

ACKNOWLEDGEMENT

At the end of a four years journey it is necessary to stop, look back, analyze what happened and recognize the help rendered by the people who helped to complete the journey. This thesis is the culmination of my sincere efforts in obtaining my Doctoral degree in Civil Engineering. I have not traveled in a vacuum in this journey. There are some people who made this journey easier with words of encouragement and by offering different places to look to rest for expanding my theories and ideas.

I express my gratitude to **The Maharaja Sayajirao University of Baroda** for providing me opportunity to pursue Doctorate degree in Civil Engineering possible. I will put my best efforts to add to the glory of The M.S. University.

First and foremost, it is my great pleasure and proud privilege to express my deep sense of gratitude to my Guide, **Dr. D.T. Shete**, Professor and Former Director, Water Resources Engineering and Management Institute (WREMI), Samiala, for his excellent guidance, constant inspiration, positive criticism and unparalleled support throughout the whole journey of my work. His comments on chapter drafts are themselves a course in critical thought upon which I will always draw. I could not have imagined having a better advisor and mentor for my Ph.D. study. He is and will be the most valued person in my life.

I am grateful to **Dr. R.C. Maheswari**, Vice Chancellor, Sardar Krushinagar Dantiwada Agriculture University, for his kind help rendered in providing the details regarding the crops grown in the area.

I express my sincere appreciation and thanks to **Dr. A. S. Patel**, Professor and I/C Director, WREMI for his kind support and encouragement.

I am deeply grateful to **Prof. A.C. Pandya**, Former Project Manager of ES CAAP / UNDP, Philipines, Former Director, GEDA, Former Director, CIAE, Bhopal and Former Director, NDDDB, for extending his helping hand in providing the required data and constantly inspiring to achieve my goal.

I am thankful to **Dr. F.P. Parekh**, Associate Professor, WREMI, for her kind support whenever needed for.

r. **U.C. Kothyari**, Professor, Department of Civil
ite of Technology, Roorkee. It was my privilege to
discuss the findings of my work with him and his suggestions were highly
valuable for improving the thesis content and presentation.

I wish to express my warm and sincere thanks to **Prof. Vyas Pandey**,
Head, Meterological division, GAU, Anand for his guidance related to the crop
planning, during my work.

I am thankful to **Dr. B.S. Patel**, Chief Agronomist, AICRP on Integrated
Farming Systems, Sardar Krushinagar Dantiwada Agriculture University, for
providing the details regarding the crops grown in the area.

I am thankful to **Shri M.K. Dixit**, Superintending Engineer and **Shri
A.G.Shah**, Assistant Engineer, State Water Data Centre, Gandhinagar for
providing the data regarding the raingauge stations situated in the study area.

I am very much grateful to **Shri M. G. Golwala**, Superintending Engineer
(Hydro), Central Design Organization, Gandhinagar for providing the information
and maps related to the major irrigation projects in the study area. I am thankful
for the assistance given by his **Executive Engineers (Shri Gohil and Shri
Bhatt)**, for the same.

I am grateful to the **Librarians** of Indian Institute of Technology, Guwahati,
Faculty of Technology and Engineering, The M.S. University of Baroda and
Sardar Krushinagar, Dantiwada Agriculture University for assisting me in
providing the required reference material for carrying out the research work.

My warm thanks are due to **Ms. M.R. Khatri, Ms. A.V. Nadar, Mr. K.B.
Patel, Ms. S.C. Parmar, Ms. N.A. Bhatia, Mr. P.G. Joshi, Ms. D.B. Joshi** and
Ms. N.G. Tiwari, former and present Temporary Teaching Assistants of WREMI,
who were always ready to help.

My sincere thanks are due to **Shri G.K. Patel**, Lab Assistant, **Shri J.D.
Vyas**, Computer operator, **Shri R.G. Prajapati**, Temporary Technical Assistant,
Shri A.D. Choksi, Senior Clerk, **Shri G.J. Darji**, Clerk; the staff of WREMI who
always helped and who were co-operative during my work.

ri **S. J. Chauhan**, **Shri L. G. Rabari** and **Shri M.K.**
peons, WREMI for their help and support during the
time of my research work.

I express my sincere thanks to all my **graduate and post graduate students** who were always concerned and curious about the research work which always motivated me to work even more hard to successfully complete the thesis work.

I wish to thank my best friends in high school, **Shraddha & Jyoti**; my best friend in undergraduate and graduate level, **Heta & Gautam**; my good friend and colleague **Bhumi**; and my childhood friend, **Gayatri**; for helping me get through the difficult times and for all the emotional support, camaraderie, entertainment, and caring they provided.

I am also very much thankful to my Sir, my colleague and my one of the most dearest friends, **Dr. T.M.V. Suryanarayana**, Assistant Professor, WREMI who always inspired me to work hard and helped me a lot during my research work which will always be the most valuable to me. I don't have any words to express his kindness, supportive nature and positive criticism during my work. Thanks a lot Sir ò ..

For her continuous nurture and parental concern, always kind and friendly words of encouragement, I take this opportunity to thank, **Dr. V.D. Shete**, for always being there and making me feel comfortable. Her constant motherly caring and love have made things much easier and motivated me the most to work hard.

Lastly I want to thank **everyone**, who helped me directly or indirectly in my research work, which I may be missing to mention here inadvertently.

It was my great fortune that during the completion of my research journey I met my life partner, **Nimish**, whose loving, encouraging, patient and faithful support during the final stages of this Ph.D. is highly appreciated. I show my gratitude to his family too specially my **mother in law**, and my wonderful three

there and believing in me that I could successfully
I thank them all for their understanding.

Finally and most importantly, I am thankful to my brother **Jiten** for always being a biggest moral support and my mother **Heena**, without whom I may not be here. For her love, concern, support, wishes and bearing me in my good and bad moods, understanding me and having faith in me, not only during my work but throughout my whole life till now. My mother is as solid as black rock. The creativity, determination and sense of conscientiousness with which she responded to life's challenges have led me to seek this in myself. I dedicate this Thesis to her. My father, **Rashmikant** for being there spiritually. Again I would like to thank both of my families for helping and supporting me directly or indirectly for successful completion of my work. It was under the blessing of God I gained so much drive and an ability to tackle challenges head on.

Place: Vadodara

Date: 4th October 2011

(N. R. Patel)