**Social and Economic Consequences of Climate Change in Pakistan[[1]](#footnote-1)**

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 The recently concluded review of the Millennium Development Goals (MGDs) shows that if the international community and its various stakeholders put their minds, resources and energy together for common shared cause, success is possible. Enormous progress has been made by mankind by reducing poverty from 47 percent to 15 percent within a span of 25 years. This example provides an auspicious setting for the possibilities at the Paris Climate Change Conference to be held in November 2015.

The journey from COP in Berlin to COP21 in Paris has not been a smooth ride. The period was dominated by debate between environmentalists and economists. Environmentalists were perceived as champions of retarding the progress of development. Developed countries had improved their own standards of living by using fossil fuels as source of energy and were now attempting to deny the fruits of better living standards for the majority of the people living in the developing world. How can they be expected to remain poor because of a problem mostly caused by people of the developed world. Economists were attacked by the environmentalists for their narrow preoccupation with growth and promotion of consumption standards that were unsustainable, could not be replicated and would cause huge damage to the planet.

Stern Review of 2006, however, was the beginning of the process to bring convergence between these two opposing viewpoints. The Review demonstrated that it was better to err on the side of caution. Preventive measures at this stage to bring down the global temperature to 20C would cost much less than the huge costs that the world would have to incur in the future if this trend of global warming is not arrested. The trade-off between growth and environmental protection was not as stark as it was made out to be. Win-win outcomes that stimulated growth, reduced poverty but did not harm environment were quite feasible. The idea of Green Growth captures the essence of this convergence.

Consequently, there has been an increasing awareness among the academics, researchers, public policy practitioners and public at large about the serious risks associated with climate change that could undermine the achievements of the last century. Studies, conferences, international leaders, advocacy groups and particularly that Nobel Prize Winner, the Inter-Governmental panel on Climate Change (IPCC) have played a major role in raising awareness and propelling action. There is an emerging broad consensus that the planet and the people would face destabilization and dislocation if measures are not taken to adapt and mitigate the risks arising from global warming. All the ingredients that make our current living condition so attractive – water resources, food availability, energy, agriculture, human health, human settlements – are vulnerable to the extreme weather events arising out of global warming. Some scholars have gone to the extent that they consider climate change “as a threat multiplier in already fragile regions of the world which could heighten global tensions. According to these studies, Environmental destruction and resource scarcity can contribute to the emergence or aggravation of violent conflicts or lead to social and economic disruptions that may indirectly become a source of conflict.

The Paris Climate Conference will in over 20 years aim to achieve a legally binding and universal agreement on keeping global warming below 20C. For the first time, each country is offering to pitch in to limit emissions growth. Intended Nationally Determined Contributions or INDCs will form the backbone of a universal rescue pact to be signed in Paris in December. Intensive engagement between China and the US over the past two years helped break the logjam in global climate politics. China the largest CO2 emitter in the world has now made a firm commitment to reduce its greenhouse gas emissions per unit of GDP by 60-65 percent from 2005 levels. It would increase the share of non-fossil fuels as part of its primary energy. China has also announced plans for a nationwide system that would put a price on-emissions of greenhouse gases. Brazil is the first large developing nation to offer an absolute cut in emissions over the next decade, instead of just restraints on continued growth. India- the fourth largest emitter in the world has also promised to limit the amount of Carbon-di-Oxide per unit of GDP. Can it reconcile this goal with its other ambitions of growing at 8 percent annually for next decade or so? This would be a challenging task as the emissions at that growth trajectory are likely to triple from 1.7 billion tons to 5.3 billion by 2030.

There are some other positive developments emanating from the private sector. Big oil and gas companies in Europe have got together and pledged to combat Climate Change by developing ‘cleaner’ energy and cutting harmful gas flaring. They intend to collaborate on the development of Carbon capture and storage systems by trapping greenhouse gas pollution before it can warm the atmosphere and storing at deep underground. Shell has cancelled its drilling in the Arctic as much for environmental reasons.

Nearly 400 financial institutions, representing more than $24 trillion in assets have signed the investor statement on Climate Change, urging World Leaders to reach agreement at the Climate Summit in Paris. Mark Carney, the Governor of Bank of England noted that ‘the risks to financial stability will be minimised if the transition to a lower carbon economy begins early and follows a predictable path”.

The Green bond market has taken off and $70 billion of green bonds will be issued this year to finance sustainable investment. Many investors are finding ways to change their portfolios so they are not exposed to ‘carbon risks’. Perhaps it is the beginning of a sea change as investors and financiers recognize the need to hedge future environmental risks. The financial community seems more united in its demand for an agreement at Paris.

The World Bank has announced a major increase in its climate financing to potentially $29 billion a year by 2020. These investments will boost support for renewable energy and energy efficiency, climate-smart transport solutions, resilient cities, the restoration of degraded forests and landscapes, enhanced water security and agricultural practices.

These are all very encouraging developments. But the agenda ahead is still daunting. A recent World Bank study warns that we are on a track for 4OC warmer world marked by extreme heat waves, declining global food stocks, loss of ecosystems and biodiversity and life threating sea level rise. An analysis by researchers at Climate Interactive of the pledges made by the countries about how much emissions they are willing to cut in coming decades shows that the collective pledges would reduce the warming of the planet at century’s end to about 6.3 degrees if the national commitments are honored.. This would be a decline of over 20 percent from an expected 8.10F if emissions continue on their present course. Countries are starting to move the needle on the projected global temperature. The nations are still far away from meeting their own shared target set in 2010 at Cancun by 200 countries of limiting global warming to about 3.60 F. That level of warming, while potentially producing dire effects on agriculture, sea level and the natural world might at least be tolerable.

Many analysts expect that any final deal stuck in Paris will probably not be enough to forestall dangerous levels of global warming. The challenge therefore would be to encourage countries to ramp up their ambitions over time. Based on pledges to date, emissions would be 52-53 billion tons of CO2 equivalent in 2025 and 53-54 billion tons in 2030 – more than today’s estimated 48 billion tons per year. To get on the path to 20C (3.60F) annual greenhouse gas emissions would have to be 11-13 billion tons lower in 2025 than pledged and 15-17 billion tons lower in 2030. Virtually every piece of land ice on Earth is melting, the sea ice in the Arctic is collapsing, droughts and other weather extremes are intensifying and the global food system has already shown signs of instability. Predictions for South Asia include increased temperature, rainfall and flooding, droughts and increased intensity of extreme weather events.

At Copenhagen Conference in 2009 it was agreed that a sum of $100 billion a year would be made available to the developing countries to finance adaptation and mitigation measures. Given the financial difficulties the European Union and Japan are facing and the contentious nature of Congressional politics on this issue in the United States there is some skepticism about the attainment of this financing goal at Paris conference. If this commitment is not met, the incentives for developing countries to pursue the agenda of Climate Change would be subdued.

In terms of the emissions of Carbon di Oxide per capita Pakistan figures quite low at 127th rank so we are not a big culprit in contributing to global warming through our own actions. But we are at the same time one of the most vulnerable countries due to the anthropogenic actions of others carried out over time. Since temperatures are rising we have witnessed the big floods in 2010, followed by droughts and floods again in Central Punjab in 2014. Himalaya-Karakorum-Hindukush together make the largest mountain chain over the earth and they are custodian of the third largest ice reserves after the Polar Regions. They protect the inhabitants of South Asia from the cold surges in winter, confine the monsoon precipitation to this region – supplying great resource of water. They possess a treasure of solid water which melts with high temperature in summer and makes this resource available in river during needy times. The Indus, Ganges and the Yangtze fed by the runoff from the glaciers of these ranges serve as the lifeline for more than 1 billion people in Asia. The thinning of ice and retreat of glacial extent of Himalayan-Karakoram-Hindukush mountain chain is taking place at an alarming rate disrupting precipitation patterns. This situation of flooding and then drought once the glaciers have melted would have serious impact on Energy-Water-Food Security nexus of Pakistan. As we are dependent on irrigation water flowing through River Indus which originates from the Himalaya-Karakorum-Hindukush Mountain Range our burgeoning population would not be able to feed itself as availability of surface and ground waters recedes and hydro power resources dwindle down. Ground water is already depleting rapidly. The erratic rainfall, soil degradation, shorter growing seasons and reduction in crop yields combined with inadequate surface water availability would push us to the limits of food insecurity. Crop water requirement is a function of temperature, radiation, intensity, cloud cover, air humidity and wind speed. Among them, temperature is the major player. Due to global warming and climate change embedded in waves of mild, moderate and severe intensity the crop water requirements would increase while available surface water supply and saline ground water not suitable for crops would decline. Already the yields of rice, wheat and other cereals have reduced significantly. This would, in turn, increase the incidence of poverty in this country. The gains we have made in reducing poverty so far would thus be nullified. This is the most serious risk of climate change that we in Pakistan have to confront.

Modeling simulations on different scenarios of future state of climate in Pakistan show that the mean daily temperature is likely to increase by 5.50C under the Business-as-usual scenario. The moderate scenarios bring this down to 4.50C by the end of the century while the optimistic scenario in which policy and institutional changes take place would bring it down to 3.40C.

Using crop simulation models, research studies have predicted decline in net cereal production by at least 4-10 percent. Pakistan’s demand for wheat by 2050 would be 43 million tons but the projected production would be 36 million tons. Similarly, a shortfall of 4 million tons is projected for rice. Reduced production would raise food prices making the food grains unaffordable and thus inaccessible to the poor and low income groups. A serious risk of malnutrition and hunger therefore looms large on the horizon. It may be recalled that the floods of 2010 had added 5 million to the pool of the undernourished people.

Higher temperatures will decrease the dissolved oxygen levels in the river. The bacterial respiration rates will rise with increasing temperature, enhancing the biochemical oxygen demand of the river. Increased temperatures will degrade the water quality of the Indus as heavy metals from the bottom sediments rise.

Indus Delta located at the mouth of the Indus River before it falls into the Arabian Sea has recorded droughts and floods in the last decade. The frequency and intensity of such extreme events will further increase in the coming decades due to high temperatures.

The districts of Thatta and Sujjawal would be badly affected as fresh waters from Indus brings alluvial soil from its catchments areas which increases soil productivity. The degraded quality of water and decreased flows downstream Kotri combined with the intrusion of sea water into these areas would result in water logging and infertility of the soil. Estimates show that approximately two million acres of Coastal areas have become nonproductive due to sea water intrusion. The Indus eco-region would further deteriorate.

Pakistan already has a very poor record in preserving its forest cover. Forests represent a kind of ecological infrastructure that helps maintain comfortable living condition on the planet. By taking up and holding carbon dioxide, cleaning water through their roots, preventing floods by stabilizing soil , forests play a vital role in human lives. Cutting down forests degrades low pressure systems that are formed by the water transpiring into the atmosphere above the forest. “Trees take up moisture from the soil and transpire it, lifting it into the atmosphere. A single fully grown tree release 1,000 liters of water vapor a day into the atmosphere. The water vapor creates clouds which are seeded with volatile gases, emitted by the trees naturally to form rain. These water-rich banks of clouds travel long, wind-driven distances, a conveyer belt for delivery of precipitation”. Planting of trees and regeneration of forests would help Pakistan in multiple ways.

Looking ahead, the world which would be marked with more discontinuity and volatility While two billion consumers with incomes sufficient to support significant discretionary spending would put pressure on natural resources, food, energy and water. . McKinsey has projected that Global Urban population would be growing by 65 million a year and nearly half of global GDP growth between 2010 and 2025 will come form 440 cities in emerging market economies. A commission headed by former Mexican President Felipe Calderon has recommended that smarter urban policies would not only cut the cost of new city infrastructure by $3 trillion over the next 15 years but also reduce Carbon di Oxide emissions by 1.5 billion tons a year.

Technologies Disruption with the rise of Artificial Intelligence, reshaping global manufacturing, deepening of IT penetration and tremendous increase in computing power will lead to decrease in prices. Less of physical capital and more of intellectual capital would be required in designing, developing and delivering goods and services. Advances in technology and the interconnectivity of geographic and product markets will make the half-life of ‘normal competitive advantage’ very short indeed.

World population would plateau in most of the world and shrink in Japan and South Korea. The number of workers per dependent in Developed countries would be 1.4 compared to 2 today.

Climate Change by raising global temperatures and intensifying heat waves, changing the annual precipitation rates, giving rise to droughts and floods would have serious repercussions on human health also. In India, eighteen heat waves were reported during 1980-98 and the heat waves of 1988.

*What are the policy initiatives that can be taken up to avoid the disaster?*

Indus Basin Treaty concluded in the 1960s was a significant hall mark in the joint management and monitoring of the Indus and its tributaries by India and Pakistan. This treaty has withstood the test of time and despite several wars and conflicts between the two countries storage of water have remained unhampered.

In view of the Himalayan glacier melting, the sporadic nature of floods and droughts, the volatility of rainfall and burgeoning population in the two countries there is an imperative need to negotiate a new Treaty between India and Pakistan that aims to provide reliable supply of irrigation water to the rivers and distributaries in the two countries. As water is the lifeline for the population, its security and equitable distribution in the wake of Climate Change be given highest priority. Hawks in both the countries would be fanning hatred accusing each other for usurpation of water rights. The chances for war and conflict because of water can only be minimized if the leadership in the two countries rise above parochial interests of one up man ship and populist rhetoric and show courage and sagacity by reaching an agreement that would bring peace and prosperity to almost 2 million people in this region. Failure to do so is bound to lead to disastrous results. Water scarcity and food insecurity would be bombs ticking to explode. The proposal made by Pakistan establishing a Peace Park at Siachen Glacier should be seriously considered by India in the larger interests of the people of both the countries.

Climate Change policies and interventions would have perceptible beneficial effects only after several decades while remedial and preventive actions have to be taken now. Policy makers with time horizons extending to the next electoral cycle do not feel any compelling reasons to initiate these measures. They are so preoccupied with managing day to day crises and responding to the immediate needs of their electorate that they do not have either the time or energy to pay attention to policy and institutional changes that would make a difference in distant future. Civil Society, which is a custodian of long run public interests, has to take the initiative and keep up the pressure on the political leadership to steer the agenda of Climate Change.

 The other serious problem is that both mitigation and adaptation to climate change require multi-level coordination, cooperation and cohesive action. The melting of Himalayas Glaciers in addition to a regional approach involving India and Pakistan would require closer coordination at the Federal, Provincial and Local Governments such coordinating mechanisms are not simply effective at present. Similarly, action to implement the mitigation and adaptation measures would necessitate a multi-sectoral framework in which responsibilities and duties are shared among different ministries and agencies in a harmonious manner. The present ministerial set up of the Government is organized around silos where turf preservation and contestation are the prevalent norms. In absence of collaboration and cooperation, implementation would face snags, deviate from timelines, remain incomplete marred with gaps. A new governance structure that involves the Federal, Provincial, Local Governments, different sectoral ministries and agencies, private sector and Civil Society has to be conceived and put in place if the Climate Change Strategy has to produce the desirable results.

1. Keynote address at The Lahore Forum on Climate Change organized by the Embassy of Paris at Lahore on October 13, 2015 [↑](#footnote-ref-1)