

Sea water intrusion into coastal aquifers -concepts, methods and adoptable control practices

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■ **ABSTRACT** : Seawater intrusion is one of the most wide-spread and important processes that degrades groundwater quality by raising salinity to levels exceeding acceptable drinking water and irrigation standards, and endangers future exploitation of coastal aquifers. In India, the coastal region occupies some of the most potential aquifer systems of the country. Extensive research is being carried out in many parts of the world with the objectives of understanding the mechanism of seawater intrusion and improving the methods to control it in order to protect groundwater resources in coastal aquifers. The developed numerical models are based on different concepts. The investigations on possible impacts of climate change and seawater level rise on seawater intrusion in coastal aquifers revealed the severity of the problem and the significance of the landward movement of the dispersion zone under the condition of seawater level rise due to climate change. Sea level rise caused by global warming has become a root cause, pressure from the increase in the quantity of saltwater that many will try to enter the fresh water aquifer. Future sea-level rise due to climate change is expected to occur at a rate greatly exceeding that of the recent past. For effective management of coastal aquifer system, it is necessary to thorough understand the aquifer geometry, distribution of the fresh water and saline water in the system, optimum pumping rates, movement of the fresh water saline water interface, tidal influence into the aquifer. Safe yield of the aquifer has to be evaluated and accordingly the extraction has to be restricted, remedial measures have to be done wherever sea water intrusion has taken place. This paper describes about sea water intrusion processes, extent, estimation and various control measures to combat the problem and for sustainable use of fresh water from different case studies undertaken at India, Australia, Netherlands, Brazil and United Kingdom.

■ **KEY WORDS** : Sea water intrusion, Interface, Multi electrode imaging, Sea level rise

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