

Groundwater Stresses on the Coastal Aquifers in Suriname: A Preliminary Study on the Vulnerability of the Drinking Water Quantity and Quality

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Abstract

The coastal aquifers of Suriname are undergoing stress. In Suriname, most of the drinking water is extract from three northward-dipping aquifers: the Zanderij-, Coesewijne- and A-Sand aquifers. This study identifies the possible causes of stress on these aquifers. Water samples show that the aquifer water is sterile and contains mainly H₂S-gas, Fe and Mn and some chloride, with increasing chloride content towards the north. Northward the chloride content in the aquifer can exceed the WHO-norm of 250 mg/l, which increases the stress on the aquifers as sources for suitable drinking water. This stress increases with the current population growth, resulting in high drinking water demand and the increase in salinity through seawater intrusions. These factors when combined may affect the quantity and relatively high quality of the groundwater in the aquifers. It is expected that the population in the coastal area of Suriname will continue to increase, so that the stresses on the potable groundwater will likewise continue increasing. An increase in stress on the potable groundwater affects the amount of discharge and quality. The main component affecting the groundwater quality is the increase in chlorides. This could be directly related to the decrease of fresh water level overlying brackish water and the migration of the fresh water / salt water line towards the south. To monitor this situation, the study will be extended by observing all the available wells in the coastal plain. Another factor that might affect the quality of the aquifer water is contamination by migration from above. Even though it is stated that the Zanderij-aquifer (main supplier for drinking water) is confined in the northern part, it is an open aquifer in the savanna belt (southern part). The savanna belt may also be seen as the recharge area of the Zanderij-aquifer. To decrease the stress on the coastal aquifers, drilling sites of production wells should be well managed to keep the fresh water level stable in the aquifers and to minimize migration of contaminants. Furthermore, a detailed hydrogeological map may help to protect the recharge areas in the savanna belt against contamination.