

**Dr. M. Anji Reddy. M.Tech (IIK),PhD (JNTU)**  
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Dr. Anji Reddy Mareddy, having his dual P.G. degree, M.Sc, from Andhra University and M.Tech, Civil Engineering from Indian Institute of Technology, Kanpur, India, joined *Jawaharlal Nehru Technological University (JNTU)*, Hyderabad in 1989. He was awarded the doctoral degree by JNTU, in 1995 for his research work on “Water Quality Modeling of Gautami – Godavari Estuary Using IRS-1B Satellite data”. Since then, he was fully engaged, in full time research in remote sensing and GIS and contributed remarkably towards developing GIS for various environmental applications. Having more than 20 years of teaching and research experience in Remote Sensing and GIS, Geoinformatics for Environmental Management, is presently working as Professor of Environmental Science and Technology in Institute of Science and Technology, Jawaharlal Nehru Technological University. He has been the principal guide for more than 130 academic projects at P.G. level, 13 for PhD projects and at present guiding 20 PhD students in the area of environmental science and technology, Geoinformatics, Remote sensing, GIS, GPS and Environmental applications.

He executed number of research projects sponsored by state and central Government and completed 25 consultancy projects in various applications of remote sensing and GIS in environmental management and planning. Presently he is the Principle investigator of very prestigious project on VIS (Village Information System) sponsored by Department of Science and Technology (DST) NRDMS, Government of India. He published and presented more than 100 research papers on various themes of remote sensing and GIS applications to environment, land use/ land cover, spatial data analysis, water resources, transportation planning, watershed management and environmental modeling. He delivered expert lectures at University of Illinois-Chicago, University of IOWA, University of Chicago, Urbana and East West Centre, Honolulu in USA, Stockholm Water Company in Sweden, International Centre for Environmental Management for Enclosed Coastal Seas, Osaka, Kobe City in Japan, University of Florida- USA, Colorado University , Denver- USA and Universities of Philadelphia , USA. By applying his rich academic experience in research, he developed a new era in Geoinformatics in JNTU. He authored few textbooks, namely, Remote Sensing and Geographical Information System, Geoinformatics for Environmental Management, Digital Image Processing and Environmental Science and Technology. He also edited the five proceeding volumes of International Conference on Environmental Management.

Reviewer / referee for journals like International Journal of Remote Sensing, U.K. and Remote Sensing Reviews, USA. Referee for DST Projects, Ministry of

water resources projects and acting as resource person for curricula development in Remote sensing, GIS, GPS and Environmental applications for various Universities. He had been a member of the executive council of united JNTU from 2004 to 2008, chairman of Board of Studies of Environment JNTU, member of Board of studies of Gulbarga University, Bangalore University, Osmania University and Sri Venkateswara University, Kakatiya University, member of Indian Society of Technical Education, Indian Society of Water Resources, Indian Society of Hydrologists and Indian Society of Remote Sensing. He is a technical member of World Bank funded GIS project-IIIP, APPCB, Govt. of Andhra Pradesh. He is also the Coordinator of Environmental Geomatics, TIFAC-CORE (Centre of Relevance and Excellence), Department of Science and Technology, New Delhi. He is a National expert committee member for Revival of Village Ponds project, Earth and Environmental science expert committee for the empowerment of women, Expert member of the project Kolleru lake restoration management plan of DST, Expert working groups member of Hyper spectral signature data base creation project and Village knowledge Management System (VKMS) of NRDMS, DST. Presently he is appointed as the Chairman of Andhra Pradesh state environmental expert appraisal committee constituted by Ministry of Environmental and Forests , Government of India with the recommendation of Government of Andhra Pradesh.

His outstanding contribution in Environmental problem solving, pollution control, health and safety, GIS and Remote sensing applications for water quality, transportation planning, assessment of sedimentation distribution pattern, EIA, Socio-economic development through scientific means stood him not only a distinguished Professor in JNTU but also at National and International level.

**M. Anji Reddy**

## **BIO - DATA OF**

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### **Educational Qualifications**

#### **Ph.D., 1995**

Remote Sensing (Title: Water Quality Modeling of Gautami - Godavari Estuary Using IRS-1B Satellite Data). **Jawaharlal Nehru Technological University, Hyderabad, A.P., INDIA.**

#### **M.Tech. 1989 (I Class with Distinction)**

**Civil Engineering**, specialization: Surveying, Photogrammetry and Remote Sensing.  
**Indian Institute of Technology (IIT), Kanpur, India.**

#### **M.Sc., 1986 (First Class)**

**Geology, Andhra University, Visakhapatnam, A.P., India.**

#### **P.G.Diploma 1987 (I Class with Distinction)**

Post Graduate Diploma in **Computer methods and Programming Andhra Pradesh Productivity Council, Visakhapatnam**

#### **B.Sc., 1984 (I Class with Distinction)**

Geology, Mathematics and Physics, **Andhra University, Visakhapatnam, A.P., India.**

### **Professional Experience**

**October 2008 to onwards Director**, Directorate of University foreign relation

**January 2006 to January 2008 Professor & Director**, Institute of Science and Technology (IST), JNT University, Hyderabad.

**February 2004 to January 2006** Professor & Head, Centre for Environment, IST  
JNT University, Hyderabad Officer in charge, IST Nodal Centre JNTU

**September 2003 to February 2004**

Professor of EST Centre for Environment, IPGSR JNT University, Hyderabad  
Officer in charge, IST Nodal Centre JNTU

**October 1999 to January 2004**

Associate Professor Centre for Environment, IPGSR JNT University, Hyderabad.  
India.

**October 1998 to October 1999**

Assistant Professor, Centre for Remote Sensing, IPGSR JNT University, Hyderabad.,  
India.

**June 1995 to October 1998**

Senior Lecturer Centre for Remote Sensing, JNT University, Hyderabad. India.

**May 1989 to June 1995**

Lecturer, Centre for Remote Sensing, JNT University, Hyderabad., India.

**Teaching Experience**

**M.Tech. Environmental Geomatics**

- Remote Sensing and Image Interpretation
- Environmental Impact Assessment
- Geographical Information System for Environmental Management
- Geoinformatics for Natural Resources Management
- Photogrammetry Engineering and Cartography
- Digital Image Processing

**M.Tech. Environmental Management**

- Remote Sensing and GIS
- RS and GIS for Natural Resources Management
- **Ecology & Environment**

**M.Sc (Tech.) Environmental Sciences & Technology**

- Advanced Computer Programming
- RS and GIS for Environmental Management
- Natural Resources Management
- GIS for Environmental Modeling

### **M.Tech. (Water Resources)**

- GIS and Remote Sensing Applications

### **M.Tech. (Transportation Engineering)**

- Remote Sensing and GPS
- GIS in Transportation Planning

### **Research Contribution**

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#### **List of PhDs Guided**

1. **Dr. A. Siva Sankar** Evaluation of Impact of Land Use Changes on ground water quality of a part of a Hyderabad city using Remote Sensing, GIS and insitu studies.
2. **Dr.Ch.MohanaVamshi** Multi Criteria Decision Support System for Optimum management of Solid Waste management
3. **Dr.V.Padmaja** Suitability analysis and Decision Support System for Solid waste disposal site in and around Hyderabad using Remote Sensing and GIS field studies.
4. **Dr. R.V.R.K. Chalam** Environmental studies on surface ground water of lower pennar using Remote Sensing and GIS.
5. **A.V.S.Prasad** Remote Sensing and GIS for the evaluation of terrain conditions and Environmental Impact Assessment of kandaleru irrigation project.
6. **Nesatalu Hiese** Evaluation of Terrain Parameters for Landslide Hazard using Integrated Remote Sensing GIS,DEM,GPS Data-A case study of Kohima area Nagaland.
7. **K.kiran** Mapping ground water salinity using Remote Sensing indicators a simple approach with Arc/GIS.

8. **P.Venkateswarlu** Remote Sensing Application to Water Resources Group water assessment development and exploration using Remote sensing Technique. A case study in Prakasam District
9. **G.Chandra Sheker Rao** Remote Sensing and Geographical information system based natural resources inventory and management plan for erimulli vagu catchment, musli river basin
10. **V. Ramamohana Reddy** Methane flux estimation from different soils using remote sensing and ground based observation
11. **R Sundarvadan** Creation of Village Information System and Model action plan for sustainable development
12. **Y.Ramamohan** Development of Crop Yield Prediction Model (CYPM) Using Remote Sensing GIS, GPS and Field Studies.

**Ph.D. students under Guidance**

<b>S.No.</b>	<b>Name of the Candidate</b>	<b>Topic of Research</b>
1.	<b>G Hanumantha Rao</b>	Development of Geospatial Model Using Multicriteria Analysis for Planning and Management of Watersheds
2.	<b>L Srinivas Naik</b>	Integration of Remote Sensing and GIS for Urban Storm Water Management
3.	<b>T Chandra Sekhara Rao</b>	Foot and mouth Diseases Warning System (FMDWS) using Remote Sensing and GIS Prakasham Dist. of A.P.
4.	<b>M Venkata Ramana Murthy</b>	Integrated flood Hazard Mitigation System & Vulnerability Analysis Using Geomatics Technology

5. **S Needhi Dasan** An Environmental impact, Assessment Study for major and Minor Water Resources Projects in Tamilnadu
6. **S Kavita** Role and impact of micro Level Natural Environmental Systems in regard to Health Impacts with Application of Microbiology
7. **B Purushothama Reddy** Integrated Approach for Urban Planning, Development & management using Remote Sensing, GIS & GPS
8. **Ch. Venugopal** Environnemental Impact River Migration And flood Hazard Mapping in Godavari Delta Region using Remote Sensing GIS GPS & Insitu Methods.
9. **A. Sri Durga** Development of Spatial Decision Support System (SDSS) for the Impact Assessment (IA) of High Input use in the Food Grain production of A.P.
10. **D Sandara Rami Reddy** Strengthening of Osman Sager Drinking Water Supply System in Hyderabad using GIS.
11. **V.RaviKumar** Characterization of Rabi Sorghum Environments and real time Information System for Forecasting the Rabi Sorghum Productivity on a Regional scale
12. **P Sreenivas Rao** Bio-Diversity Characterization at land space Level using Geomatics
13. **Ather Sultana** Integrated Optimal land Use system Model Development for Watershed.
14. **R Sobha** Integrated Micro watershed Management and Development of model action plan using Remote Sensing and GIS – A case study from Ranga Reddy District.

15. **HiteshMalhotra** Creation of comprehensive forest information system for the Environmental Management of Eastern Ghats`
16. **K. Santhosh Kumar** Development of Land suitability model for Irrigation Management using Remote Sensing and GIS – A case study of part of Nagarjunasagar command area, .
17. **Ganta Rajani** Designing and Development of web based mandal information System using Geomatics- A case study from Prakasham District
18. **P. Srilatha Reddy** Designing and Development of environmental Information System – A Case study of Prakasham District Using Remote Sensing and GIS.
19. **Kavita** Development of Village Information system Using Remote Sensing, GIS.

### **Books Authored**

- Textbook of Remote Sensing & Geographical Information Systems, BS Publications,2002
- Geoinfomatics for Environmental Management, BS Publications, 2004
- Proceedings of International Conference on Environmental Management ,BS Publications 2005,5 Volumes

- 1) Pollution and Control Technologies
- 2) Environmental Geoinfomatics and Modeling
- 3) Environmental Resources and Sustainability
- 4) Environmental Impact and Assessment
- 5) Environmental Education and Awareness



- Digital Image Processing, BS Publications,2006
- Textbook of Environmental Science & Technology, BS Publications, 2007

### **Training Programs/ Conferences Conducted**

- International Conference on Environmental Management – 2005 (ICEM-2005) from 27<sup>th</sup> to 30<sup>th</sup> October 2005
- Organized an International Conference on Industrial Pollution and Control Technologies ICIPACT-2001
- National Conference on Environmental Management (NCEM 2006) Nov16-18 2006.
- Five day Training Program on GIS for Municipal Applications to the Functionaries of Andhra Pradesh Urban Services for the Poor (APUSP) Project Towns conducted at Centre for Environment, IST, Jawaharlal Nehru Technological University and organized by School of Planning and Architecture, JNTU, Hyderabad from 28<sup>th</sup> Nov – 2<sup>nd</sup> Dec, 2005.
- Four-Week Training Program on Digital Image Processing in Environmental Applications, Sponsored by Academic Staff College – University Grants Commission, 2005.
- Four-Week Training Program on Geoinformatics for Environmental Management, Sponsored by Academic Staff College – University Grants Commission, 2004.
- Two weeks short term training program on Geomatics Engineering (Remote Sensing and GIS) for Environmental Management sponsored by Indian Society of Technical Education (ISTE) from March 15<sup>th</sup> – 27<sup>th</sup> 2004,.
- Four weeks training program on remote sensing and geographic information Systems to in-service faculty of Andhra Pradesh Pollution Control Board (APPCB) officials, under World Bank funded IIIP project from 25<sup>th</sup> Nov to 25<sup>th</sup> Dec, 2002.

- Two weeks training course on Geomatics engineering (Remote sensing and GIS) to in-service teaching faculty of civil engineering department of polytechnic colleges of Andhra Pradesh from 9<sup>th</sup> July 2002 to 23<sup>rd</sup> July 2002
- One week orientation course for assistant environmental engineers of A.P Pollution Control Board from Jan 5<sup>th</sup> to 11<sup>th</sup> Jan , 2002.
- Two weeks training course on Geomatics engineering (RS and GIS) for resource management to the in-service teaching faculty of civil engineering of polytechnic colleges of A.P for A.P Technical Education Board, 2002,
- Workshop on Remote Sensing and GIS for Environmental Management, as a Prelude to ICIPACT 2001.
- One week training program on applications of remote sensing and GIS technologies for resource management, to the state government officers.
- Four week training program on applications of Remote sensing and GIS technologies from Feb 10<sup>th</sup> – March 10<sup>th</sup> 2000.
- Training Program on remote sensing for Transportation Engineering., 1992.
- Two day brain storm session on capacity building on geospatial technologies  
March 2008
- Four two week training programs on geospatial technologies for working personnel of Government sponsored by DST GOI

#### **To be Conducted**

- Second International conference on Environmental Management(ICEM 2009) November 2009
- National conference on green buildings – December 2008

## **R&D and Consultancy Projects**

- 1. Sedimentation and water quality problems and their remedial measures of Sriram Sagar reservoir using remote sensing techniques., Sponsored by Department of Science & Technology (DST), Ministry of Science and Technology, Govt. of India. 1995 under Young Scientist Scheme (Rs.3.50 lakhs)**

This project is undertaken to examine the potential utility of Indian Remote Sensing-IB (IRS-IB) Linear Imaging Self Scanner (LISS) digital data for mapping the spatial distribution of suspended sediment concentration in surface water of Sri Ram Sagar reservoir, a source of drinking water for many townships in Telangana region of Andhra Pradesh state. The study also assesses the storage capacity of this reservoir using pictorial data and also suggests remedial measures to control the siltation of the reservoir. Regression models are developed which help formulate and validate the relationships for suspended sediment concentrations and multispectral satellite digital data using statistical principles. The model developed in this project help to initiate timely remedial steps and provide recommendation for an integrated and sustained growth and development of adjoining habitats.

- 2. Creation of Forestry Information System for Medak District of Andhra Pradesh state, India using IRS Satellite Data., Sponsored by Forest Department, Govt. of Andhra Pradesh. (Rs.2.50 lakhs)**

Forest department, Government of Andhra Pradesh has sanctioned a project to quantify the forest cover using the satellite digital data with the help of image processing software namely ERDAS. In this project, the forest cover has been classified three categories namely, notified forests, degraded forests and scrub forests and for each category area of forest cover is quantified which is being used by forest department in decision making process.

**3. Land use / land cover mapping of Hyderabad city using remote sensing and GIS., Sponsored by Municipal Corporation of Hyderabad. (Rs.3.85 lakhs)**

The project highlights the advantage of using fused product of IRS-ID PAN and LISS-III satellite imagery in preparing a Land use / Land cover map of the total Hyderabad area using visual interpretation technique and digital data analysis. The manually prepared map is further processed in Arc/Info and Arc View GIS software to generate a digital database and statistical details.

**4. Evaluation of Impacts of land use changes on Environmental Quality (air, water, soil and bio-environment) of Hyderabad and creation of Hyderabad Environmental Information System (HEIS) using Remote Sensing, Geographical Information Systems and *In Situ* methods., Sponsored by Ministry of Environment and Forests, Govt. of India.(Rs.22.00Lakhs)**

The main objective of this project is to develop HEIS which involves generation of thematic and topographic layers of MCH area from the SOI toposheet and satellite imagery and preparation of spatial distribution maps of water, soil and air quality parameters using curve-fitting method in GIS software. These maps are correlated with land use/ land cover to identify the environmental sensitive zones in the area under Municipal Corporation of Hyderabad and to suggest remedial measures to prevent further environmental degradation. HEIS is generated on sound scientific basis to disseminate accurate, reliable and updated information on the environmental quality of Hyderabad City at the click of the mouse, which immensely helps in creating the environmental awareness among citizens as well as guiding the framework of policy-makers.

**5. Environmental aspects of Pennar River delta using Remote Sensing and GIS techniques., Ministry of Water Resources, Govt. of India.(6.00 Lakhs)**

The project deals with the application of Remote sensing and Geographical Information Systems (GIS) technologies for the identification of salt-water intrusion zones in the Pennar river basin in the East Coast of India. An assessment has been made to quantify the level of seawater intrusion by analyzing the water

quality data, and integrating it with remote sensing data and field data on GIS platform. A map showing the spatial distribution of salinity with total area classified into fresh, slightly saline and moderately saline zones is prepared. Integrating field studies, Hydrochemical analysis, Remote Sensing and GIS technologies, a methodology has been developed for Identification of Saline Water Intrusion zones, which is tested, finalized and validated.

**6. Development of a method for Environmental Impact Assessment (EIA) of pipeline alignment surveys using remotely sensed data and GIS integration., Sponsored by University Grants Commission, Govt. of India. (Rs.3.60 lakhs)**

This project deals with the application of IRS-LISS data and GIS techniques for siting pipeline alignment from Patancheru to Balnagar of Hyderabad district, Andhra Pradesh with an emphasis on the development of EIA methodology for siting pipeline alignment. A dynamic methodology for locating a cost effective pipeline route based on Remote Sensing and GIS, assisted by land use / land cover type, wetland distribution and proximity to other environmentally sensitive resources and a Query Based Decision Support System (QBDSS), namely Least Cost Pathway Analysis Model have been developed in this project. The work has focused on integrating technologies to support the multiobjective analysis and a rule-based expert system to facilitate and improve the choice of multiobjective programming weights to be used in a operational model. The *Query Based Decision Support System* developed is an application that has different kinds of features for deducing different results and to locate different queries on varied earth features.

**7. Development of Decision Support System (DSS) for Identification of solid waste disposal sites in Hyderabad using Remote Sensing and GIS., Sponsored by All India Council for Technical Education. (Rs.6.00 lakhs)**

The role of GIS techniques in mapping and analyzing the thematic layers prepared from remote sensing data for identification of suitable solid waste disposal site is demonstrated in this project. This study also demonstrates how the required *In*

*Situ* data and Remotely Sensed data can be placed in a GIS system to model and identify waste disposal sites for Hyderabad City. The methodology developed for finding a suitable waste disposal site gives information regarding the existing solid waste disposal sites in and around Hyderabad and will also provide probable sites suitable for waste disposal in Hyderabad. The DSS developed is very much useful for decision makers, who are involved in MCH and urban developmental activities. The infrastructure developed in this programme can be used to take up consultancy work for solid waste disposal siting, treatment of different types of industrial effluents, soil analysis for industrial estate etc. The importance of Remote sensing, GIS and GPS technologies that offer a rapid and economic way to find out the suitable site for solid waste disposal is demonstrated in this project.

**8. Industrial pollution prevention project of Hyderabad district. Sponsored by Andhra Pradesh Pollution Control Board.(Rs.0.50 lakhs)**

The project involved preparation of 31 different thematic layers and production of their soft copy for identification of a site suitable for setting up an industry in Hyderabad district. In order to prepare suitability map for siting an industry in Hyderabad District, sensitive zone map, air pollution sensitivity map, surface and ground water pollution sensitivity maps are derived as per Central Pollution Control Board guidelines. Three integrated maps are prepared for delineation of risk areas. The sensitive zone (physical features) map is further superimposed on air pollution sensitivity map, surface water pollution sensitivity map, and ground water pollution sensitivity map using overlay analysis, buffering techniques and decision matrices. The cursory examination of these “*risk area maps*” revealed that the risk of siting either air polluting or water polluting industries and / or any other activity that leads to ground water contamination is alarmingly high, hence should not at all be allowed in Hyderabad District.

**9. Creation of Maripeda Mandal Information System. Sponsored by DRDA, Velugu Project, Government of Andhra Pradesh, Warangal.(Rs.1.50 lakhs)**

This project involves the development of an information system using GIS and Visual Basic for presenting the spatial and aspatial information of the Maripeda Mandal of Warangal district. The existing land and water resources, cropping patterns, etc. are studied and mapped using remote sensing and GIS techniques. Various thematic layers like base map, transport & settlement map, village map, contour map, drainage map, soil map, land use / land cover map, geomorphology map, groundwater prospects map, environmental quality map and map showing demographic details etc. are all prepared and linked to the information system. This decision support system gives the detailed information about the Mandal with respect to different parameters like socio profile, agricultural practices, ground water, soil, rock structure, population, etc., displayed in the form of both maps and data. It helps in decision-Making, helps in report generation and for updating with the data from time to time and is user friendly.

**10. Development of 1 meter contour for HNSS (Package 35) Reservoir. Sponsored by RMN & GVR Joint ventures Engineers and Contractors, Hyderabad, Andhra Pradesh, India.(Rs.1.20 lakhs)**

This project is designed with the aim of identifying the command ayacut and plan the distributary system in the required contour to feed the ayacut identified areas. It is also aimed at estimating the Jeedipalli reservoir capacity through development of one-meter contour plan using Differential Global Positioning System (DGPS).

**11. Development of 1 meter contour for HNSS Ayacut area (Package 34),. Sponsored by Reddy Veeranna Constructions Private, Bangalore, Karnataka, India(Rs.10.00 lakhs)**

This project is designed with the aim of identifying the command ayacut and plan the distributary system in the required contour to feed the ayacut identified areas through development of one-meter contour plan using DGPS. The one-meter contour map thus prepared is overlaid on the village level cadastral maps to plan the canal system for irrigation purpose. This contour map also helps in identification of hilly terrain, plain lands, village locations and drainage systems.

Wastelands are also identified from the satellite imagery and further overlaid on cadastral maps in order to identify the irrigability land and wasteland.

**12. Development of Integrated Irrigation Information Systems (IIS) for a part of Nagarjunasagar Command Area, Andhra Pradesh using Remote Sensing, GIS, GPS and field studies., Sponsored by Ministry of Water Resources, Govt. of India.((Rs.36.50 lakhs)**

This project aims at supporting the Govt. of Andhra Pradesh in planning, coordinating and developing interventions in the irrigation sector of Nagarjuna Sagar command area. The expected output of the project is an “Integrated Irrigation Information System (IIS): a computer base model” using Remote Sensing GIS, GPS and field studies. This project is designed to meet specific objectives of examining and analyzing spatial information related to present irrigation practices in Nagarjuna Sagar command area. In this project spatial and attribute database are generated which are further used to develop crop yield prediction model, calculate the agricultural productivity index, net primary productivity etc. Finally an Integrated Irrigation Information System (IIS) consisting of project data module and irrigation management module will be generated using GIS.

**13. Development of a GIS Based Decision Support System for Optimal Route Analysis for Transportation of Solid Waste., Sponsored by UGC, New Delhi.(Rs.5.85 lakhs)**

This project aims at developing a decision support system for finding a suitable route for transportation of solid waste in Hyderabad using remote sensing, GIS and GPS technologies. It gives information regarding the existing solid waste collection points, existing waste disposal sites in and around Hyderabad, detailed transportation network of the city and probable routes suitable for transportation of wastes. The methodology developed will be very much useful for those involved in Municipal Corporations and urban developmental activities. State road transport corporations can also use the infrastructure developed in this programme for finding the shortest route to reach a particular destination.



**14. A pilot study on impact assessment of water conservation programme (Watershed and Neeru-Meeru) of Government of Andhra Pradesh: A scientific approach. Sponsored by Ministry of Rural Development, Govt. of A.P. (Academic Project)**

The concept of Neeru-Meeru programme has been developed by Govt. of A.P. with the motto of promoting conservation and utilization of water resources. The programme envisages creation of awareness amongst people for ensuring their participation in land and water resource management. Prioritization of the areas has been carried out to execute the water conservation and soil moisture retention activities based on field data. An attempt has been made in this project to carry out a pilot study for evaluation of the impact of Neeru-Meeru programme employing remote sensing and GIS techniques for a semi-arid, rainfed drainage basin of Vemuleru watershed of Prakasam district in A.P. Different thematic layers viz., LU/LC, Hydrogeomorphology, NDVI etc. are generated and a comparative land use/ land cover status of the watershed for the years 1997 and 2001 is developed keeping in view the status of pre and post launching of Neeru-Meeru programme.

**15. An integrated approach on Cherial Watershed management using remote sensing and GIS(Academic project)**

The project focuses at developing an integrated model for the chronically drought prone area of Cherial watershed in Warangal district of Andhra Pradesh using Remote sensing and GIS techniques. The model explores and suggests cost-effective and sustainable methods of increasing the crop yield by increasing the ground water potential artificially. The main objective of the study is to evaluate both surface and groundwater resources in the region and develop methods for its efficient utilization and sustainable management. The thematic layers are derived from IRS-ID PAN + LISS-III merged satellite imagery and Survey of India (SOI) topomaps using visual interpretation technique and further integrated for the generation of final action plan maps for water and land resources development. Effective soil and water conservation measures are recommended to increase the subsurface aquifer capacity. The hydrological model developed aims for optimum development of water resources required to meet basic minimum needs of farmers

thereby improving their socio-economic conditions and helps in evolving a broad national policy which can be applied by decision makers for sustainable development of any given watershed area.

#### **16 Evaluation of impacts of land use changes on ground water quality of a part of Hyderabad city using remote sensing, GIS and in situ studies(Academic project)**

Spatial variation of deteriorating environmental quality with respect to ground water pollution and the role of GIS in effective assessment and mapping of ground water pollution patterns and monitoring its trends in Hyderabad metropolis are the key features of this project. The methodology developed explores the correlation between the concentration levels of pollutants in urban ground water and urban land use and highlights the impacts of urban growth, population increase and land use/land cover changes on the water quality status of Hyderabad city. The study concludes that there exists a linear and positive correlation between, the impacts of land use changes and poor groundwater quality in most of the areas under MCH in all the 4 major classes of landuse viz. Residential, Waste land, Agricultural and Industrial areas. Based on the identified impacts, appropriate long-term and short-term strategies for improving the groundwater table and quality in stress areas are suggested for environmental management.

#### **17 . Multi-Criteria Decision Support System For Optimum Management of Solid Waste : (Pilot study )**

A Multi-Criteria Decision Support System (MCDSS) is developed in this study, which is the first broad, multi-criteria methodology for solid waste planning designed for the towns and municipalities in Medak district. The project involves examining the status of solid waste generation in municipalities of major towns of Medak District by assessing the existing solid waste management system, creation of digital database derived from different sources and other related organizations on ArcGIS platform to develop multi criteria Decision Support System (DSS) for optimal management of solid waste. It also involves design and development of DSS comprising of data management module, data validation and analysis

module, module that is capable of analyzing the generated data in to deferent categories, transfer station capacity module, module that calculates Site Sensitivity Index (SSI), and selection criteria for disposal site evaluation and finally to apply this MCDSS on Medak district, for its applicability so as to generalize the conceptual methodology for other areas which have analogous environmental settings.

#### **18. Application of Remote Sensing and GIS on Landslide Investigation in the Kohima Area of Nagaland( Study conducted for Nagaland Government)**

This research work is designed with the broad objective to develop a digital landslide hazard zonation, vulnerability and risk maps for Kohima area, Nagaland. The development of these maps is mainly based on integrated study of various geo-environmental and terrain parameters, demographic, meteorological, historical landslides events and related filed data. All these parameters are derived from different databases created through the analysis of satellite data, like IRS ID LISS III and PAN, Survey of India toposheets, field data, GPS data and collateral data collected from various Departments. To carry out an integrated study, Landslide Hazard Evaluation Factor [LHEF] rating scheme is generated and hence rating of each one of the above factors is combined to compute the Total Estimated Hazard [TEHD] rating. Considering these TEHD values, the entire study area is categorized as very low, low, medium and high hazard zone which is an evident by the field data on landslides.

#### **19. Poverty Alleviation and Socio-Economic Development Through Protection of Natural Resources Using Remote Sensing and GIS of Prakasam District, Andhra Pradesh, India (Academic interest)**

Socio-economic conditions of most of the rural areas are below average level of development, especially in Andhra Pradesh. Major developmental activities have to be taken up for the upliftment of these conditions. Therefore an attempt has been made to develop and manage watersheds for this purpose in Racherla watershed of Prakasam district of Andhra Pradesh, India. Innovative technologies like remote sensing and GIS have been applied for better interpretation. A special

emphasis is laid on the development of action plan for land and water resources, which are mainly based on the land use/ land cover, geomorphology and slope of the area. From the final output of the themes generated, percolation tank and check dams are recommended in the study area mainly to control sedimentation from the catchment. To increase the groundwater recharge and to control soil erosion, other hydraulic structures like water harvesting ponds, contour bunds, gully plugs, bank protection etc. is recommended.

**20. Development of Remote Sensing and GIS based Information System for Village level planning: A Pilot Study of Prakasam District, Andhra Pradesh, Sponsored by NRDMS, Department of Science and Technology (DST).(Rs.133 Lakhs)**

This project aims at developing a standardized database for Landuse/Land Cover on 1:10,000 scale for object oriented mapping of Prakasam district on the basis of open geospatial consortium (OGC) standards. It gives database of Prakasam district with the modules to create a Village Information System (VIS) using web services, which is user interactive for broad-based information retrieval and query on natural spatial and non-spatial database. The methodology developed will be very much useful for resource planning and inquiry based information and for easy administration. Development of this data model for village level information is based on the hypothesis that completely embedding all the information (spatial and non spatial) at village level within the GIS would significantly improve the user-friendliness and interactive and having the village information available on the web would make it remotely accessible to a diverse cadre of users (public, administrative people, resource planners, and others). Thus, a user-friendly, web based, interactive, event-based information system is been developed.

**20. Development of Integrated Irrigation Information System (IIS) for Nagarjuna Sagar Command Area, Andhra Pradesh using Remote Sensing, GIS, GPS and Field Studies (Under INCID Programme). Sponsored by Ministry of Water Resources (MoWR)**

Integrated Irrigation Information System (IIIS) has been designed and implemented for supporting the irrigation authorities in its efforts to improve the performance of the existing systems through their management and operating activities. It integrates database, a set of application modules and user interfaces. This IIIS is intended to support the activities required for an efficient management of an irrigation system, such as planning for the coming season. During the irrigation season the actual data of the system is regularly monitored, so that the actual operation scheduled can be updated. The present IIIS satisfies a requirement for a simple approach and the necessity to represent the actual irrigation situation. Different models are included for the irrigation water demand. A set of programs that will facilitate the management tasks of irrigation systems have been developed under Integrated Irrigation Information System. Such a set should not be limited to water aspects but to all the major issues of day-to-day management activities and shall also include crop production, control of maintenance, water fees and other relevant tasks. The aim of an Irrigation system is to provide the amount of water that is necessary for an optimal growth and production of the actual crops applied in the field. The adjustment of the actual crop water demand to the available or expected supply of water is one of the tasks with which the irrigation authority has to cope. National level, Basin level, Command area level.

## **22. Development of Land Suitability model for irrigation management of Addanki branch canal command area, Andhra Pradesh using remote Sensing, GIS, GPS and field studies.**

Land Suitability or Evaluation is a tool to be used in planning process and should be feasible in order to meet changing conditions and requirement. The result will assist the planners and decision makers in their selection of land use alternatives so that available resource may be used most beneficially for development and **“A Systematic Approach”** for land suitability pattern shows how man uses the land and how best he can plan its future use. Information on land use permits a better understanding of the land utilization aspects on cropping pattern, fallow land, forest wastelands, surface and ground water, land capability, soil characteristics etc which are very vital for development planning and also for **“Optimal land use Planning”** for sustained efforts and renewed economic returns.

### **23. Development of Kolleru lake Geospatial Information System (KLGIS) Sponsored by NRDMS & NSDI Department of Science and Technology (DST)**

Situated between the Krishna and Godavari deltaic systems (between 16°32' and 16°47'N latitude and 81°05' and 81°27'E longitude) and about 35 km from the coastline, Kolleru Lake is a unique wetland water body. It is a freshwater wetland receiving waters from Budameru, Tammileru and Ramileru rivers in addition to the Godavari and Krishna irrigation canal system and about 15 major drains. The catchment area of the lake comprises approximately 4760 sq. km. The lake water is mainly used for domestic purpose, agriculture, fishing and aquaculture purposes. Rich in flora and fauna, it attracts migratory birds from Australia, Siberia, Egypt and Philippines between the months of October and March. During this season, the lake is visited by an estimated 2,00,000 birds. The lake is facing an ecological crisis as it is situated in the delta. Surrounding industrial and agricultural activities, aquaculture practices and municipal waste discharge from surrounding villages have deteriorated the lake environment. Keeping in view the importance of Lake Kolleru and its ecosystem, this project aims to create the database and development of data model to map the spatial dimensions and monitor the aspatial characteristics of the lake and its catchment area and develop a Geospatial Information System using the advanced technology of remote sensing, GIS, GPS and in situ methods.

### **24. HYPERSPECTRAL SIGNATURE: DATA MANAGEMENT SYSTEM**

The sensors working in hyperspectral region (400 – 2500nm) provide high spectral resolution data, which can bring out diagnostic features with better discrimination. The hyperspectral imaging combines conventional imaging, spectroscopy, and radiometry to produce images with spatial resolution element (pixel). The measurement of spectral signatures and calibration of ground reflectance (influence of solar illumination, atmospheric effects such as attenuation and scatter and uncorrected band to band instrument response functions) enable a better discrimination of surface features in the hyperspectral satellite data i.e., identification, masking and description of earth resources and manmade structures on the earth surface. This can be done using high Spectral Resolution Spectral Radiometer. This Instrument records the values of the data and can be converted to radiometric quantities through proper calibration that are related to the scene phenomenology (e.g., radiance, reflectance,

emissivity, etc.). The technique provides a link to spatial and spectral analytical models, spectral libraries, to support various environmental applications.

The applications of these hyperspectral signature techniques are ranging from earth remote sensing to early cancer detection and tissue analysis in biotechnology. The hyperspectral signature technologies have been applied in lithological mapping, geobotanical mapping, development of algorithms and related information products in exploration geology, environmental monitoring and assessment, agriculture (Crop Health Monitoring), wetlands, manufacturing (Advanced Manufacturing Technology), medical photo diagnosis imaging (Small Target Detection & Search and Rescue Operations), camouflage detection and land mine detection, counterfeit currency and cannabis detection, emergency response & plume tracking, battle field monitoring of CB agents, detection of illicit drug manufacturing by products, Non native plant species detection, coastal studies, oil detection, vegetation species mapping, vegetation stress identification, water quality assessment, sediment composition maps, coral reefs monitoring, vegetation mapping for studying the biodiversity in nature reserves, managing recreational parks, spatial planning, preventive detection of fire risk etc. Whenever a high level of detail of the composition of remote objects on the Earth's surface is required, such as environmental site characterization where a quantitative knowledge of contaminant distribution and/or surface properties is necessary, hyper spectral image analysis is appropriate. Hyper spectral image analysis is also well-suited to natural resource management, exploration and extraction, where the principal objective is to identify, map or produce specific minerals or rock types. In the case of petroleum exploration, the goal might be to map surface distributions of rocks with certain characteristics (e.g., organic content, porosity, etc.) and then tie that information with subsurface data. Forestry, agricultural and ecosystems analyses - where differentiations between species and levels of plant health within species are made - also can benefit from the application of hyper spectral image analysis. The utility of hyperspectral analysis extends far beyond the realm of the earth sciences. In military and intelligence applications, hyperspectral imagery can add confidence to interpretations based on very high spatial resolution data. A commander using hyperspectral data to plan a military operation has the potential to more accurately assess target identity, attributes and defenses than one using more conventional forms of remote sensing.

For this capability and above said applications, the need exists for advanced calibration artifacts to improve measurement accuracies in a wide variety of applications, ranging from basic colorimetric characterization to remote sensing radiometry. This is the time to develop and maintain different sets of calibration artifacts for each type of calibration, or for each anticipated application of an instrument. It is essential to develop a well-populated spectral library, which is to be accessible in a user-friendly way. Success in the use of this quantitative measurement technology would provide a quantum leap in enabling Indian Information Superior during peace and war periods. With the threat of terrorists at hand, we need all the data to be available in the laboratory. Spectral signatures of chemical and biological materials could be used in the remote spectral sensing of chemical and biological agents in the field. In addition, Laboratory spectral measurements (special spectral databases) at certain temperature have to be produced for the intelligence purpose, community in general and other customers. In India, spectral signature database systems are currently inadequate and need to develop it further. The laboratory and field spectral measurements (reflectance, emittance, and luminescence) of different natural resources and man-made materials are to be generated as hard copy and soft copy.

Understanding the potential applications of this technology for civilian use, these can also be used for various military applications. The NRDMS has formulated mega project named as **“HYPER SPECTRAL SIGNATURE STUDIES: APPLICATIONS AND DATABASE MANAGEMENT SYSTEM”**, In order to fulfill the objectives of this project.

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14. A detailed statistical study on selection of optimum IRS LISS pixel configuration for development of water quality methods, **IJRS**, vol.9, (res. 120320), 1997.
15. Water quality modeling of Gautami-Godavari river estuary using IRS 1B satellite data, **Procd's of int'l. conference on RIVER TECH.96, IWRA, USA.**
16. Water quality and spatial distribution of pollutants sources of large water bodies and evaluation of performed mitigation programmers, **procd's of int'l conference, Stockholm Water Company, Sweden, 1997.**
17. Development of effective image classifier for landuse / landcover, Geosciences, **IIT Kanpur press, India, 1997.**
18. Remote sensing for water quality modeling, **procd's of national conference, ISRS, India, 1997.**
19. Erosion intensity mapping as a key for environmental planning thru Remote Sensing and GIS, **procd's of int'l conference ICIPACT-1997**
20. Remote sensing for the estimation of suspended sediments in Sriramsagar reservoir at FRL, **procd's of int'l conference ICIPACT-1997.**
21. Socioeconomic development through watershed management using remote sensing and GIS techniques, **procd's of conference GWR-1998, India.**

22. Remote sensing and GIS for jurreru watershed management, **procd's of national conference on water resources, BH University, India, 1998.**
23. Water supply distribution of Hyderabad, India, a remote sensing and GIS based case study, procd's of 9<sup>th</sup> Stockholm water symposium Sweden, 1999.
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32. Remote Sensing and GIS for watershed management, **procd's of ICIPACT-2001, JNTU, 2001.**
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44. Impact Assessment of “Neeru – Meeru” programme of Andhra Pradesh Government – A scientific approach, procd's of **National Seminar on GIS applications in microlevel planning**, NIRD, Hyderabad – 2002.
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47. Monitoring of Temporal Changes in Land use/ Land cover using IRS ID merged data: A cast study form a Typical Aquatic Region of Kakinada bay,

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52. Development of Decision Support System (DSS) for selection of garbage disposal sites using Remote Sensing and GIS – A case study of Hyderabad city, India., at **30<sup>th</sup> International Symposium on Remote Sensing of Environment held in Honalulu, Hawaii, USA** from November 10<sup>th</sup> to 14<sup>th</sup>, 2003.
53. “Remote sensing applications for the management of water and land resources in rainfed area of Prakasam district, Andhra Pradesh, India” published in **Journal of Environmental Informatics Archives**, Volume 2 (2004), pp 885-892.
54. “Geoinformatics for Selection of Solid Waste Disposal Sites” published in **Geospatial Today**, Vol 3, Issue 3, Oct 2004.

55. "Assessment And Mapping Of Water Pollution Indices In Zone-III Of Municipal Corporation Of Hyderabad Using Remote Sensing And Geographic Information System" published in the **Journal of Environmental Science and Engineering**, Volume 47 No.1, January 2005.
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57. "Role of Remote Sensing and GIS in Assessment and Mapping of Groundwater Contamination in Municipal Corporation of Hyderabad (Zone – VI), Andhra Pradesh, India" (In Press) accepted for publication in the **Asian Journal of Microbiology, Biotechnology and Environmental Science** in the Issue 4 of year 2005.
58. "Integrated Approach For Sustainable Management Of Land And Water Environment In Shivannagudem Watershed Using Remote Sensing And GIS" (In Press) accepted for publication in the **Asian Journal of Microbiology, Biotechnology and Environmental Science** in Issue 2 of year 2006.
59. "Solid Waste Disposal Site Selection Using Analytical Hierarchy Process And Geographical Information System" (In Press) accepted for publication in the **Journal of Pollution Research** in Issue 1 of year 2006.
60. "Correlation study of ground water quality and land use / land cover in Hyderabad city through integrated remote sensing and GIS: A case study from Indian sub-continent" accepted for publication in **the International Journal of Remote Sensing**.
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63. “Remote Sensing and GIS Techniques for Evaluation of Impact of Land Use / Land Cover on Groundwater Quality - A Case Study of Hyderabad City, India” accepted for publication in **Geospatial Today**.
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67. “Analytical Hierarchy Process (AHP) – GIS Model For Landfill Siting: A Case Study Of Hyderabad City, India” International Conference on Environmental Management (**ICEM-2005**) from 28<sup>th</sup> to 30<sup>th</sup> October, Hyderabad, 2005.
68. “Modeling the effects of saline water intrusion dynamics in lower pennar basin” International Conference on Environmental Management (**ICEM-2005**) from 28<sup>th</sup> to 30<sup>th</sup> October, Hyderabad, 2005.
69. “Quality assessment of groundwater in coastal aquifers for irrigation of lower pennar basin” , Nellore Dt, AP, India. International Conference on Environmental Management (**ICEM-2005**) from 28<sup>th</sup> to 30<sup>th</sup> October, Hyderabad, 2005.



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published in the **Asian Journal of Microbiology, biotechnology and Environmental Science .vol.8,no(3):2006:489-498.**

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88. “Integrated Ground water prospects analysis using Remote Sensing And Gis Techniques” Published in the **Journal of current sciences. Voal.10 NO(1) : 2007**
89. “Spatial Distribution Mappping of Ground water Quality using Remote Sensing and GIS – A Case study of Hyderabad city Andhra Pradesh, India,” published in the **Journal of Ecology Environment and conservation. . Voal.13NO(3) : 2007;PP.(5-11)**
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91. “Optimum Utilization Of Water Resources For Effective Irrigation Management Using Remote Sensing And GIS – A Case Study” Accepted for

publication in the **Journal of Nature, Environment and pollution Technology, Voal.6 NO(4),PP 573-582 : 2007**

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**93.** “Creation of Ambient Air quality information in a rapidly growing industrial centre using Remote sensing & GIS –A noval study” Accepted for Publication in the **International journal of Industrial pollution control, issue No.(1)2008.**

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**95.** .“Integrated Approach for Water Resources Development in Drought Prone Areas of Warangal District Using Remote Sensing and Geographical Information System (GIS)”. Accepted for Publication in the **Journal of Environmental Ecoplanning,Volume.14,No(3)2007.**

### **Technical Visits Abroad**

Visited the following international institutions and instrumental to make Memorandum of Understanding (MOU) for teaching research and to conduct common courses for the benefit of students, staff and scholars.

- University of Illinois, Chicago, USA., 1996
- Stockholm water Company, Stockholm, Sweden 1996
- University of IOWA, USA., 1999
- University of Chicago, Urbana, Chicago, 1999
- International Centre for Environmental Management for Enclosed Coastal Seas, Kobe city, Japan, 2001

- East West Centre, University of Hawaii, Honolulu, Hawaii, U.S.A, 2003
- University of Philadelphia ,U S A ,2007
- University of Florida ,Gainsville U S A 2007
- Colorado University Denver U S A 2007

**Member of Statutory / Expert committee/Technical/Professional bodies.**

- Chairman, A.P State level Expert Appraisal Committee (SEAC) of State Environmental Impact Assessment Authority(SEIAA)of Min.of Environment & Forests, GOI
- Chairman ,Board of Studies ,Environment ,JNTU
- Executive Council, JNT University, Hyderabad.
- Member DST Government of India
- Member, BOS, Environmental Science and Technology, JNT University Hyderabad.
- Member, Board of Studies, Environmental Science and Technology, Gulbarga University, Gulbarga, Karnataka.
- Technical Member, World Bank funded GIS project-IIIP,
- Member, Board of Studies, Bangalore University, India
- Member, Board of Studies, Sri Venkateswara University.
- Member, Indian Society for Technical Education
- Member ,Indian Society for Water Resources
- Member, Indian Society for Hydrologists
- Member, Indian Society for Remote Sensing.
- Member, Indian Science Congress
- Member D S T N R D M S Working Group for major projects namely
  - i)Hyper spectral Signature Database Creation
  - ii) Data Model Development on 1:10000 scale.
  - iii) Science plan for Kolleru Lake Restoration
- Member ,Technical expert committee, Women Scientist Scheme DST
- Member, National committee on Restoration of Village Ponds and Management NRDMS DST Government of India.

### **Software Expertise**

- Remote Sensing: ERDAS, GEOMATICA, ENVI, e-Cognition
- GIS: Arc/ Info, Arc View. ARC.GIS, Spans, MapInfo; Mobile Mapping
- CAD: AutoCAD Map, Micro station.
- Photogrammetry: Leica digital Photogrammetry ,DAT/EM
- Modeling: Mikeshi, Modflow, Statistical: Sysstat, Minitab
- Experienced in developing software for E-Governance