Section C

301/C

Groundwater management in sand dune areas of the Kayts Island with the aid of laterals

S Shanmuhananthan

Engineering Services (Northern Province), No. 80, Chetty Street, Nallur, Jaffna

Kayts is one of several islands which lie off the western end of the Jaffna Peninsula in the northern-most part of Sri Lanka. A thin fresh water lens is present in the sand dune area on Kayts, which occupies a small area of the western south part of the island. The low salinity groundwater lens that constitutes the Kayts aquifer system is the only promising source of fresh water. Increased risk of seawater intrusion and upconing from unsustainably high extraction rates due to increase in land development and projected population growth in this region has raised concerns for the quantity and quality of groundwater available for drinking and agriculture. Hence development of a groundwater management strategy is essential for the sustainable management of groundwater resources. A vital part of this strategy will be to ensure that management actions do not adversely affect the quality of the groundwater if sustainability in terms of quantity as well as quality is to be achieved. A numerical groundwater flow and transport model was developed as part of the investigation to assist in the analysis of freshwater and saltwater flow for current and increased pumping under various recharge scenarios. The model results reveal that the water quality is beyond the permissible salinity limit in most parts of Kayts. Particularly at the end of the dry season a narrow stretch of freshwater lens is available only in the sand dune areas. In the model study point extraction from four wells located in this sand dune area resulted in upcoming of the saline interface and increased salinity levels beyond 3200 mg/L. In order to find out a method of pumping for sustainable groundwater extraction in this region and to avoid sea water intrusion due to excessive pumping rate, it was decided to introduce bottom sealed pumping wells with laterals which can yield more fresh water to the pumping wells and it was examined in the model to ascertain the effect of this type of extraction on water levels and salinity. There was no notable upcoming effect which clearly indicated that this extraction methodology and pattern is sustainable.

somasuntharamshanmuhanthan@yahoo.com Tel: +94 777158570