Acknowledgements

With all humility and sincerity, I bow to the Almighty for giving me enough opportunity, strength, inspiration, blessing and courage for the completion of this manuscript.

I express my deep sense of gratitude and profound feeling of admiration for my revered guide Dr. G.S. Gill, Professor and Chairman, Centre of Advanced Study in Geology, Panjab University, Chandigarh, for his valuable guidance, close supervision, erudite advice and constructive criticism throughout the pursuit of the investigations. His ever helping nature, immense knowledge, constant motivation, keen interest and sympathetic understand were the sources of inspiration during my research work.

I feel immense pleasure to express my heartfelt gratitude to my guide Dr. Naresh Tuhi, Professor, Centre of Advanced Study in Geology, Panjab University, Chandigarh, for his able and supportive guidance, constant monitoring of my research and giving valuable suggestions. His constant advice, analytic gaze and a sense of precision helped me in completion of this manuscript with least discrepancies.

I feel grateful to Dr. R. K. Kohli, Professor and former Chairman, Department of Environment Science and Vocational Studies, Panjab University, Chandigarh, for providing working facilities in the department. He has been a source of inspiration and encouragement during the course of the research work.

I express my sincere thanks to Dr. A. S. Ahluwalia, Professor and Chairperson, Department of Environment and Vocational Studies, Panjab University, Chandigarh, for providing me all the research facilities.

I feel grateful to Chairman and Director, Centre of Advanced Study in Geology, Panjab University, Chandigarh, for providing working facilities in the department.

Thanks are due to Dr. Rajesh Dhar, Scientist, Central Instrumentation Laboratory (CIL), Panjab University, Chandigarh, for providing facilities of standards of different trace elements and AAS instrument. I am equally thankful to Dr. (Mrs.) Veena Dadwal, Professor, Centre of Advanced Study, Panjab University, Chandigarh, for her help during chemical analysis of samples at Geochemical Laboratory.

I feel grateful to Sh. G. P. Singh, Assistant Hydro geologist, Central Groundwater Board (CGWB), Northern Region, Chandigarh, Govt. of India, for making available departmental studies reports related to the water resources of the Ghaggar River Basin.
The Author is at loss to find suitable words of thanks for his dear friend Ms. Deepika Thakur, Research Scholar, Department of Environment and Vocational Studies, Punjabi University, who devoted her valuable time and provide help at various stages of the study for compilation of thesis. Thanks are due to Dr. Surender Singh Yadav, Assistant Professor, Department of Botany, Maharishi Dayanand University, Rohtak, and Vineet Poonia, Public Relation Officer, Haryana Government, who acted as my mentor.

My special thanks to Dr. Sunil Mittal, Assistant Professor, Department of Earth Sciences, Central University, Bathinda, who has been supportive throughout my search work and provided valuable suggestions.

My special thanks to my loving friends Harish Balhara, Dr. Dinesh Chahal, Dr. Satish Mittal, Praveen Yadav, Jaibhagwan Yadav, Anil Yadav, Shashi Yadav, Sandeep Sheoran, Inderbhagat Negi, Narender Panesar, Narender Malik, Ashok, Kumar, Bhavesh Thakur, Kuldeep Poonia, Sanjay Raghuvanshi, Kulwinder Bories and Anil Ghanghas who always encouraged and stood by me during the need of hour.

I feel grateful to the supporting staff of Geology and Environment Science Departments of Punjabi University, particularly Mr. Kuldeep Bhat and Rajinder Prasad, for providing me all help at various stages during the course of this research work.

Above all, I owe intensely to my grandparents, my parents, my sisters Nirmala and Neelam and my cousin Joginder Kundu. Special appreciation is extended to my mother and father for their patience and forbearance during the stints away from home in the course of research. I am sincerely and morally bound to acknowledge the constant inspiration and blessing bestowed by my late grandmother and grandfather.

Lastly, I am thankful to University Grants Commission (UGC), New Delhi, for award for Fellowship (as J.R.F and S.R.F) for the whole tenure.

FEBRUARY, 2011