International Journal of Multidisciplinary Research and Development
Online ISSN: 2349-4182, Print ISSN: 2349-5979, Impact Factor: RJIF 5.72
www.allsubjectjournal.com
Volume 3; Issue 11; November 2016; Page No. 138-140

Quality of water samples from dug wells of Arukani, Tamil Nadu

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Abstract
The aim of this research work was to assess the quality of water from dug wells of Arukani, Tamil Nadu. Twenty (20) dug wells were randomly selected in Arukani area and water samples were collected during July to August 2016. The samples were checked for odour, colour and taste and these largely satisfied consumer preferences. Physico Chemical analysis were conducted to determine the concentration of pH, Cl, NO_3, mg, Ca. The objective of the study is to determine the quality of water samples from dug well of Arukani.

Keywords: dug well, water, physico - chemical analysis

Introduction
In most familiar cities the supply of water for domestic purposes has several accompanying 15 adequacies. The socio economic rate of development, growth in industrial base, poor planning, insufficient funding, lack of maintenance [1] observed that more than 3 million rural and suburban residents in USA relay on a private well water and about 20,000 new wells are drilled each year in the state.

Materials and methods
Water samples from the selected dug wells were collected during July to August 2016 with a sample collected from each well. 20 dug wells were randomly selected. All the wells were between 10 and 20m in depth. They are concrete lined with water recharge coming only from the bottom of the wells. The surrounding soil is basically sandy and well drained. The pH and temperature were measured on site. Each sample was collected in a fresh 1.5 L plastic bottle with the cap tightened. After collected the samples were first checked for adour, colour and taste. The physical and chemical parameters namely pH, Chlorides, Nitrate, Magnesium and Calcium were analysed. Then the samples were subjected to filtration prior to Chemical analysis. Nitrate was determined by colorimetric procedure. The methods of analysis were detailed in [2].

Study area
The study was carried out at Arumanai village which is located on the south west of India. Samples were collected randomly 20 different dug well. The study was carried out over a period of July to August 2016.

Result and Discussion
The physico – Chemical analysis were presented in the figures. The pH of the water samples showed the maximum value 8.11 in well number 10 (Fig 1). The most commonly reported cause of water pollution in developing countries is inadequate waste management with significant proportions of the urban populations in such countries having poor access to proper solid waste management and sanitation. Such waste contaminate drinking water and other water resources. The WHO has no guideline values for colour, adour and taste [3]. However, a rule of thumb is that the water must not be objectionable to consumers. Two well samples were yellowish. While the rest of the samples were colourless.
Most consumers prefer water to be colourless [4, 5]. 85% of the well samples were odourless while 15% had objectionable adour. None of the well samples had objectionable taste. The pH indicated mild to modulate acidity of the well water for the majority of cases.
Chlorides was higher in 0.89 mg/l of well number 17 (Fig 2). The maximum concentration of nitrates in the water samples was 26.2 mg/l in the well number 13 (Fig 3). The higher concentration of magnesium in the water samples was 34.2 mg/l in well number 19 (Fig 4). The higher concentration of Calcium in the sample was 125 mg/l in well number 11 (Fig 5). [6, 7] provide comprehensive review of the health significance of mg and Ca in drinking water. According to [8] low and medium mineralized underground and surface waters levels varying from tens to hundreds of mg/l and the mg concentration varying from units to tens of mg/l. This was found to be in this present research as well. Magnesium deficiency increases the risk in human beings of resinous pathological conditions [9, 10]. The recommended magnesium daily intake for an adult is about 300 to 400 mg. Chlorides were found in particularly low concentrations in all the water samples. The sodium often associates with chloride can be concern to people suffering from heart disease. According to [11] chloride is an 'essential' mineral for human beings.

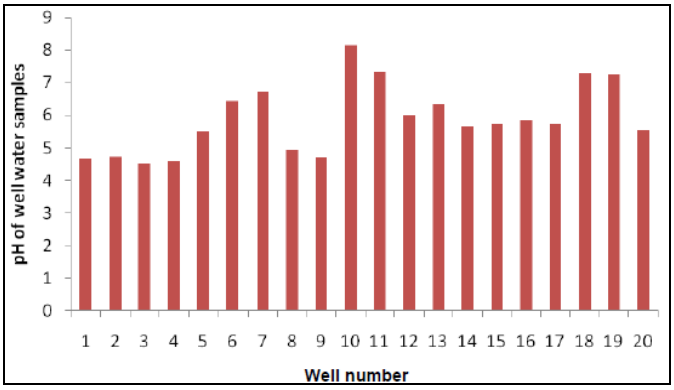

Fig 1: Monthly variation of pH

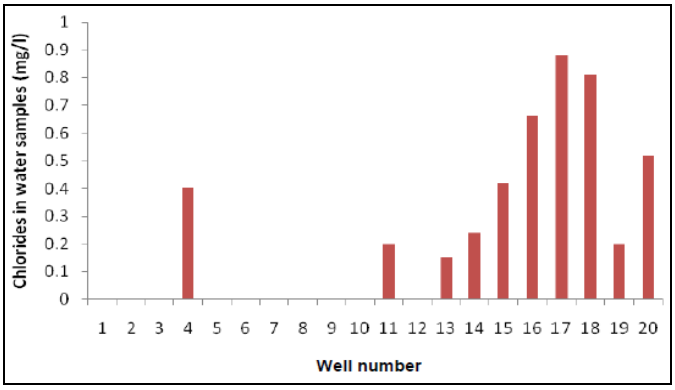

Fig 2: Monthly variation of Chloride

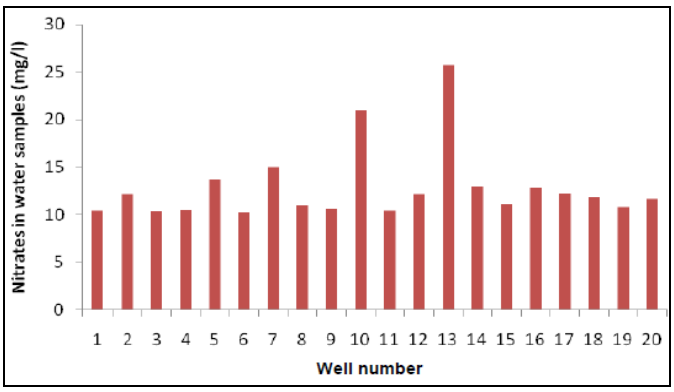

Fig 3: Monthly variation of Nitrate

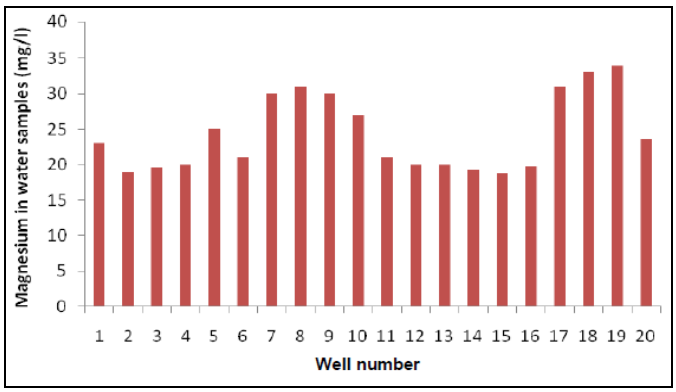

Fig 4: Monthly variation of Magnesium

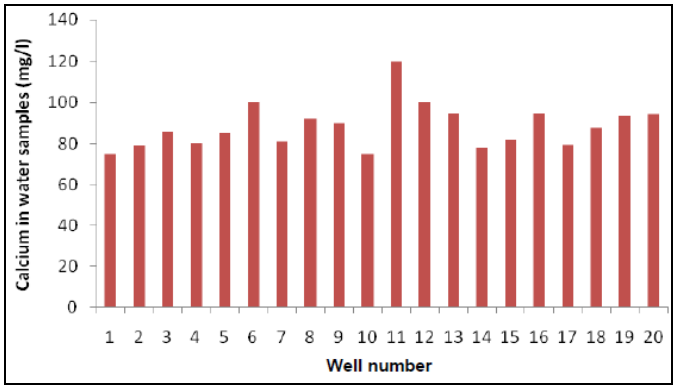

Fig 5: Monthly variation of Calcium

Conclusion

The quality of water in these village wells are poorer than those found in wells from rural communities. This finding is consistent with the knowledge that urban environments are exposed to more pollution sources. Drinking water quality in rural and the effect of management practices suggested a combination of educational programs for home owners and new regulations to overcome the largest barriers to safe drinking water. Proper measures are taken for the health of the society can be maintained.

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