E2-08: Problems and remedial measures to improve the quality of water in hand pump wells in Kandy District

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With the advent of the water decade, 1981 - 1990, around 2,500 hand pump wells were constructed in Kandy District. This study was undertaken to survey the quality of water in these wells and to find remedial measures to upgrade problematic wells to acceptable drinking water standards.

The total iron, manganese and nitrate contents were determined by colorimetric methods. The flouride and iodide concentrations were determined using the Ion Specific Electrode method. All samples were tested for total coliforms and faecal coliforms by the membrane filter method.

The main constraint of these hand pump wells was that 10% of the wells had high iron contents of more than 1.0 mg/l Fe. To a lesser extent, was the presence of high iron and manganese together in 2.5% of the wells. There were 7 wells with high nitrate contents, which exceeded the safety limit of 45% mg/l NO_3. Except 2% of the wells, all other wells were within the permissible limit for fluoride. Borehole wells appeared to contain higher concentrations of iodide in comparison to shallow wells.

A low cost filter unit was developed to remove the iron and manganese from groundwater. The efficiency level achieved in removing iron content was around 95% using stone chips/sieved sand as filter media. The manganese content too was reduced to 90% efficiency level, but this removal was not uniform and not regular using laterite and sieved sand as filter media. The filter unit removed the iron content to acceptable levels. However,the presently available nitrate removal methods were too costly to adopt at village level.

The results of the bacteriological counts indicated that only 85% of bore holes and 58% of hand dug wells conform to WHO standards respectively. Thus it is always advisable to boil the drinking water.