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**ENRICHMENT OF IRON IN THE GANNORUWA WELL
FIELD; CAUSES AND PATHWAYS**

A PROJECT REPORT PRESENTED BY

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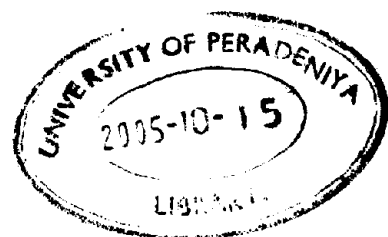
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**ENRICHMENT OF IRON IN THE GANNORUWA FIELD:
CAUSES AND PATHWAYS**

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Abstract

The excessive concentration of iron in drinking water is one of the wide-spread hydrogeochemical problems in Sri Lanka, particularly in groundwater. Excessive iron gives undesirable odor, colour, and taste to drinking water.

The well water from Gannoruwa well field which supplies drinking water to Gohagoda area was selected to study the behavior of iron in groundwater. These wells have been constructed on an alluvial sand deposit on the Mahaweli river floodplain. Some wells in this area show higher iron concentrations (more than 3.00 mg/l) whereas some others in the close vicinity to those show low iron concentrations (0.12 mg/l). It should be noted that in one production tube well, the iron concentration was 0.02 mg/l during its first commissioning in 1994. This concentration gradually increased to about 3.00 mg/l over period of ten years. Therefore this study mainly focuses on studying the behavior iron in the alluvial sandy aquifer.

More than hundred water samples from four different wells and from the river were collected at regular intervals during test pumping.

Eh, pH, water temperature, electrical conductivity, and manganese were measured using standard methods along with total iron concentration. The Eh values of water varied from -0.125 to +0.260 V where iron concentration of the water varies from

0.01 to 4.07 mg/l. The manganese content varies from 0.1 to 0.8 mg/l. The pH varies from 6.49 to 7.39.

The results obtained from this study showed a good correlation between the state of total iron concentration and redox potential, both varying with the pumping time. The total iron concentration is higher in wells located close to the river whereas it becomes low with the distance away from the river.

This study showed that the iron concentration of groundwater in the aquifer is controlled by the prevailing redox conditions of the aquifer environment. When water percolates through the sandy aquifer existing oxidizing conditions convert Fe^{2+} to Fe^{3+} form and then trap in the aquifer, hence the iron content is lower in wells located away from river.