

Impacts on Groundwater Resources by rainfall variations due to Climate Changes in Sri Lanka

A.M.N.P.B.Abeysinghe (Provincial Manager NC/C, Hydrogeologist, WRB); R. R. G. R. Rajapakse (AGM -Research & Development)

How precipitation patterns impact groundwater resources in Sri Lanka

Precipitation patterns play a significant role in impacting groundwater resources in Sri Lanka. As a tropical country, Sri Lanka experiences two monsoon seasons, the southwest monsoon from May to September and the northeast monsoon from December to February, which brings the majority of the annual rainfall. The distribution, intensity, and duration of precipitation during these monsoons, as well as other rainfall events throughout the year, directly influence groundwater recharge, groundwater levels, and overall groundwater availability in Sri Lanka.

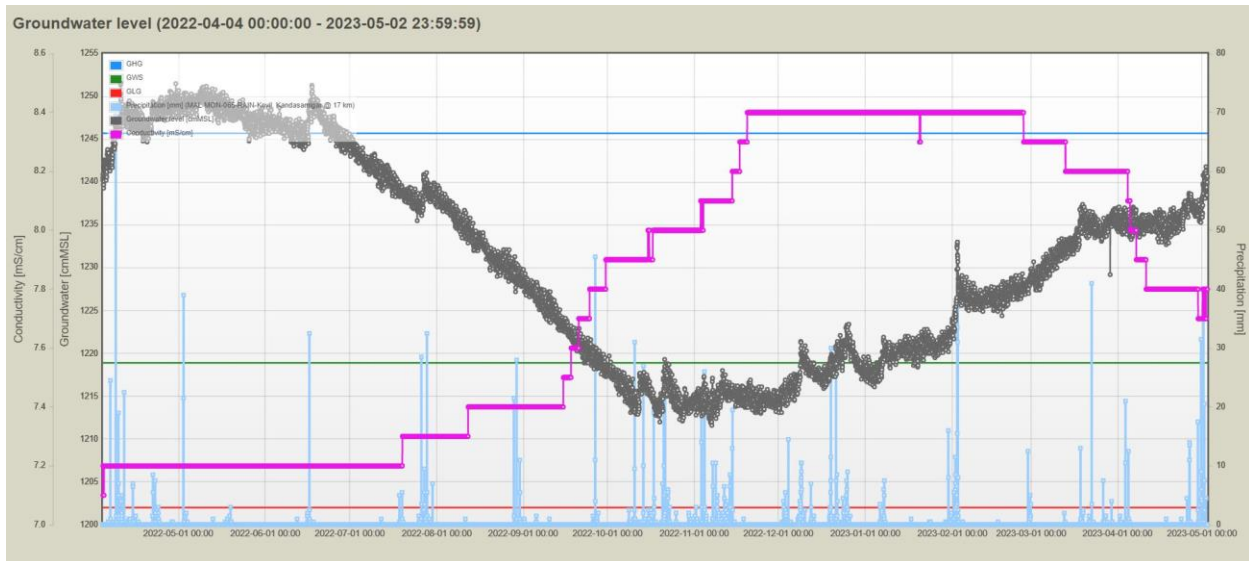
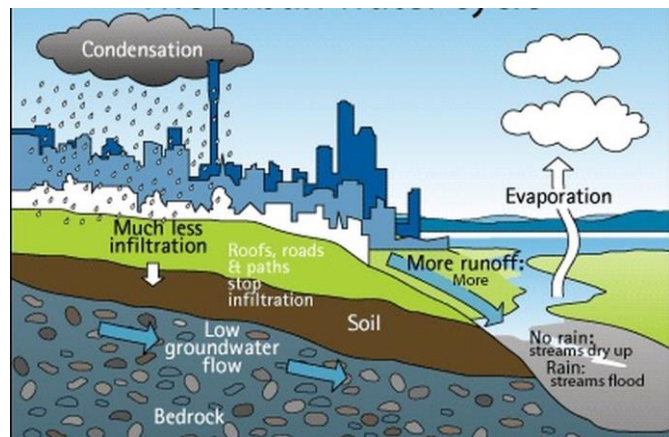


Fig 01: General Variation of the Groundwater Level and Electrical Conductivity in the groundwater in Anuradhapura respect to the precipitation

Here are some ways in which precipitation patterns impact groundwater resources in Sri Lanka:

Groundwater Recharge

Precipitation is a primary source of groundwater recharge, as it replenishes the groundwater aquifers by percolating through the soil and replenishing the groundwater table. The amount and intensity of rainfall directly affect the rate of groundwater recharge. During heavy rainfall events, a significant amount of water may quickly run off the surface, resulting in reduced infiltration and



recharge, leading to decreased groundwater availability.

Seasonal Variability

The monsoon seasons in Sri Lanka are critical for replenishing groundwater resources. The southwest monsoon, which affects the western and southern regions of the country, contributes to the recharge of the coastal aquifers. The northeast monsoon, on the other hand, affects the northern and eastern regions and replenishes the aquifers in those areas. Any variations in the timing, duration, or intensity of these monsoons can impact the overall groundwater availability and recharge rates.

Interannual Variability

Precipitation patterns in Sri Lanka can also vary significantly from year to year, resulting in interannual variability. In some years, Sri Lanka may experience above-average rainfall, leading to increased groundwater recharge and higher groundwater levels. In other years, there may be below-average rainfall, resulting in reduced groundwater recharge and declining groundwater levels. Such interannual variability in precipitation can impact the sustainability of groundwater resources and may require adaptive measures for groundwater management.

Groundwater Quality

Precipitation patterns can also impact groundwater quality in Sri Lanka. Heavy rainfall events can cause surface runoff, carrying pollutants from agricultural fields, urban areas, and other sources, which can infiltrate into groundwater and result in groundwater contamination. Conversely, prolonged dry periods with limited rainfall can lead to increased salinity and mineralization of groundwater due to over-extraction and reduced freshwater recharge.

Climate Change

Changing precipitation patterns due to climate change can have significant impacts on groundwater resources in Sri Lanka. There are projections that Sri Lanka may experience changes in rainfall patterns, with increased intensity of rainfall events, changes in the duration of monsoons, and overall variability in precipitation. These changes can further impact groundwater recharge, availability, and quality, and may require adaptation strategies for sustainable groundwater management.

In conclusion, precipitation patterns are a critical factor that influences groundwater resources in Sri Lanka. Understanding the dynamics of precipitation patterns, their variability, and their impacts on groundwater recharge, availability, and quality is crucial for sustainable groundwater management in Sri Lanka. Integrated water resources management, including monitoring of precipitation, groundwater levels, and water quality, along with adaptive strategies to address changing precipitation patterns due to climate change, are essential for ensuring the long-term sustainability of groundwater resources in Sri Lanka.

Let's discuss How sea level rise impact groundwater resources in Sri Lanka in Article 02, which will be published on 23rd May 2023.