UNIVERSITY GRANTS COMMISION

FUNDED

Minor Research Project

Entitled "*Assessment of Drinking water and Irrigation water of several villages of Kalol (N.G) Taluka, District-Gandhinagar and improving quality of water".*

Ref: Vide the Project No. F.No:47-208/12(WRO)

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-:By:-

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1. OBJECTIVES OF THE PROJECT:

The objectives of the project work are as follow:

1. To create awareness in the villages about quality.
2. To discuss the suitability of ground water for human consumption and classified them.
3. To improve health of human being and fish production.

2. WHETHER OBJECTIVES WERE ACHIEVED:

Kalol province of Gandhinagar District having varied water quality in different villages and if may affect on quality of agriculture production, human health and fish production. There are so many chemical industries in our areas which are increase the water pollution of ground water, lake and pond etc. because all are interacted with each other. These polluted water also affected the health of human being. Kalol (N.G) province dist: Gandhinagar, Gujarat is fully irrigated areas and industrial area. There are so many crude oil well. Due to these reason underground water level is low major drinking water bores are up to 1200 to 1400 ft. deep, so underground water is contaminated by Fluoride and so many other salts. Surface water is also affected by pesticides, industrial pollution and microbial organisms. By the analysis of bore well water it was possible to create awareness in the villages about water quality. We discuss the suitability of ground water for human consumption and classified them in to different categories. From the analysis of water samples we have recommended some suggestion to improve health of human being and fish production.

3. ACHIEVEMENTS FROM THE PROJECT:

The minor research project would provide an excellent opportunity to understand importance of pure water. From the analysis of water samples we have recommended some suggestion to improve health of human being and fish

production. This project work is presenting new analytical data, thought and other aspects for statistical analysis. We discuss about this work is in the international, national and state level conference and seminar with eminent scientist coming from different area in the field of environment chemistry. Finally this project work shell provided me a good opportunity for a meaningful interaction among the members of scientist's fraternity.

4. SUMMARY OF THE FINDINGS:

Study area:

Kalol (Dist. Gandhinagar) is situated in the North region of Gujarat between the latitude $23^{\circ}\,18'\,03''$N and longitude $72^{\circ}\,19'\,56''$ E and covers area of 40819 sq.km with a population of 207693(2011).Kalol Taluka is bounded on the north by the Mehsana district south by Ahmedabad, on west by Kadi Taluka and on the east by Gandhinagar the capital of Gujarat state.

The study of Sixty Two villages bore well water of Kalol Tahsil sites were selected for samples collection. The samples were collected by standard methods given by WHO. Total 62 water samples were collected and analyzed by physico chemical methods.

Collection of water Samples

Groundwater samples were collected from 62 locations during 2013-2015. Sample method is adopted as suggested in WHO, Methods for collection and analysis of water samples. Sampling is done at each station in polythene bottles of two-liter capacity. During the present investigation samples collected are classified into four zones like north, east, south and west. It symbolized S-1, S-2, S-3…etc. and water sample collected from bore well. The samples have been analyzed at the

C. U. Shah Science College, Ahmedabad. The sampling points are given in Table-1 to 4.

Table-1

Sampling locations from north zone of Kalol villages

Sample Number	Sample locations (Village Name)	Sample Number	Sample locations (Village Name)
S_1	Ambavpura	S_9	Jamla
S_2	Ola	S_{10}	Veda
S_3	Isand	S_{11}	Nava
S_4	Vadavsvami	S_{12}	Kantha
S_5	Pansar	S_{13}	Paliyad
S_6	Dingucha	S_{14}	Khoraj Dabhi
S_7	Bhavpura	S_{15}	Vagosana
S_8	Himmatpura		

Table-2

Sampling locations from east zone of Kalol villages

Sample Number	Sample locations (Village Name)	Sample Number	Sample locations (Village Name)
S_{16}	Arsodiya	S_{25}	Limbodara
S_{17}	Dhamasana	S_{26}	Golthara
S_{18}	Bhadol	S_{27}	Mubarakpur
S_{19}	Nardipur	S_{28}	Chadisana
S_{20}	Mokhasan	S_{29}	Aluva
S_{21}	Soja	S_{30}	Amja
S_{22}	Balva	S_{31}	Nadri
S_{23}	Kalol(East)	S_{32}	Shobasan
S_{24}	Dhendhu		

Table-3

Sampling locations from south zone of Kalol villages

Sample Number	Sample locations (Village Name)	Sample Number	Sample locations (Village Name)
S_{33}	Saij	S_{44}	Ganpatpura
S_{34}	Serisa	S_{45}	Usmanabad
S_{35}	Dhanaj	S_{46}	Sabaspur
S_{36}	Borisana	S_{47}	Vadsar
S_{37}	Palsana	S_{48}	Nasmed
S_{38}	Jaspur	S_{49}	Sanavad
S_{39}	Khatraj	S_{50}	Rakanpur
S_{40}	Bhimasan	S_{51}	Hajipur
S_{41}	Bhoyan moti	S_{52}	Rancharada
S_{42}	Jethalaj	S_{53}	Santej
S_{43}	Karoli		

Table-4

Sampling locations from west zone of Kalol villages

Sample Number	Sample locations (Village Name)	Sample Number	Sample locations (Village Name)
S_{54}	Pratappura	S_{59}	Chhatral
S_{55}	Piyaj	S_{60}	Panchavati,Kalol
S_{56}	Nandoli	S_{61}	Ramnagar
S_{57}	Bileshwarpura	S_{62}	Vansajada
S_{58}	Dhanot		

In the current study, The present investigation had led us to conclude that the quality of water few samples subjected to study was acceptable from of physico-chemical parameters, but the some samples number of S_{13},S_{18},S_{33},S_{34},S_{39},S_{40},S_{41},S_{42},S_{43},S_{47},S_{48},S_{49},S_{50},S_{51},S_{52},S_{53},S_{54},S_{55}, S_{56},S_{57},S_{59},S_{61},S_{62} showed high total hardness. Total hardness of the samples in falls in different categories. Majority of which samples 79% samples belong to very hard category having more than 180ppm TH. The 14% samples fall under hard water 120-180 ppm and rest 7% of the samples in medium range category having TH 60-120ppm, not even a single sample have in soft category in 0-60ppm. According to the TDS classification the 35 % of the samples are fresh water with TDS less than 1000ppm. The 65% samples are of brackish type with TDS greater than 1000ppm. But only 8% are found within the ISI standard drinking water desirable limit of 500ppm. The samples number of S_1,S_2,S_3,S_4,S_5,S_6,S_8, S_{16},S_{17},S_{23} and all samples of south and west zone showed high chloride content. The 45% samples were found above ISI permissible limit 200mg/l of Total Alkalinity. The 67% samples have low DO content and the samples number of S_{13} ,S_{23},S_{28}, S_{32},S_{33},S_{34} ,S_{35},S_{36}, S_{37},S_{54},

S_{57},S_{59},S_{60},S_{61}, showed high nitrate content. Another parameters within the limits of water quality standards showing average water quality and the water from these sampling points 68% water samples is fit and 32% water samples is unfit for drinking purpose.

By the analysis of bore well water we have recommended some important point. All the ground water extraction structures should be registered and regulated to avoid over exploitation and deterioration of ground water quality. The water obtained from the ground water structures should be tested and analyzed to ensure the suitability of ground water for human consumption. The ground water abstraction sources and their surroundings should be properly maintained to ensure hygienic conditions and no sewage or polluted water should be allowed to percolate directly to ground water aquifer. Proper cement platforms should be constructed surrounding the ground water abstraction sources to avoid direct well head pollution. The surrounding surface area of the ground water abstraction structures should be frequently chlorinated by use of bleaching power. Possibilities of construction of artificial recharge structures should be explored to augment the ground water recharge. In the absence of alternate safe source of water, the water with excessive undesirable constituents must be treated with specific treatment process before it's use for human consumption. The untreated sewage and sewerage flowing in various open drains are one of the causes of ground water quality deterioration. Proper underground sewage system must be laid in all inhabited areas and the untreated sewage and industrial wastes should not be allowed to flow in open drains. A proper system of collection and transportation of domestic waste should be developed Land fill site(s) should be identified and it must be scientifically designed. Ground water quality near land fill sites should be regularly monitored. The mass awareness should be generated about quality of water, its effect on human health and responsibilities of public to safeguard water

resources. Proper cement platforms should be constructed below the main and sub canal which is passed from south and west zone of Kalol taluka but extra water of main canal pass away from this area in rainy season should be allowed to percolate directly to ground water. All ponds of Kalol taluka should be deep so rainy water directly percolate in ground water. Dropping irrigation system should be required to save ground water. Number of percolating well should be increase in this area to save rain water.

5. CONTRIBUTION TO THE SOCIETY:

By the analysis of bore well water it was possible to create awareness about water quality in our society. We have explained that how to save water and water level to get good environment. We have discussed the suitability of ground water for human consumption and classified them in to different categories and explain this to mass of our society members. From the analysis of water samples we have recommended some suggestion to improve health of human being and fish production to build healthy and prosperous society. We have satisfied that by this project we can save human being and environment by maintain water level in ground water through active percolating well.

The project findings are directly benefited for local community as it contains scientific analysis of their day to day water consumption. They finding also indicate the utility of such water by locals are of WHO standard.

Paper published:

1. **Patel RP**, Nimavat KS, Chaudhari JA(2014).
   Physico-Chemical Assessment Status of Ground Water of Some Villeges of Kalol Tahsil. **International Journal for Pharmaceutical Research Scholars**(2014).Vol.3(2), pp 120-126.
2. **R. P. Patel,** K. S. Nimavat, J.A. Chaudhari(2015).
   Ground Water Quality Assessment for Some Villages of Kalol Tahsil, Dist: Gandhinagar. **International Journal of Advances in Pharmacy, Biology and Chemistry(2015).**Vol.4(2), pp 424-429.