

Groundwater Resources in Sri Lanka

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The main source input of water resources in Sri Lanka is direct rainfall which mainly showers down during the Maha season between October and January. With an average annual rainfall of 75 inches over the country of 25,330 sq. mile area, the total annual run off of drainage rivers and streams is only 41.6 million acre feet. In the dry zone, the run off in the streams, varies between 10% to 50% of the precipitation and in the wet zone it is about 65%. Allowing a small percentage for the evapo-transpiration losses, the balance amount of water percolates into the ground and exists as groundwater.

The relevant systematic and scientific investigations for an exploration of groundwater in the country are being carried out for the past 15 years by the Government Institutions such as the Irrigation Department and Water Resources Board and valuable information is available with them.

The availability of groundwater varies greatly in different parts of the island because of the diversity of geologic, topographic and climatic conditions. On the basis of hydrogeology, the zones of occurrence of groundwater may be classified broadly into the following groups :

1. Belt of sedimentary rocks consisting predominantly of miocene karst limestone, existing within the north and north-western coastal belt of Sri Lanka encompassing the whole of Jaffna Peninsula and the Islands.
2. The coastal sand deposits occurring in most parts of the coastline and the thin alluvial deposits within the river outfalls overlying the precambrian basement and the sedimentary rocks.
3. Crystalline hardrock area which occupies nearly 90% of the country and thinly covered by a mantle of residual soils and the valley alluvium.

The groundwater potential in the Zone 1, the sedimentary rocks, has been found to be the highest and is partly exploited. Deep seated groundwater aquifers have been found to exist in areas such as Vanathavillu, Madurankuli, Mannar, Silavathurai, Mulankavil, Paranthan and Mullaitivu. Most of these basins were observed to be overlain by impermeable and semi-permeable formations creating flowing conditions in some limited localities. In the Jaffna Peninsula, where the overburden is very thin, groundwater has been the main source of water for all purposes. Investigations are being carried out to study the extent of fresh water availability and safe limits of exploitation to prevent the floating thin freshwater lens from dangerous damages of lateral intrusion and upconing of sea water. The yield of groundwater from the shallow to moderately deep tube wells in these areas ranges from 6,000 to 24,000 gallons per hour.

In Zone 2, the coastal sands, and alluvial deposits in river-mouth areas, groundwater potential is substantial. The available good quality water in this zone is limited by the recharge input from rainwater and the danger of sea water intrusion. The shallow tube wells in the major river deltaic areas and the littoral sands yield ranging from 2000 to 6000 gallons per hour.

In the rest of the country, where the hard basement rock exists, the occurrence of groundwater is limited and confined to fissured, fractured and sheared zones essentially. Moreover, the inter-mountain valley regions with thick overburden store substantial groundwater which can be exploited. The yield from wells in this zone ranges from 200 to about 5,000 gallons per hour, most commonly averaging to about 1,000 gallons per hour. It is important to keep in mind that the yield from a well depends on the location of the well in relation to the geomorphology and the geological structure, storage of groundwater, the transmissivity of the formation, the design and construction of the well.