Final Report of the work done on the Minor Research Project.

1. Project report : **Final**
2. UGC Reference No. : **F. No. 47-348/2001(WRO), Dt. 29 Jan. 2002**
3. Period of report from : **12 Feb 2002 to 12 Nov 2004**
4. Title of research project : **"Evaluation of drinking water quality in Dhansura and Malpur taluka of saber kantha District"**
5. (a) Name of the Principal Investigator : **DR. V.M.BAROT**

   (b) Deptt. and University/College where work has progressed

   : **SMT.S.M.Panchal Science College, Talod, Dis. Sabarkantha [Gujarat]**
6. Effective date of starting of the project : **06 April 2002**
7. Grant approved and expenditure incurred during the period of the report :
8. Total amount approved Rs. : **35,000/-**
9. Total expenditure Rs. : **25,766/-**

Report of the work done:

(i) Brief objective of the project : **Already Submitted**

(ii) Work done so far and results achieved and publications, if any, resulting from the work : **NA**

(iii) Has the progress been according to original plan of work and towards achieving the objective if not, state reasons : **Yes**

(iv) Please indicate the difficulties, if any, experienced in implementing the project : **Nil**

(v) If project has not been completed, please indicate the approximate time by which it is likely to be completed. A summary of the work done for the period (Annual basis) may please be sent to the Commission on a separate sheet : **NA**

(vi) If the project has been completed, please enclose a summary of the findings of the study. Two bound copies of the annual report of work done may also be sent to the Commission.

Already Submitted

(vii) Any other information which would help in evaluation of work done on the project. At the completion of the project, the first report should indicate the output, such as (a) Manpower trained (b) Ph. D. awarded (c) Publication of results (d) other impact, if any. **Nil**

Signature of the principal **Principal College Investigator**

FINAL REPORT OF THE PROJECT AWARDED BY U.G.C.

1. Background:

Dr. V M Barot of Smt. S.M. Panchal Science College, Talod, N.G. was awarded a project under the financial assistance of University Grant Commission to conduct a research study on status of Water Quality in two talukas of Sabarkantha district in Gujarat State.

The project envisaged estimating and ascertaining the quality of drinking water in one of the most problem areas for drinking water. The objective was to check the quality of water with reference to health impact on the communities that consume the water. As evident, water is associated with large number of water borne diseases either bacteriological or chemical.

The research study focused mainly on the chemical quality of water as some of the chemical parameters like fluorides, nitrates and salinity have got adverse impact on the health. North Gujarat and Sabarkantha district in particular are prone to such problems. It was therefore imperative to examine the water quality and the associated risk so as to suggest the remedial action and caution the community towards the risk that they are facing if any.

The study was undertaken for a calendar year covering seasonal variations for all the three seasons. The analysis was emphasized upon three critical parameters viz. fluoride, nitrate and TDS (salinity).

2. Description of the area:

The Sabarkantha district in North Gujarat is located between 23°03' to 24°30' N latitude and 72°43' to 72°39' E longitude. The district has total geographical area of 7,390 sq. kms and the population of the district is 20,82,531 souls as per 2001 census. The topography of the area is slightly hilly in the eastern side and flat in the rest of the part. The two talukas (blocks) viz. Dhansura and Malpur are located on the southern side of the district covering 1,48,829 population out of which 05% is tribal population. The average rainfall in the area is about 800 mm and there are no perennial rivers in the area. The riverbed in some of the major rivers like Sabarmati and Hathmati has a rocky terrain, which is likely to contain sedimentary rocks having traces of fluoride. This is one of the reasons that the fluoride content in the area is higher as compared to other districts. The district is predominantly agriculture based and there is heavy exploitation of ground water. This has resulted into the depletion of the ground strata and deterioration of quality of water which has resulted into the increased

amount of salinity. The nitrate is also considerably higher in some pockets of the district due primarily to the rocks containing nitrate bearing strata.

3. Status of Drinking Water:

The main source of water in the area is from the ground water. The depth of the aquifers tapped is on average 100 - 300 mtrs. There are no surface water sources and hence a major dependence is on ground water only. The Water Supply Department of State Government through its autonomous Board called Gujarat Water Supply & Sewerage Board maintains regional water supply schemes to cover more than half of the area. The quality of water gets fluctuations from season to season due to the varying degree of recharge. Although the water supply authorities attempt to check the quality of water, looking to the vast size of the area, it may not be possible to maintain it regularly. It is therefore, necessary that the community is also educated to participate and cooperate in the water quality protection and assurance work. With this objective in mind, this study was undertaken to ascertain the quality of water in two blocks where the principal researcher is working.

4. The work done:

The major work under the project was to check the chemical quality of water through collection of samples from various sources in the villages and analyze them for critical parameters as listed above. Simultaneously the research team also conducted a sanitary survey of the sources and discuss with the village administration, the protection of sources, particularly from contamination point of view. The samples were collected

in cleaned plastic carboys under the supervision of the principal researcher and were brought to the laboratory of the College. The samples were analyzed as per the prescribed methods in ISI standards. Discussions were held with the laboratory authorities of the State Government to maintain the accuracy and coherency in the sample analysis. The analytical results are tabulated as per Chapter. The samples were collected for all the three seasons and potability as per the ISI standards and seasonal variations in the analysis were recorded. Based on the analytical results the conclusions were drawn to decide the acceptability of water from various sources for drinking purpose.

5. Observations:

The research team has collected 54 samples from 18 villages of Dhansura taluka and 72 samples from 24 villages of Malpur taluka. The list of the villages and source of the sampling are indicated in the table given at Annexure I-VI. In 06 samples, the fluoride content is found to be high which is beyond the permissible limit of 1.5 mg/l. In 06 samples, the TDS content is found to be exceeding the permissible limit of 2000 mg/l and in 48 samples, the nitrate content is exceeding the permissible limit of 45 mg/l. Obviously, the samples showing excessive value for fluoride, TDS and Nitrate are not fit for human consumption. So, the authorities are required to consider the remedial measures. The remedial measures available are either to go in for alternative safe source within the village or if not available locally, then to find a reliable source in the vicinity area. The

Government authorities are concerned for the quality of the water as a priority area and definitely consider providing alternative safe source if the matter is brought to their notice. It will therefore be follow up action of the research team to forward the findings of the report to the local authorities for remedial measures.

Following salient observations are reported from the analysis of three seasons:

a. There is no major variation in the pH value of water. It has remained almost constant and within the permissible range.

b. There is no remarkable variation in the fluoride value of water in different seasons.
c. The nitrate content in the three seasons also remains almost same.
d. TDS content gets slightly deteriorated in summer season as compared to monsoon and winter.

6. Recommendations:

a. The water quality especially for the health parameters needs to be examined at a regular interval, atleast twice in a year.
b. The village community should be educated about the adverse impacts of the chemical constituents of drinking water, which has got detrimental health impacts.
c. The Government should decentralize the quality assurance process for rural areas and should involve the local community as well as local NGOs in the work.
d. The local people or the village level water committee needs to be trained properly for conducting periodical survey of water sources and carry out quality analysis with nearby laboratory.
e. Government with the support of NGOs and Science / Engineering College laboratories of the area should join hands in educating the people and facilitating the quality assurance work for drinking purpose.
f. The principal researcher and his team would be willing to provide necessary assistance in the establishment of such quality assurance programme.

7. Scope for further work:

Due to the limitation of time and financial support, the present study could only look into the chemical aspects of the drinking water, but two important areas associated with this type of study need to be addressed. These are bacteriological quality of water to be ascertained and also the impact of exceeding chemical parameters upon the health of the community consuming the water, for e.g. the prevalence of fluorosis, blue baby and stomach inflammation or stone problem due to excessive TDS.

8. Acknowledgements:

The research team would like to acknowledge the help of following Institutions / individuals in conducting the project study:

a. University Grants Commission
b. Dr. B. K. Jain, Principal of Science College, Talod.
c. Dr. J. M. Barot, Ex-Director, Gujarat Jalseva Training Institute, Gandhinagar.
d. Mr. Bhanubhai Rathod, Mr. Tejas Upadhyay of Science College, Talod.