent COPs. These included the goal of limiting global warming to a maximum of 2^0C compared to Pre-industrial level as recommended by the IPCC; an institutional architecture for global action comprising a Green Climate Fund (GCF) to finance mitigation and adaptation activities in developing countries to which developed countries agreed to jointly mobilize US$ 100 billion a year by the year 2020; provision of US$ 30 billion for the years 2010-12; a Technology Mechanism to accelerate development and transfer of technology in support of mitigation and adoption action in developing countries; mechanisms for preventing de-forestation and forest degradation; and an agreement by developed countries to provide adequate, predictable and sustainable financial resources, technology and capacity building assistance to developing countries for mitigation and adaptation.

COP 16 (Cancun, 2010) established the GCF, Adaptation Framework and Committee; and Technology Mechanism. COP 17 (Durban, 2011) launched a new round of negotiations to be concluded by 2015 on a new agreement to take effect from 2020. COP. 19 (Warsaw) called for voluntary pledges by all countries on

Intended Nationally Determined Contributions (INDCs) on mitigation and adaptation. COP 20 (Lima, 2014) made limited progress on the text of a new agreement.

2014-15 saw hectic efforts to ensure the success of the crucial negotiations at the Climate Change Conference (COP 21) in Paris in November-December, 2015. These included several sessions of inter-governmental negotiations on the text of a new agreement; moves by President Obama to garner support for climate change related actions at home and abroad, joint announcements by China, the US, India and other industrializing developing countries to curtail their emissions by 2025 or 2030; a special UN General Assembly session on climate change in September 2015 and INDC submissions by 185 countries responsible for 94% of all global emissions prior to the Paris Conference.

The Paris Climate Conference (COP 21) was attended by over 43,000 representatives of states and other stakeholders, including 150 heads of state and government. The French Government made enormous efforts towards the success of the negotiations. Protracted negotiations were held during day long and night sessions through scores of open ended groups on the major elements of a new global climate agreement. The negotiations had to be extended by a day and eventually culminated in the adoption of the Paris Agreement amid worldwide acclaim.

The Paris Agreement recognizes that climate change "represents an urgent and potentially irreversible threat to human societies and the planet", describes climate change as "a common concern of humankind" and proclaims an agreement "to uphold and promote regional and international cooperation in order to mobilise stronger and more ambitious climate action by all parties and non-party stakeholders, including the civil society, the Private-sector., financial institutions, cities and other subnational authorities, local communities and indigenous peoples." The key elements of the Paris Agreement are noted below:

The Global Goal

- "holding the increase in the global average temperature to well below 2^0C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5^0C above pre-industrial levels…"

- Mitigation through GHG emission reduction carried out on a voluntary basis and pledged in Intended Nationally Determined Contributions (INDCs) (to be notified by all Parties and updated periodically.

- Adaptation actions by developing countries to be undertaken on the basis of the Cancun Adaptation Framework and measures identified in INDCs."

Finance

- Developed countries shall provide financial resources to assist developing countries for both mitigation and adaptation. (The decision mentions US$ 100 billion from 2020 through 2025 and setting of a new quantified goal prior to 2025). Financial resources will be provided through the Green Climate Fund.

Loss and Damage

- The Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts will serve as a means of averting, minimizing and addressing loss and damage associated with the adverse impacts of climate change. The areas of cooperation and facilitation under L&D would include, *inter alia*, Early Warning System; Emergency Preparedness; slow onset events; events involving irreversible and permanent loss and damage; comprehensive risk assessment and management; risk insurance; non-economic losses; and resilience of communities, livelihoods and ecosystems. The agreement did not mention how the activities would be funded.

Technology Development and Transfer

- Assistance shall be provided to developing countries by the Technology Mechanism based on a Technology Framework established under the Paris Agreement and funded by the Green Climate Fund. The Framework will be elaborated by the upcoming COPs.

Capacity-Building

- Capacity-building assistance will be provided for mitigation and adaptation actions; technology development and deployment; access to climate finance; education and training.

Transparency

- A transparency Framework will ensure transparency in actions related to climate change by both developed and developing countries.

Implementation of the INDC's

- Each Party shall regularly provide information on their GHG emissions and information for tracking progress in the implementation of its INDC pledges.

Global Stock-take

- The COP of the Paris Agreement shall undertake a first global stock-take of the implementation of the Agreement in all respects in 2023 and every five years thereafter.
- The Paris Agreement shall enter into force a month after at least 55 Parties accounting for at least an estimated 55% of the total global GHG emissions have ratified or otherwise formally approved the agreement.

The central message of the Paris Agreement is an emphatic call for a global transition to a low-carbon economic and life style

paradigm based on the development and deployment of non-fossil fuel based energy.

The outcome of the Paris Conference was described as "a triumph for people, the planet, and for multilateralism" by UN Secretary General Ban Ki Moon, as "the best chance we have to save the one planet we have got" by President Obama, and "a turning point in the world's fight against un-managed climate change" by French President Hollande. However, it has been criticized for its numerous gaps and weaknesses. Scientists have said that the GHG emission reductions pledged in INDCs would not achieve the agreed goals of limiting warming to 1.5^0C and 2^0C which would require a complete stoppage of all industrial emissions by 2030 or 2050 respectively. They point out that the average temperature has already gone up by 1^0C. Other "inconvenient truths" about the Paris outcome include the absence of reduction obligations by the US responsible for 28% of the cumulative global emissions and global warming" and China whose emissions in 2014 totaled 28% of the global total; inadequate reductions promised by the developed countries responsible for the historic concentration of emissions; postponement of the first "global stock take" until 2023- an inordinately long interval during which current emissions will continue or will go up; the absence of binding commitments on mitigation, adaptation, finance, technology transfer and capacity building as well as time scales and deadlines for specific targets envisioned in the outcome; and, finally, the hallow words about the principles of "equity" and "common but differentiated responsibilities" meant to sooth the hurt feelings of the developing countries.

Developing countries seem to have acquiesced in the virtual re-writing of the UNFCCC by the Paris outcome in order to preserve multilateralism they need more than the rich countries, especially in reducing the ill effects of climate change on their economies and societies. Negotiations during the next few years on the operationalization of the institutional architecture outlined in the Paris Agreement are likely to be tough, polemical, and protracted. The main issues of contention are GHG emission cuts sufficient to limit warming to 2^0C and adequate support to developing countries

in achieving a smooth transition to a low-carbon development trajectory and coping with the losses inflicted by climate change.

Section-2

The Climate Change and Security Nexus: The Global Discourse

The statement on the outcome of a major conference hosted by Canada in Toronto in June 1988 captioned 'The Changing Atmosphere: Implications for Global Security' warned that changes in world climate "represent a major threat to international security", adding that "the potentially severe economic and social dislocation for present and future generations would worsen international tensions and increase risk of conflicts among and within nations." However, the security implication of climate change did not figure in the initial global discourse on climate change. Neither the UNFCCC (1992) nor the Kyoto Protocol (1997) refers to it. A statement of UN Secretary General Kofi Annan in 2000 alluded to "a growing consensus that collective security can no longer be narrowly defined as the absence of conflict" and identified "environmental disasters" as "one of the threats to human security." The report of the UN "High-level Panel on Threats, Challenges and Change" (2004) cited "environmental degradation and climate change" as one of the global threats warranting preventive actions." The report called for "the effective implementation of the Kyoto Protocol and new negotiations towards a post-2012 long-term strategy for reducing global warming."

The UN Security Council discussed the security implications of climate change for the first time in 2007 at which dozens of member states, especially the small island countries, highlighted the threats to their security and indeed survival posed by climate change. In 2008, the UN General Assembly held a debate on "Climate Change as a Global Challenge" in the wake of the IPCC's fourth assessment report leading to the adoption of a resolution calling on all UN agencies "to intensify their efforts in considering and addressing climate change, including its possible security implications." The resolution requested the Secretary General (UNSG) to submit a report on "the possible security implications of climate change" at the next (64^{th}) session of the General Assembly.

The UNSG's report on 'Climate Change and its Possible Security Implications (64/350) based on the IPCC's assessment report and inputs by member states, the UN system and NGO's

succinctly reviewed the intersection between climate change and national and global security. Emphasizing the "interdependence between human vulnerability and national security" the report identified five channels through which climate change could affect security. One, climate change could heighten human insecurity by threatening food production and security and human health by causing increased exposure to extreme events such as floods, droughts, storms, hurricanes. Two, climate change could slow down and reverse the gains of socio-economic development, thereby undermining the ability of states to main internal peace and stability. Three, climate change could increase the risk of domestic conflict by triggering population displacement, involuntary migration, domestic conflict or violence related to competition for natural resources including water and land in Africa and South Asia. Four, climate change could cause loss of territory and statelessness, especially in the case of some small island developing states as a result of sea-level rise and inundation. Five, climate change could potentially cause conflicts between countries sharing trans-boundary water or other resources, e.g. in South Asia and Africa. (The report specifically refers to the Indus Waters Treaty between India and Pakistan and the need for "efforts… at all levels to ensure its continued effectiveness."

The UNSG report recognizes that climate change could act as a "threat multiplier" that would exacerbate existing threats posed by persistent poverty, weak state institutions for resource management and conflict resolution, faultlines and historic mistrust between communities and nations as well as inadequate access to information and resources. However, it also lists a number of "threat minimizers"- actions that could reduce climate-related insecurity such as actions on climate change mitigation and adaptation, economic development, democratic governance, strong local and national institutions, international cooperation, preventive diplomacy and mediation, timely availability of information, and increased support for research and analysis to improve understanding of climate change-security inter-linkages." It calls for "a comprehensive, fair and effective global agreement" that could "help stabilize our climate, protect development gains, assist

vulnerable nations adapt to climate change and build a more secure, sustainable and equitable society."

The UNGA debate voiced support for the recommendations of the Secretary General. The Security Council held another debate on climate change in 2011 focusing on the impacts of sea level rise and global food insecurity caused by climate change.

Significantly, the Fifth Assessment Report of the IPCC (2013-4) included a sub-section on the impacts of climate change on human security such as increased displacement of people due to a lack of resources and extreme weather events, in both rural and urban areas particularly in low income developing countries, which has the potential to increase the risk of violent conflicts, such as civil war and inter-group violence by exacerbating well documented conflict drivers , such as poverty and economic shocks. The report also refers to the "trans-boundary impacts of climate change such as changes in sea ice, shared water resources, and pelagic fish stocks (which) have the potential to increase rivalry among states." The IPCC warned that "throughout the 21st century climate change impacts are projected to slow down economic growth, make poverty reduction more difficult, further erode food security and prolong existing and create new poverty traps."

The three "key risks" posed by climate change in Asia highlighted by the IPCC which have already been experienced by Pakistan are "increased riverine, coastal, and urban flooding leading to widespread damage to infrastructure, livelihoods, and settlements; "increased risk of heat-related mortality; and "increased risk of drought-related water and food shortage causing malnutrition".

At the national level, the US alone has formally identified climate change as a major threat to US national interests in security and foreign policy-related legislation and high level policy documents. In 2007 and 2014, the Military Advisory Board (MAB) of the US Centre for Naval Analysis (CNA) published reports highlighting the risks posed by climate change to US national interest. Whilst the 2007 report titled "National Security and the Threat of Climate Change" described climate change as "a threat

multiplier for instability in some of the most volatile regions of the world", the 2014 report warned that "the projected impacts of climate change will be more than threat multipliers; they will serve as catalysts for instability and conflict."US Secretary of State John Kerry in a 2014 statement described climate change as "a global threat of the same magnitude as terrorism, epidemics and weapons of mass destruction" A US department of Defense statement (2014) called climate change "a threat multiplier." A statement issued by the White House in May 2015 on the National Security Implications of a Changing Climate pointed out that the "climate change-induced increases in the frequency and or intensity of extreme weather events … would lead to economic and political instability which can have dangerous national security implications."

India's National Climate Change Policy (2008) and the terms of reference of the dozen or so inter-ministerial, multi-stakeholder national missions on various climate change-related issues do not make any reference to the potential security implications of climate change. However, Indian security experts and think tanks have underlined the nexus and called for integrating the security implications of climate change into India's national security strategy. The Institute of Defense Studies and Analysis (IDSA) - a leading official think tank-has established a Working Group on the Security Implications of Climate Change which has identified the key vulnerabilities of India, including the impacts of temperature increase on crop yields; sea level rise; water scarcity and biodiversity loss. The major security-related effects of climate change cited by security analyst Brahma Chellaney are "intensified inter-state and intra-state competition over natural resources, making resource conflicts more likely," including water disputes with China; extreme weather events and rise in ocean levels leading to influx of "climate refugees" from Bangladesh; and human insecurity resulting from adverse effects on agriculture and energy sectors.

Section-3

The Impacts of Climate Change on Pakistan: Possible Implications for Human and National Security

Pakistan's vulnerability to the negative impacts of climate change is shaped by its geophysical features and political, socio-economic and governance conditions. The geophysical factors exposing the country to the consequences of climate change impacts include:

- Pakistan's location in a pre-dominantly warm, sub-tropical zone with low rates of precipitation (60% of the country receives less than 250 mm of rain annually; only 24% of the areas receive between 250-500 mm).

- Predominantly arid and semi-arid land and soil conditions.

- Dependence on water supplied by the Indus River System fed largely by ice and snow melt in the high altitude Hindu Kush-Karakoram-Himalaya (HKH) glaciers which are vulnerable to rapid recession due to climate change-induced increase in temperature.

- The crucially vital twice-yearly monsoon winds and precipitation which supplement (up to 30 %) the river flows and recharge the ground water are also vulnerable to variation in timing and intensity resulting from higher temperature.

- Pakistan's critical dependence on its agriculture and livestock sector which contributes 23% of its GDP; 45% of jobs and supports livelihoods of more than 50% of its population living in rural areas. Pakistan's industry and exports are largely agro-based.

- Population explosion marked by an increase from 35 million in the late 1940s to around 192 million at present and growing at an annual rate of 2.5% or higher and un-regulated urbanization diminishing cultivable land and depleting water

and other natural resources and constraining the provision of basic social services including education and healthcare to people, especially those with low income.

- Historic vulnerability to recurring extreme events such as floods and droughts likely to become more frequent and more intense as a result of climate change. (Pakistan is said to have experienced 21 major floods between 1950 and 2011)

- A 1000 km long coast line exposed to inundation by rising sea level that could submerge its large cities, including Karachi, salinate agriculture land and aquifers and imperil the livelihoods of farming and fishing communities.

Pakistan's socio-economic and governance deficits and fault lines include:

- Sluggish rate of economic growth averaging 3-5% in recent years caused by severe energy shortage owing to "theft, losses, non-recovery of dues and mismanagement; corruption; losses incurred by large public sector enterprises led by incompetent people; poor law and order, terrorism; fragmentation and polarization of society and growth of intolerance and religious and ethnic divisions; skills deficits rendering demographic dividend unachievable; insufficient use of modern communication tools; gender deficit ; technology and competition deficit leading to slow, poor quality industrial production and declining exports; decaying water infrastructure.

- Resource and management deficits impeding disaster management and providing relief to communities affected by recurring floods and extreme events such as heat waves in Karachi, drought in Baluchistan and arid and semi-arid areas in Sindh, and heavy rains in the Northern Regions during 2014-15.

The observed and anticipated adverse impacts of climate change on various economic sectors in Pakistan have been documented in the reports compiled by the Task Force on Climate Change (TFCC) set up by the Planning Commission in 2008 and a number of Pakistani and international inter-governmental and non-governmental organizations. These studies reveal Pakistan's acute vulnerability to climate change-induced accelerated glacial melt, erratic monsoon winds causing either heavy precipitation and floods or insufficient rains creating hydraulic drought conditions, heat waves, cyclonic storms and hurricanes, and rising sea level which would amplify pre-existing fault lines and risks. The most serious impacts are likely to be experienced by the country's freshwater resources. The impacts on Pakistan's major sectors are briefly noted below.

Agriculture and Livestock

Nearly 80% of Pakistan's major crops (wheat, rice, cotton, sugarcane) are grown on 23 million hectares (mha) of which 74% is irrigated by canals and ground water. Almost 38% of the irrigated land has been degraded by water-logging and salinity, soil erosion, and contamination by chemical fertilizers and pesticides. Climate change would diminish productivity and quality of crop yields and livestock, increase demand for irrigation water due to higher evapotranspiration caused by higher temperature and reduce grazing lands for animals. The adverse effects of climate change would seriously threaten the country's food security and the livelihoods of the people.

Energy

Pakistan's inability to exploit its vast potential for energy (hydro-electric; solar, and biomass caused by planning and governance deficits and non-utilization of installed capacity (22000 MW) have led to growing and persistent shortages since 2008 estimated at around 9000 MW eroding 3-4% of GDP annually by curtailing production activities and inflicting multiple hardships on the people. Domestic natural gas shortages are growing.

In 2012 a dozen large, medium size and small hydel power stations produced 6516 MW of electricity against a total potential of over 50,000 MW. The Government has earmarked on an ambitious programme of additional hydel and thermal power generation combined with efforts to reduce transmission and distribution losses. It has also taken several steps to increase supply of natural gas through indigenous production and imports.

Reduced availability of water threatens hydropower generation and thermal power plant cooling. Energy infrastructure is vulnerable to floods, storms, hurricanes and sea-level rise.

Health Care

Water shortage coupled with elevated temperature will add to the existing health-related stresses by increasing incidence of heatstroke, pneumonia, malaria, cholera, dengue fever and other vector-borne diseases, apart from reducing the nutritional content of food. Recurring floods since 2010 have damaged or destroyed hospitals and health care centres. Increased incidence of disease has reduced the capacity and productivity of workers of all kind.

Disaster Management

More frequent, longer duration and more intense extreme weather events (floods, droughts, hurricanes) threatening infrastructure, farms and crops, homes and other buildings would cause enormous human and material losses and force millions of people to seek alternative land, shelter, and livelihoods elsewhere, especially towns and cities. The country's disaster risk reduction and management capacity will come under relentless, increasing pressure.

Forests and Other Ecosystems

Climate change impacts are likely to exacerbate the depletion of Pakistan's forest cover of less than 3.5% of the total land, one of the lowest in the world, undermining the ecological and socio-economic benefits of forests, rangelands and mangrove forests in the coastal regions. The mountain regions of the country are especially

vulnerable to climate change impacts such as glacial outburst floods, landslides and avalanches threatening forests and orchards. The country's flora and fauna and other biodiversity assets will face increasing risk of depletion and extinction.

Arid and Semi-Arid Regions

Communities in the country's large arid and semi-arid regions, already suffering from water scarcity and soil aridity, will come under increased stress.

Economic and Financial Costs of Climate Change

Some recent studies on the impacts of climate change, such as the 'National Economic and Environmental Development Study (NEEDS) 2011 commissioned by the UNFCCC contain estimates of the economic/financial costs of the impacts of climate variability as well as the cost of adaptation activities in Pakistan. The 2010 flood alone is said to have caused damage estimated at US$ 10 billion, a huge sum for a developing country with a burgeoning population facing a growing array of socio-economic and security challenges. However, given the continued scientific uncertainty over the precise causal nexus between extreme events and climate change, on the one hand, and over the timing, location and scale and magnitude of the extreme events and other impacts, it is highly risky to precisely calculate the economic and fiscal costs of climate change impacts

Section-4

Pakistan's Response to Climate Change Related Challenges

Pakistan had played a lead role in the negotiations culminating in the adoption of the UNFCCC. It has ratified the Convention and its Kyoto Protocol and participates in the annual UNFCCC /KP Conferences and Meetings of Parties and other global and regional forums. A Cabinet Committee on Climate Change established in 1995 and recently re-designated as Prime Minister's Committee on Climate Change serves as the apex body for guiding climate-related activities. A scientific research centre- the Global Change Impact Study Centre (GCISC) was set up in 2002 to assess the impacts of climate change on the country's agriculture other sectors. The National Environment Policy (2005) identified climate change as a major concern. The long- term socio-economic development blueprint Vision 2030 (2006) underlined the need for actions to address the impacts of climate change. The Planning Commission's Task Force on Climate Change set up in October 2008 carried out a comprehensive assessment of all aspects of climate change, including its effects on the economy and suggested options for mitigation and adoption. The Federal Government created a Ministry of Climate Change in 2012 consequent upon the dissolution of the Ministry of Environment in 2011 in pursuance of the 18th Constitutional Amendment. A National Climate Change Policy was approved in 2012 and a Framework for its implementation was evolved in 2013. The medium-term policy framework Vision 2025 adopted in 2014 set a number of goals for responding to the "profound challenges posed by climate change". These include designing water, food and energy security policies and plans with specific reference to the imperatives of climate change as well as "promote long-term sustainability, conservation and protection of natural resources".

A National Disaster Management Act was promulgated in 2010 and a broader National Disaster Risk and Reduction Policy 2013 was formulated the following year. In 2014 an Inter-Ministerial/Inter-Agency Committee was set up by the Ministry of Climate Change to steer and oversee implementation of the National Climate Change policy and provide advice on global negotiations. Pakistan has also formulated a number of sectoral policies pertaining

to areas relevant to climate change, such as biodiversity, drinking water and sanitation, forest protection.

Pakistan's Climate Change Policy and its implementation Framework contain over a hundred recommendations on mitigation(reduction of GHG emissions) in the energy, industry, agriculture, and transport sectors and adaptation to alleviate the negative fallout of climate change on key sectors such as water resources, agriculture and livestock, human health, forests and other vulnerable ecosystems. They also cover cross-cutting subjects including awareness raising, capacity building and international and regional cooperation. The proposed interventions are unexceptionable having been prepared by experts, especially those calling for development of renewable sources of energy and promoting energy efficiency; augmenting the woefully inadequate water storage capacity, improving water infrastructure, promoting water conservation and water use efficiency, rain-harvesting; development of heat resistant higher yield crop varieties and animal breeds; afforestation and reforestation programmes. The recommendations include enhancing institutional capacities at the federal, provincial and lower levels of government, enlisting the active participation of all stakeholders, and regional and international cooperation.

Pakistan's response to climate change suffers from a number of deficits. The high level Prime Minister's Committee on Climate Change has been largely dysfunctional. The Ministry of Climate Change which is mandated to serve as focal point for all international climate change mechanisms established under the UNFCCC as well as coordinate climate-related activities within the country is plagued by serious financial and human resource constraints. Most of the environment and climate change-related institutions and centres are mired in fiscal and management deficits. Pakistan lacks technical capacity to compile GHG emissions inventory and baseline studies in respect of its major economic sectors. The efforts of the Ministry of Climate Change to implement the Climate Change Policy through prioritized, costed, time-bound action plans on mitigation and adaptation have been hampered by financial, technical, and human resource constraints. Climate change

continues to be treated as a sectoral subject to be handled by a severely handicapped ministry whose responsibilities include half a dozen or more major multilateral environmental agreements (MEAS).Coordination between the Ministry of Climate Change and the various line ministries and departments such as the Ministry of Water and Power, the Ministry of Food Security and Research and the Ministry dealing with health issues, is inadequate and the meetings of the Inter-ministerial/Inter-agency Committee are invariably attended by lower-level officials. There is poor understanding of climate change issues on the part of the political elite, including parliamentarians, at both the federal and provincial levels. Unlike the print media which has paid increasing attention to climate change, the country's fast growing 24/7 electronic media is oblivious of this global threat with grave implications for the country.

On the positive side, the Pakistan branches of international and Pakistani non-governmental organizations such as IUCN, WWF, Oxfam, Action Aid, SDPI, LEAD Pakistan, MGPO and UN and multi-lateral agencies, including the World Bank and the Asian Development Bank and the various development agencies of friendly countries have carried out wide-ranging research and advocacy activities related to climate change.

The Government has taken a number of steps to develop renewable sources of energy, especially solar and wind, expand water storage capacity, improve productivity in the agriculture and livestock sector and reduce line losses in the power sector. These measures qualify as promising mitigation and adaptation initiatives. But the Government has thus far not showcased them as part of a climate change agenda.

Section 5

The Climate Change-Security Nexus: The Need for Recognition and Operationalization

The national security-climate change nexus is un-mistakable in the case of Pakistan both in terms of the traditional definition of national security focusing on protecting national sovereignty and independence and territorial integrity from the use or threat of force as well as the broader, contemporary definition encompassing human security predicated on internal peace and stability, sustained socio-economic development and poverty eradication and availability of basic provisions and amenities such as homes, jobs, education, health-care, and access to clean air and water and affordable food and energy.

The relevance of climate change impacts in the context of Pakistan's foreign and security policies is highlighted by the fact that 78% of the country's surface water resources supplied by the Indus Basin originate outside its borders. The Indus and its major tributaries originate in the Tibetan plateau and pass through Indian-administered Jammu and Kashmir. Another major tributary of the Indus- the Kabul River- enters Pakistan from Afghanistan and merges with the Indus, adding nearly a quarter of its flows. The Indus Waters Treaty (IWT) signed in 1960 regulates the flows of the three western rivers-the Indus, Chenab and Jhelum-in to Pakistan and Azad Kashmir. Climate change-induced reduction in the flows of the western rivers is a potential source of tension in India-Pakistan relations. Reduction in the flow of the Kabul River linked to climate change also poses security risks. Pakistan must exert efforts to ensure the integrity of the Indus Basin and its continued access to the river flows from across its borders. Mutually beneficial cooperation with Afghanistan for the optimum utilization of the Kabul River is a high priority national security imperative for Pakistan.

Sluggish economic growth adversely affects the maintenance of adequate military preparedness. Climate change-induced natural disasters as well as domestic law and order disturbance inevitably necessitate deployment of military personnel for relief operations and restoration of peace to the detriment of attending to military

contingencies. Natural disasters, especially floods, storms and hurricanes as well as rising sea-level also damage military assets and vital energy and transport infrastructure with serious national security implications

The "elements of national power" listed by the Indian National Defense College in 1996 are equally applicable to Pakistan. "National Security", as defined by the Indian NDC, "is an appropriate and aggressive blend of political resilience and maturity, human resources, economic structure and capacity, technological competence, industrial base and availability of natural resources and finally the military might."

The Government of Pakistan has initiated a process for the formulation of a national security policy. In August 2013, the Defense Committee of the Cabinet (DCC) was reconstituted as the Cabinet Committee on National Security (CCNS) with a mandate "to frame a National Security Policy." According to a statement issued by the Prime Minister House, the CCNS "will focus on national security agenda with the aim to formulate a National Security Policy which will become the guiding framework for its subsidiary policies- defense policy, foreign policy, internal security policy and other policies affecting national security."

The CCNS can draw upon the considerable spade work undertaken by the National Security Secretariat and the National Defense University including policy-centered research and consultations with a broad range of experts and organizations covering the traditional and non-traditional sources and factors of national security.

There is a strong case for recognizing climate change as a key determinant of Pakistan's human and national security. Acceptance of the critical relevance of climate change for our national security would lend a much needed impetus to serious efforts aimed at reducing the negative implications of climate change for Pakistan as well as enabling the country to contribute to the global efforts for addressing this common threat.

Integration of climate change imperatives in national development plans and actions; strengthening of the institutional mechanisms for domestic action and external inter-actions; promoting the resilience of economic and natural systems and communities that are especially vulnerable to the adverse effects of climate change; and the mobilization of federal, provincial and lower levels of government and non-state stakeholders in climate change-related initiatives and activities are urgently called for. A few specific suggestions are noted below:

Institutional Mechanisms: Federal Government; PMCC

The Prime Minister's Committee on Climate Change (PMCCC) needs to be strengthened as the apex national policy coordination mechanism for interaction with the Council of Common Interest (CCI) and relevant parliamentary committees and federal ministries. The PMCC should have a small, efficient secretariat located in the Prime Minister's Secretariat.

Ministry of Climate Change or a National Climate Change Commission / Authority

The Federal Ministry of Climate Change should be restructured on the basis of a review of its domestic and external responsibilities. Coordination between national and sub-national level governments is an essential prerequisite of the success of climate change-related activities. All countries are required to designate focal points for inter-action with the various mechanisms that have been established under the UNFCCC and/or are expected to be set up in pursuance of the Paris Climate Agreement The existing mechanisms include the two main subsidiary bodies of the UNFCCC, the Green Climate Find (GCF), the Adaptation Committee and Fund; the Technology Mechanism comprising an Executive Committee and a Technology Centre and Network and the Capacity Building Mechanism. A Loss and Damage Mechanism is expected to be elaborated and operationalized in the near future.

In order to secure assistance from the aforementioned mechanisms as well as other external sources, the Government

should either strengthen the existing M/O Climate Change or consider the setting up of a National Climate Change Commission or Authority on the lines of the Higher Education Commission staffed by technically qualified personnel. The UN system, the multilateral financial bodies and/or friendly governments should be approached for support in the establishment of the proposed climate change-related institutional arrangements.

Other Statuary Bodies

There is a need to revisit the mandates and performance of the various statutory bodies responsible for climate change-related activities, including those that have been placed under the M/O climate change and other federal ministries. These include the Global Change Impact Study Centre (GCISC); the National Disaster Management Authority (NDMA); the Pakistan Environment Protection Agency (Pak-EPA); as well as the Alternative Energy Development Board, the Energy Conservation Centre (ENERCON); the water-related constitutions such as the Water and Power Development Authority and its several research centres, the Indus River System Authority (IRSA), the National Flood Commission; the Pakistan Agriculture Research Council (PARC), the University of Agriculture in Faisalabad, the Oceanographic Institution in Karachi, the forest institutes in Peshawar and Jamshoro. operating under various federal and provincial ministries with a view to enhancing their performance.

Ministry of Foreign Affairs

Pakistan needs to significantly enhance its "climate diplomacy" as a key component of efforts to cope with the challenges posed by climate change. The capacities of the Ministry of Foreign Affairs and key Pakistan Missions (New York; Geneva; Paris; Berlin; Nairobi; Vienna) should be further augmented in order to play a more pre-active role in the forthcoming hectic negotiations for finalizing and operationalizing the institutional arrangements envisaged in the Paris Agreement as well as secure support from friendly foreign countries for climate-related efforts. Pakistan should pay increased attention to the effective implementation of the

climate change-related decisions adopted by SAARC summits and ministerial conferences.

Other Federal Ministries

The other key ministries relevant to climate change are the Ministry of Development Planning and Reform; Ministry of Water and Power; Ministry of Food Security and Research; and Ministry of Science and Technology. Their capacities need to be bolstered.

Inter-Ministerial/Multi-Stakeholder Working Groups

Given the wide ranging multi-sectoral nature of climate change impacts, Government should consider the establishment of national level multi-stakeholder working groups led by sectoral ministries on the lines of the National Missions setup by the Indian Government (the National Missions on Solar and Wind Energy; Water, Sustainable Agriculture; Food Security; the Himalayan ecosystems and Himalayan Studies; Forestry; Capacity-Building and Knowledge Management). The Working Groups may be mandated to prepare inputs for national mitigation and adaptation plans, updating of the Intended Nationally Determined Contributions (INDCS) and project proposals for the national development plans and external cooperation based on research and stakeholder consultations.

- **Provincial and Lower-Levels of Government**

The institutional capacities of provincial and lower-level governments, especially those in the smaller provinces and the federally or provincially administered territories (FATA and PATA) to deal with climate-related issues need to be significantly reinforced.

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