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CHEMISTRY OF HAND PUMP WELLS  
KANDY DISTRICT

# CHEMISTRY OF HAND PUMP WELLS IN KANDY DISTRICT

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Padmasiri in partial fulfillment of the requirements  
for the award of Master of Philosophy in the  
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# CHEMISTRY OF HAND PUMP WELLS IN KANDY DISTRICT

M.Phil Degree (by research) in Chemistry

## ABSTRACT

In order to provide safe drinking water to the rural sector in Kandy District, nearly two thousand hand pump wells were constructed from 1984-1991. This research study was undertaken to survey the water quality of these wells, identify the problems and to find remedial measures to up grade problematic wells to acceptable drinking water standards.

The main constraint of these hand pump wells was that 10 per cent of the wells had high iron contents of more than 1.0mg/l Fe. Then to a lesser extent was the presence of high iron and manganese together in 2.5 per cent of the wells. There were seven wells with high nitrate content, which exceeds safety limit of 44 mg/l  $\text{NO}_3$ .

A low cost filter unit was developed to remove the iron and manganese from ground water. Suitable locally available materials, such as wood charcoal/sieved sand, stone chips/sieved sand, laterite/sieved sand were found as the filter media. The efficiency level achieved in removing iron content was around 95 per cent. The manganese content too was reduced to 90 per cent efficiency level, but this removal was not uniform and not regular. The use of laterite and sieved sand, which could be found locally was found to be a very appropriate cost effective method to remove iron and manganese from ground water at village level.

In spite of the precautions undertaken in siting, construction and installation, nearly 42 per cent of the hand dug hand pump wells have not reached the guideline values of the WHO with respect to bacteriological quality of drinking water. The results of the bacteriological counts indicate that only 85 per cent of bore holes and 58 per cent of hand dug wells conform to WHO Standards respectively. Only 5 per cent of traditional wells were found to be in conformation with the WHO Standards of bacteriological quality of drinking water. However, the bacteriological data of these hand pump wells have shown tremendous improvement over that of the traditional wells. Only 49 per cent of the faecal coliform isolates were found to be *Escherichia coli*. This study shows that in tropical climates the faecal coliform count not necessarily mean true faecal pollution.

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