

Challenges and opportunities linked with climate change for Pakistan

Ghulam Rasul

Research and Development Division, Pakistan Meteorological Department, Islamabad

rasul@pmd.gov.pk

Abstract

Warming of the Global Climate System is unequivocal and many of the observed changes are unprecedented over different time scales. The atmosphere and oceans have warmed, the amount of snow and ice have diminished, sea level has risen, and the concentration of Green House Gases has increased. The trigger to the climate system is rising temperature mainly due to the human influence on the natural feedback system. The changes in climate differ in terms of characteristics over time and space. The geographical features of Pakistan make it a unique case for climate change experiences as its northern mountains control the dynamics of Asian Summer Monsoon and they are custodians of world's third largest ice mass after the polar regions. From the south, the Arabian Sea has the potential to produce a number of tropical storms which may become a permanent threat to the livelihood of the vulnerable areas. Increased melting of snow/ice synchronous with the peak monsoon may generate devastating floods in the Indus River System because there is control over the flow of water in monsoon rich area. The temperature increase in UIB during the last century was recorded as 1.1C which was higher than the global average as well as the low elevation plains of the region. In last decade (2001-2010), the increase in the mean daily temperature remained 0.9C above long term average of 1961-90. Pakistan is the major beneficiary and ranks 8th among the most vulnerable countries to the risks of climate change. Basically it is a semi-arid country getting average total annual precipitation about one foot and 60% of its total arable land is irrigated by contiguous network of canals. About 70% is the contribution of seasonal snow and glacier melt to the river flows which have been experiencing extreme inter-annual and inter- as well as intra-seasonal variability resulting into frequent floods and drought. Increasing temperatures have been playing an important role in accentuating the physical processes behind the hydrological cycle resulting into extreme events. Water sector is likely to be the first victim of climate change which may affect agriculture, energy, biodiversity and the socio-economic sectors. Too much water and too less water will be the problematic nexus for Pakistan. Monsoon brings lot of water which could be stored in reservoirs to protect flooding and that water stock can be used for power generation and irrigation of winter crops. Extending summer and shrinking winter in mountainous areas provide an opportunity to grow two crops in a year. The population growth rate in Pakistan is one of the highest in the world which does not allow the match of available resources for sustainable development. Migration of rural population to urban centers may be reduced by establishing small and medium size industry. Climate resilient and highly productive crop varieties along with mechanized farming may satisfy the objectives of food security saving the harvests from pre- and post-harvest losses due to uncertain weather conditions which are likely to prevail under climate change.