GROUNDWATER QUALITY ASSESSMENT IN NORTH CENTRAL PART OF SRI LANKA

S.M.U.S.B. Samarathunge

Postgraduate Institute of Science, University of Peradeniya, Peradeniya, Sri Lanka

The study assessed the groundwater quality variation in eight divisional secretaries Galenbindunuwewa, Horowpathana, Kahatagasdigiliya, Kebithigollawa, Medawachchiya, Nuwaragampalatha central, Rambewa, and Padaviya in the Anuradhapura District of North Central Province. Vast distribution of paddy cultivation and existing tank cascade systems cover nearly 50% of the land area. All water quality parameters were taken into consideration and analysis were done to identify the trend patterns of each chemical constituent.

A seasonal change of the groundwater quality is the primary task of the study. Initially 68 shallow and 70 deep sampling locations were selected to study the quality variation in the aquifers. Monitoring events were conducted in both wet and dry seasons to assess recharge and discharge responses coupled with the groundwater quality variations. Samples were analyzed for cation and anion using standards methods.

All the parameters in shallow aquifer at wet and dry period, the medians are equal under 95% confidence interval. The electrical conductivity and total hardness shows positive moderate relationship with the change of dry season to wet season. Fluoride and Sulphate content shows positive strong relationship. Nitrate content shows poor negative relationship. In deep aquifer all the parameters in wet and dry period, the medians are equal under 95% confidence interval. The electrical conductivity and total hardness shows positive moderate relationship with the change of dry season and wet season. Fluoride content shows positive strong relationship.

With reference to the geology the electrical conductivity in hornblend gneiss, quartzo feldspathic and granite shows high values. Quartzite and charnokitic gneiss represent low values. Total hardness in hornblend gneiss is the highest. Charnockitic gneiss recorded the lowest range. The fluoride content of quartzite was the highest value recorded. Quartzo feldspathic and hornblend gneiss having lowest range of fluoride. The Sulphate content was of hornblend gneiss is highest than the other rock types. The lowest values were recorded from quartzite. The Sulphate content of quartzite was the highest. Charnokitic gneiss and granite had the lowest value range. The chemical parameters were analyzed with the stream order location. Electrical conductivity, total hardness, fluoride content and Sulphate content show a slight increase of values with the increase of the stream order. Nitrate content shows an opposite behavior of decrease of values with increase of the stream order.
The quality variation of shallow and deep groundwater is one of the prime concerns and is thought to be linked to the problem of inherited disease, which prevails in the North central province. The assessment of water quality through a well-defined sampling network is of great significance in the area as it provides basic data to mitigate issues due to water quality deterioration.