Some studies on groundwater contamination of the shallow aquifer in the Kelantan River Basin

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Abstrak (Abstract)

The shallow aquifer system in the Kelantan River delta area constitutes an important source of water supply for domestic purposes and agricultural uses. With increasing human activities and urban development on the surface coupled with the absence of protection zones may risk the aquifer of anthropogenic pollution.

In 1994 a preliminary groundwater contamination study of this shallow aquifer system covering 1,040 square kilometers was initiated to find out the concentration and potential sources of nitrate and other relevant chemical parameters. A total of 605 localities of groundwater samples from dug wells were collected and analysed. The types of land use, types of soil material and well parameters were also recorded in the field.

Further study in 1998 was done to determine the level of organic chemical parameters such as pesticide, phenolic compounds, oil and grease, anionic detergent and other selected inorganic chemical constituents. A total of 101 samples were collected from the tube wells of the Department of Minerals and Geoscience's monitoring network and selected shallow dug wells previously having high nitrate content.

The earlier study showed that the shallow aquifer of the Kelantan River basin is somewhat contaminated locally with nitrate. The background nitrate value from 300 dug wells is 8 mg/l. Thirty five percent of those wells have nitrate higher than background value but only two percent have nitrate greater than 45 mg/l (World Health Organisation's allowable limit for drinking water). In 1998 nitrate content locally increased in some areas along the coast but not in the Kota Bahru town area. The 1998 result did not detect the presence of pesticides (organo-chlorine and organo-phosphorus). However, phenolic compounds, oil and grease and anionic detergents have been detected in the groundwater of the shallow aquifer system. Values of phenolic compounds range between 0.03 mg/l to 0.98 mg/l, oil and grease between 1.3 mg/l to 8.1 mg/l and anionic detergent between 0.25 mg/l to 0.73 mg/l.

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