ACKNOWLEDGEMENTS

This endeavour would not have been possible without the guidance, support, assistance, hopes and aspirations of many. I would like to use this moment as a personal space to thank all the individuals and groups who helped and inspired me to achieve this milestone.

Foremost of all, I would like to thank Tezpur University for giving me the opportunity to conduct this research work. Ph.D is a guided work as my supervisors have always stated. This Ph.D has been successful only because of their valuable guidance. I am grateful to Professor Kali Prasad Sarma and Dr. Manish Kumar for guiding me towards this goal. Joining the doctorate program right after completing my post graduation wasn't very helpful to be true. I was clueless, about the type of work I would be doing. I was also not aware of the nature and the level of commitment that was expected from me as a "scholar". However from the initial thrust to the direction of my research my supervisors were always with me. Professor Sarma has known me since my days as a post graduate student in the Department of Environmental Science, Tezpur University and I am grateful that he trusted to choose me as one of his PhD scholars. Apart from acquiring academic knowledge, I got to learn many valuable lessons from both my supervisors, especially work ethics. Speaking of work ethics, I learnt a lot from Dr. Kumar. In the beginning I was daunted by the expectations he had from me. He always tried to make it sure that I performed my tasks on time and with maximum efficiency, I would admit that I failed him on many occasions; but he was always around to criticize and inspire me, and to ensure that I did most of the learning by myself.

My doctoral committee members Prof. Ramesh Chandra Deka and Prof. D.C. Baruah have always attended my progress seminars and I would like to thank them for their valuable advice. The other teachers and faculty members of the department have been equally helpful, especially for offering me additional bits of knowledge, advices and for encouraging me. I would also like to thank them for providing me the laboratory assistance without which my work would have been incomplete. Prof. Kushal Kumar Baruah, Dr. Apuba Kumar Das, Dr. Raza Rafiqul Haque, Dr. Ashalata Devi, Dr.

Nirmali Gogoi, Dr. Satya Sundar Bhattacharya, Dr. Amit Prakash, Dr. Sudip Mitra and Ms. Sumi Handique I would like to thank all of you for your help and support.

I would like to extent my gratitude to all the people and groups that provided me with technical and professional help in my analytical and laboratory works. I thank you Mr. Jayanta Bora (Technical Assistant, Environmental Science), Mr. Manoranjan Sarma (Technical Assistant, Chemical Science), Dr. Kunal Borah (Senior Technical Assistant, Department of Physics), Mr. Dhruba Deka (Laboratory Assistant, Department of Physics), Mr. Anjalu Ramchiary (Research Scholar, Department of Energy), Mr Biju Boro (Laboratory Assistant, Department of Physics). I am grateful for the valuable help provided by the GIS laboratory, and the laboratories Dr. Haque, Prof. Baruah and Dr. Bhattacharya. I am very grateful to the Council of Scientific and Industrial Research (CSIR), India for providing me with the crucial financial help for my research activities.

I cherish the moments spent with my laboratory mates; my days as a research scholar were made special by you all. I am grateful to you all not only for the assistance and the encouragement but also for the lighter moments that we had together during this tedious journey. I would like to thank Ms. Pallavi Das, Ms. Anindita Gogoi, Ms. Aparna Das, Ms. Rinkumoni Borah, Mr. Jyoti Prakash Deka, Mr. Arbind Kumar Patel, Mr. Latu Khanikar, Ms. Jinu Deka, Ms. Upasona Devi, Ms. Sanghita Borah, Ms. Sangita Baruah, Mr. Rajat Subro Bose and all the wonderful post graduate students that I got the chance to help and work with during my days as a scholar.

The journey to achieve this doctorate degree has been a unique experience. These five and a half years have felt like a lifetime, but living the life of research scholar is quite difficult at times. Thankfully it was made easier and funnier by the wonderful friends that always surrounded me. I would like to thank Nabajit, Rajesh, Jyoti, Arbind, Kaustubh, Bidyut, Tanuj, Suranjana, Diganta, Himolin, Leena, Pallavi, Anushree, Pranamika, Pratibha, Karishma, Aparna, Anindita and all the other amazing friends that I made during these five years. I would like thank Gaurav, Sabya, Jit, Numan and the other Btech guys with whom I used to play "counter strike" during the initial stages of my Ph.D. Quizzing has been one of my part time hobbies and I would like to thank all

the people that I have come to know through my quizzing endeavours. I would like to thank Ashutosh Das, Manash Pratim Bora, Poroj Bhuyan, Mr. Upakul Sarma, Anubhav Joshi, Subhasish Dutta, Rahul Choudhary and Dudul Das. I would also like to thank the people with whom I occasionally sat to play and discuss music; I would like to thank Bapan Daimari, Kaushik Mali, Sanjay Gautam, Rajkamal Sonowal and the rest of the gang.

I would like to dedicate this space to Ms. Parijat Saikia the person who always stood beside me and empowered me. In times of trouble you have always lifted my morale and helped me be a stronger person by encouraging me to believe in myself. You mean so much to me and to just say "thank you" will never be enough.

I will always be indebted to my mother Mrs. Ranu Das and my father, Mr. Mahesh Das, although my parents never understood my work, or the things that I did as a scholar, yet they have always been proud of my decisions and have been very supportive. I respect your patience and your love, without your hopes and aspiration I would not have made it this far. My wonderful cousins Mr. Mriganka Pathak, Mr. Rajib Pathak, Ms. Khanjana Pathak, Ms. Khanika Pathak, Mr. Asim Jyoti Pathak, Ms. Upasana Pathak, Mr. Rajkumar Pathak you all have been very supportive and I thank you all.

Lastly and most importantly I would like to thank the one above all, I have never been a very religious person but I have always had a belief in you. I thank you GOD for giving me the strength and the confidence to complete this work.

Nilotpal Das