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## Status of water resources in mining region of Goa

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Water is one of the prime natural resources on which the sustenance and economic development of any State is largely dependent. Unlike most of the rivers in the northern part of the country, none of the rivers in Goa are snow-fed, resulting in sharp imbalances in water availability between the summer and monsoon months. Groundwater basins in the State do not have any significant inter-state component and to a large extent may be considered as "Hydrologically Land Locked". Central Water Commission (CWC), Government of India, has estimated the surface water potential of Goa to be 8437 million cubic meters (MCM). Assuming a 10% recharge to groundwater due to the average annual rainfall (3500-4000 mm), the groundwater potential of Goa has been worked out to be 152 MCM by the Central Ground Water Board. Despite such an enormous resource base, the potential utilization of water resources has been low. Factors such as steep topography, short river length, unique physiography, etc., result in low capability for utilization of water resources. Anthropogenic factors like mining activities, agricultural practices and increased built-up area have further widened the demand supply gap. For assessing the surface water quality status of Goa mining region, thirty six (36) water quality monitoring stations were identified and established at various locations along rivers, streams and nallahs etc. Hotspots as per the sensitivity criteria with respect to the water quality deterioration, scenic, aesthetic and recreational aspects and water supply have been established. To assess the status of groundwater, forty five (45) monitoring locations were sited from North & South Goa. To determine the recharging potential of aquifers, Hydrographs were plotted for the wells at all 45 locations. It is seen that wells have good recharge potential and the quantitative impact is primarily persistent in certain areas like Shrigao, Dhandkal (Honda), Pissurlem, Dignem etc. where some wells dried up during the summer season. Several management strategies like settling ponds, laterite rubble wall arrestors, garland drains, overburden and mineral dumps in series (which also help during annual desilting of the ponds), application of Geo-textiles etc. to arrest silt and sediment flows from soil are suggested along with development of central water supply tanks to meet water demand.

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## Major global changes and their impact effects

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Major global changes would result from the impact of a large meteorites, asteroids or comets. The collision would set the planet ringing like a giant bell. This leads to produce powerful earthquakes and violent volcanic eruptions. In addition, the impact into the ocean would send gigantic tsunami racing toward nearby shores. The impact could also reverse the planet's magnetic field. On the other hand, the impact effects would make a thick blanket of dust into the atmosphere, shutting out the Sun and chilling the planet. The dust and smoke blocking out the Sun would cause a rapid cooling of Earth's surface by 20°C or more. The cooling would persist from several months, bringing freezing weather conditions, giving rise to glacial accumulation. So much damage would beset Earth that extension of species would surely follow.

## Biography

Mohamed Tharwat Salah Heikal received PhD from Tanta University, Egypt in 1987. Currently he is Professor of Petrology at Tanta University. He is the Coordinator of Petroleum and Mining Geology Program (PMGP) at Tanta University and President of Arab Meteors and Space Sciences Association (AMSSA). His activities include; peer reviewer of highly cited geological journals and he has published more than 75 papers in reputed journals and has been serving as a reviewer of repute.

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