I take this opportunity to express my deep sense of gratitude towards my Late Guide Prof. (Dr.) A.S.Patel, Ex. HOD Civil Engineering and Ex. vice Dean, Faculty of Tech. & Engg., M. S. University of Baroda, for their continuous effort and unending guidance during this research project.

(Dr.) G. S. Joshi has been remained as a great source of inspiration to me and without her sincere and excellent guidance at every stage; this thesis would not have been completed. I sincerely thanks for her continuous effort and unending guidance during this Ph.D. thesis.

I express my sincere thanks to Prof. (Dr.) H.M.Patel, Head of Civil Engineering Department, for providing me the necessary facilities to complete my Ph.D. research work.

I would like to specially mention the name of Prof. (Dr.) A.S.Patel, Prof. (Dr.) H.M. Patel and (Dr.) G. S. Joshi, who are the main inspiration for me for this entire research work. I would not have successfully completed without their support.

I am greatly thankful to Prof. B.S. Parekh, Professor, Computer Dept., FTE, M.S.U., and Prof. (Dr.) Vilin P. Parekh, Principal, PIET, Limda, Waghodia for encouraging me to register Ph.D. in initial stage.

I am also thankful to Prof.(Rtd.) J. J.Prajapati, Prof. (Rtd.) P.N. Sutaria, Prof. (Rtd) P.D.Vyas, Prof.(Dr.) N. J. Shrimali, Shri M.B.Patel, Shri R.H.Pathak, Shri L.I.Chauhan, Dr.Sanskriti S. Majmudar, Dr.Suvarna D. Shah, Shri V.M.Rana, N.G.Shah, B.D.Vashi, S. M. Dave, Manish P. Jain, Kosha A. Shah, Shilpesh C. Rana, Sandip K. Kharva, Sachi Hathi, Leena Milind Hire, Rippal D. Shah, Abhipsha Makvana, Deepak Rathava, Ashlesha V Chauhan, Samir Patel, Megha A. Shah, and all my colleagues teachers of the various departments in the faculty for their technical guidance, moral support and encouragement during the course of my research study.
Myself thankful to both, Dr. Dhanesh Patel and Dr. Purnima Pandit, Applied Mathematics department, FTE., for their support and help during mathematical model study.

I am also thankful to Mr. Deshmukhsir, Director, CWPRS, Khadakvasala, Pune, India, for providing me useful detail information (Broacher, CD-Rom and related literature) for this Ph.D. research work. I would not have successfully completed without their support.

I am also thankful to Mr. K. L. Dave, (Rtd) Ex. Chief Engineer and Director, GERI, Vadodara and Dr. V. M. Yagnik, M.D., GWRDC, Gandhinagar for their full cooperation, valuable oral guidance during the course of this Ph.D. research work. I am thankful to Mr. Vinod S. Patel, President, IWWA, Vadodara chapter for giving me useful information and discussion for this study.

I am also thankful to Shri O. T. Gulati, Chief Engineer, Narmada Nigam, Rajkot and Prof. Dr. Anupam K. Singh, Prof. Dr. M.B. Dholakia for their excellent and kind cooperation in this Ph.D. research work.

I am also thankful to Mr. U R. Patel and Mr. Ladbhai from flood control cell, Ukai dam, Ukai. I am also thankful to Mr. K. B. Rabadia, C.E. (SIC) Surat for providing me relevant data. Myself thankful to Dr. B.S. Panisir and Dr. Eldhosir for better conceptual explanation of my research topics. I am also thankful to Dr. B. K. Samtani, Dr. P. L. Patel, Dr. J. N. Patel, Dr. S. M. Yadav and Dr. P. D. Purey from SVNIR, Surat for GIS and RS related NRSC data concept.

I am especially thankful to Khatvanisir-Exn.Engineer, SMC, Surat and Elangosir-SR, NRSC, Hyderabad. I am also thankful to all officials of the various government sections (like Flood control Cell, C. D. O., SWDC - Gandhinagar, Surat Irrigation Circles, Sub division offices, CWC -Surat, GERI –Vadodara, NRSC-Hyderabad, CWPRS- Khadakwasala, Pune etc.) for their sincere and warmly support during my visit to their offices.
Myself greatly thankful to my best friend Mr. Vipul Vasia, Assistant Professor, Gandhi Govt. College at Surat for great time together for collection of data within 7 days.

It is not only acknowledgment of the moral support, guidance and cooperation which are received from my family but I feel proud of mentioning that whatever I am today is because of the zeal, love and affection of my father in law Prof. (Rtd.) Sudhakar B. Shastri – Gandhinagar and my beloved wife Mrs. Prerna G. Joshi during study journey from Diploma Civil engineering to Ph.D. This thesis dedicated to my beloved Grandmother name “Tapi-Ba”, as thesis entitled Tapi river match to my Grandmother.

I am also thankful to my friends, well wishers and colleagues - Ashwinbhai Pandya, Nayan P. Soni, Avdhut Tandle, Archana Avadhut Tandle, Shirishbhai, Shashikantbhai, Hitesh P. Parekh, Mayur Patni, Ritesh Rana, Nirav Patel, Nikitamadan, Jatan Panchal, Krunalbhai, Dharmesh Bhatt, Amrut Dodia, Minesh Shah, Pravinbhai A. Jaiswal, Rohitbhai Mali, Anant Joshi, Purveshbhai, Vipulbhai Parmar, Anandbhai, Vikasbhai, Ajaybhai, and Maheshbhai etc. for their help and support during my research study.

I thankful to all mighty God for this stage of success.

Last but not least, I express my hearty thanks to those whom I might have missed who helped directly or indirectly and co operated me a lot in completion of this Ph.D. research work.

(GAURANG I. JOSHI)

Ph. D. Student

January – 2014

Vadodara