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Impact of climate change on hydrodynamics of coastal aquifer Gujarat, India

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Climate change is not only a major global environmental problem, but is also an issue of great concern regarding water resources to a developing country like India which has agriculture based economy. The Earth's climate has demonstrably changed on both global and regional scales since the pre-industrial era, with some of these changes attributable to human activities. The changes observed in the regional climate have already affected many of the physical and biological systems and there are visible indications that social and economic systems have also been affected. Climate change in all probabilities will put stress not only on availability of water resources but will also lead to salinity Ingress, socioeconomic changes along the coastal areas etc. The recent studies show that sea level has risen by an average of one millimetre/year in some parts of Indian coast and from the analysis of 100 years of tide gauge data in Mumbai (near to study area), Kochi (West Coast) and Vishakhapatnam (East Coast), it is observed that sea level in these areas rose by 0.78, 1.14 & 0.75 mm/year respectively which is close to the global average. The salinity in coastal areas is generally as a result of lateral, sub-surface intrusion of the sea water because of lowering of the ground water levels (i.e. 3 m bmsl) & ingress of sea water through soil cover. It is reported that the coastal areas of Gujarat once had fresh water aquifer & good soil therefore, agriculture production was good. Ground water over exploitation in relation to annual recharge and man-made ecological imbalances, have resulted in the transgression of the saline sea water into the fresh water areas along certain stretches of the coastal line. Further saline ingress will take place as a result of stipulate sea water rise as a consequence of Climate Change. The state of Gujarat has 1600 km of coastline which is basically a 'submerging type' as such prone to the effects of sea-level rise. Miolitic limestone and alluvial tracts from potential aquifers but they are prone to saline intrusion. Seawater intrusion is negligible in Deccan trap basalt hardrock, except through large creeks, fissures, and joints. Gaj limestone and clay possess inherent salinity. Near the seacoast, tides also affect groundwater levels and groundwater quality in the coastal Saurashtra area, ground water exploitation has increased substantially, saline ingress has affected 2 to 4 km area from the coast covering about 7,000 sq. km The remediation measures to check the salinity ingress because of the intensive development of groundwater, the social economic impact and the measures being planned in view of the projected sea water rise are discussed.

References:

