## Acknowledgement

I wish to express my deep sense of gratitude to Dr. N. Sharma, Senior Lecturer, Department of Geology, Maharaja Sayajirao University of Baroda, without his guidance and supervision this work of thesis would not have been possible. I owe a lot for his abiding belief in me which acted as a beacon for completing the work while doing a regular job in NHPC. Without his constant motivation and encouragement, I would not have been in a position to complete the thesis work.

I would also like to thank Prof. Nikhil Desai (Head & Dean) and Prof. P. P. Patel (Former Head), Geology Department, Maharaja Sayajirao University of Baroda for providing facility and all round help in my thesis work. Prof. P. P. Patel has been a constant source of inspiration for me. In my early days of Applied Geology while working under him I was fascinated by the science of hydrogeology. The ignited inspiration led me to undertake the study of hydrogeological aspect of Mahi-Narmada doab area.

I am indebted to Prof. K.C. Tiwari in improving the quality of my thesis work. Without his involvement it would not have been possible to produce a work of this quality. I am also thankful to him for his critical reading of the manuscript and for his valuable comments in improving the overall quality of the thesis work.

I am also thankful to Dr. V. Sridhar and Dr. Alpa Sridhar for continuously prodding me for the Ph.D. work. It was during the time while working under Dr. Alpa that I visited length and breadth of Gujarat state and witnessed the water problem, especially in rural areas of the state. It further prompted me to undertake this research in all earnest.

I also express my heartfelt gratitude and deep reverence to Prof. L.S. Chamyal. It has been one of the biggest opportunities in my life to be attached with such a highly inspired worker in the field of education and research. His guidance, encouragement, support during my periods of despair helped me in overcoming my problems and completing this work. Thanks are also due to Dr. D. M. Maurya, for providing details on Cambay basin and Dr. Rachna Raj for her work on Dhadhar river. Moreover, time to time discussions with them greatly improved the first two chapters of the thesis.

My special thanks to Dr. Bindu Bhatt for her valuable guidance and her effort to finalize the thesis work. Her valuable suggestions helped me in giving shape to Chapter-IV on Remote Sensing and GIS work. Her constant encouragement, motivation, guidance and all round support, has helped me a great deal in completing this thesis. I am also thankful to Mr. Janak Joshi for helping me in GIS work, also Mr. Suhrud Pendse, Miss Shivani Trivedi and Miss Paulomi Paria for their help.

A big thank you also to my friend Shri Rajpal Yadav, as the first field work was carried out on his motorcycle. His motorcycle 'Rajdoot' also needs due mention, though very old, but remained reliable and never broke down during my entire field work, giving credence to the old saying "Old is Gold" in the true sense. In order to save time we use to travel through river, nallahs agricultural fields, unmetalled roads and fortunately never faced any problem.

My heartfelt thanks to my University friends Dr. Uday Bhonde, Dr. Bhawani Desai, Mr. Kirti Kumar Dave, Shri Chandrakant Mistry, Mr. Victor Ralte, Dr. Sunit Biswas, Dr. Naresh Mulchandani, Dr. Subhash Bhandari, Dr. Sanjay Patel, Dr. Benidhar Deshmukh, Dr. Punita Parekh, Mr. Amit Sharma, Mr. Anand Mehra, Dr. Mahendra Gadvi and Mr. Shahi Bhushan Shukla, for their help and constant encouragement during the entire tenure of my research in Maharaja Sayajirao University of Baroda.

I extend my sincere thanks to all my teachers in the Geology Department who have helped me in innumerable ways during my research work. I also thank the non-teaching staff members of the department for the cooperation extended by them.

I also express my sincere thanks to Dr Kalpana Maheria and Dr. Laxmipriya for friendly advice and for keeping my motivation level high, even after my joining NHPC, as a geologist.

During my research work lot of chemical and glassware were borrowed from the laboratory of Chemistry Department of M. S. University. My friends in chemistry department have not only helped me in providing such logistic support but also my discussions with them regarding chemical reactions and preparations of standards helped me in developing better understanding of hydrogeochemistry particularly chemical analysis of water. Dr. Vikas Sharma, Dr. Aarti Dogra, Dr. Dinesh Nair.

I am also thankful to Dr. V.P. Dimri; Director, NGRI, for allowing analysis of water samples in ICP-MS. As the fellowship amount was meager to support such analysis, his kind act of providing the facility free of cost helped me to trace element analysis of water samples. I am also thankful to Dr. George Mathew, Assistant Professor, IIT-Powai, for his support in testing of water samples in ICP-AES instrument.

I also express my in depth gratitude to the following institutes/organizations (in alphabetical order) for extending help for my thesis work.

- Biochemistry Department, Maharaja Sayajirao University of Baroda: Professor Naresh, HOD, for permission to work on UV spectrophotometer.
- Botany Department, Maharaja Sayajirao University of Baroda: Especially Dr. Ramnaiya, Senior Lecturer, for permission to use visible spectrophotometer.
- Environmental Science, Maharaja Sayajirao University of Baroda: Jayshree De for allowing me to work on UV spectrophotometer also for allowing me to use portable field instruments like pH meter, TDS meter, Temperature meter, Conductivity meter etc. Without her help it would not have been possible to make field measurement of essential parameters. Shri Jigneshbhai Patel is duly thanked for extending his help.
- Ecentral Ground Water Board, Ahmedabad: For providing data and reports on groundwater for the study area. Dr. Senthil Kumar and Dr. Gyansunder is duly acknowledged for their help and discussions.
- Geography Department, Maharaja Sayajirao University of Baroda: Jayshree De, former HOD, for allowing to refer topographic sheets.
- Gujarat Engineering Research Institute, Vadodara: For water analysis of groundwater samples.
- Gujarat Water Resource Development Corporation, Gandhinagar: For providing groundwater data of the study area.
- Gujarat Water Supply and Sewage Board, Vadodara: Especially Public Health Laboratory of GWSSB for analysis of groundwater samples.

- Indian Institute of Technology, Powai: For trace element analysis in ICP-AES instrument and also for allowing me to use their library work for literature survey.
- Indian Institute of Technology, Roorkee: For allowing me to use their library for literature survey.
- ♣ National Geophysical Research Institute, Hyderabad: For trace element analysis in ICP-MS instrument.
- 4 Oil and Natural Gas Corporation Ltd, Vadodara: For use of their library and allowing me to refer their work on Cambay basin.
- Physical Research Laboratory, Ahmedabad: Especially Prof. R. Ramesh for O<sup>18</sup> stable isotope measurement.

Jigish R. Gohil is duly acknowledged for his constant encouragement, support and all round help. His involvement in the field trips for water sample collection resulted in timely collection of samples for both of seasons of the year. He has been a great helping hand, especially during my times of despair. His friendship has been a constant source of inspiration for me.

I am also thankful to General Manager and Chief (Geology), of Sewa Hydroelectric Project Stage-II, NHPC Ltd, for permitting me to continue my Ph.D. and also for their cooperation and encouragement. Shri Ashish Dutta (Assistant Manager), NHPC Ltd, Sewa HEP-II, is duly acknowledged for his valuable comments which greatly improved the original manuscript. Mr. Manvender Nayal, is thanked for typing work and helping in many other ways. Thanks also to colleagues from the author's present organization (NHPC Ltd) for their all round support.

I am greatly indebted to all villagers who generously helped in providing water samples and other information. In my entire period of field work, I met various people and in the process shared and gathered a great deal of experience of life. Also, how in the true sense, earth, disseminates in various components, behaves, was learned from them. From this experience, it would be easy to conclude that best way to study the earth, is patient observations.

Finally, I thank my family members for the patience they kept in the last eight years and for their belief and constant prayers for me. Without their all abiding love and encouragement, this work would not have seen the light of the day.

Last but not the least, I am thankful for the financial support provided by the CSIR in the form of JRF and SRF (Fellowship no 9/114(121)/2K1/EMR-1).