**Rising sea level: Threat to coastal life (Part 1)**

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Coastal zone is generally described as the ‘broader transitional area between the hinterland and the marine environment. Globally, coastlines are significant centers of economic, social and cultural development, and coastal areas are home to crucial ecological and environmental resources. Global warming and climate change pose serious threat to these coastal environments through rising sea levels. Persistent and increasing concentration of greenhouse gases in the atmosphere are raising the atmospheric temperature and is direct cause of bringing about a rise in sea level. Thus, global warming will accelerate global sea level rises through the 21st century, resulting in large impacts to coastal communities. Experts categorize two possible causes of Sea Level Rise (SLR): Thermal expansion of seawater (because of ocean warming), and input of water mass from land ice melt and land water reservoirs. Their analysis of data of ocean temperature collected over several decades reveals that thermal expansion of ocean waters has significantly increased during the second half of the twentieth century, accounting for approximately 50% of the observed sea level rise from 1993 to 2003. We see that the variation in climate and its manifestations in biological, physical and social outcomes are surely under discussion with both academia and political community and therefore it cannot be ignored. While great doubt exists regarding the path and amplitude of variations, it is known with relative certainty that the sea level rise is an almost permanent and inescapable global event. Even though sea level has been rising gradually for hundreds of years, the increase in the rate of rise because of globally prevalent factors will magnify exposure of coastlines and their systems the world over. Rise in sea level is going to have significant effects on land and sea life, and is known to predict major shift in population over the next century, particularly in the developing world.

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United Nations Environmental Program (UNEP) through its OCA/PAC regional seas program of 1989 has grouped Pakistan in the countries, which are more vulnerable to the effects of a SLR (Sea Level Rise) especially Karachi, Badin and Thatta Districts. It is estimated that 10% of the country’s population is living in the coastal belt, at least 20% of coast areas of Pakistan is comparatively better developed, and that 40% of all major industries in Pakistan are in or near the coastal areas. To protect these assets, Pakistan will find the endeavor costly especially in case if the effects of climate change manifest themselves suddenly rather than gradually. A rise of sea level by a few mm per year, may not be threatening but direct and indirect impact of such rise may have severe impacts on the coastal resources for sustainable coastal zone management and, in the case of direct land loss of low-lying areas through sea-intrusion, can rapidly damage or destroy coastal ecosystems.

Some researchers of National Institute of Oceanography (NIO) gave warnings and submitted reports to federal government in which future projections of sea level rise have shown coastal areas of Karachi going under the sea by 2060 as some part of Malir have already been claimed by the seawater. Projections have also shown that districts of Thatta and Badin can also sink into the sea by the year 2050. During the past 35 years, at least 2 kilometers of coastal area near Sindh and Baluchistan has evidently submerged into the sea and destroyed about 200,000 acres of land. Water in some parts of Baluchistan coast has also become salty and brackish. Rising seas will increase the salinity of creeks, coastal wetlands and aquifers, also disrupting marine life and possibly threatening surface / sub-surface drinking water supplies, and infrastructure. Similarly, Coastal land of Baluchistan of about 770 kilometers has also been claimed by the sea. To stop the land erosion, Sindh Government plans to construct a 220 kilometers road beside its coastal area.

As result of SLR, in general sea level, tides and storms riding on ever-higher levels of sea flow into the communities settled in the coastal areas to cause massive destruction of lives and infrastructure. Similarly, natural protections like dykes and levees against the potential damages of storm surges are increasingly threatened. Sand banks, barrier islands, beaches, salt quagmires, mangrove stands, and sand and mud flats are pushed inland as sea levels rise unless there are obstructions along the retreat path. If these cannot move, such natural protections are washed over or sunk. In many countries, most beaches have sea walls, jetties, and other artificial defenses to protect roads, buildings and other infrastructure in the coastal areas. In such places, sea-level rise increases erosion of stranded beaches, wetlands, and engineering structures.

There are some sustainable development challenges too as research suggested that the current concentration of greenhouse gases is around 380ppm, which suggests a sense of urgency as there does not seem to be much time to lose before corrective measures could be implemented. According to the Inter-Governmental Panel on Climate Change (IPCC) research study humans on earth should reduce producing greenhouse gases by 50% to 80% of what they are on track to be in the next century to maintain the concentration of greenhouses in the atmosphere to the current level. Most of the responsible states in the world are working hard to reduce and cut producing greenhouse gases

(To be concluded).

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