

# CONTACT

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**INDIAN INSTITUTE OF REMOTE SENSING**  
(National Remote Sensing Agency)

Dehradun

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*iirs newsletter*

## **Editorial Column**

Hello ! IIRS alumni. Yet another colourful issue of CONTACT is in front of you. In the last six months many new activities have started in IIRS, - new buildings, new courses, new projects, new infrastructure and facilities. IIRS is now in the capital of new state of Uttaranchal. Our efforts to develop a close contact with IIRS alumni and users have started taking a shape. We have received a few letters from them. Therefore, two new columns—“Alumni Response” and “User’s Corner” have been included in this issue.

CONTACT welcomes short articles and achievements of alumni to enrich the objective of IIRS as well as CONTACT. So please keep writing to us.

With good wishes.....”

**Editor**

*“Promote and pursue professional excellence through education and training in the field of Remote Sensing and Geoinformatics, integrate research, user dialogues and field experiences in natural resources survey, mapping and environmental management for sustainable development; establish inter-disciplinary interface including concern for socio-economic considerations for assessing, managing and development of natural resources are goals of IIRS”*

## **EDITORIAL COMMITTEE**

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## **Managing Disasters through Remote Sensing and GIS**

Natural Disasters such as floods, hurricanes, landslides, earthquakes can wipeout mankind by destroying infrastructure, agriculture, plants and by killing people and animals. Wars have similar consequences too! Natural Disaster can not be averted but the impact on mankind can be reduced drastically by prevention, prediction and proper management of Disaster.

Remote Sensing and GIS provides a database from which the evidence left behind by disasters that have occurred before can be interpreted and combined with other information to arrive at disaster prone area map. Satellite images give a synoptic overview and provide very useful environmental information, for a wide range of scales, from entire continent to small area, moreover, many types of natural hazards namely floods, drought, cyclones, volcanic eruption etc. will have certain precursors. The satellite can detect the early stages of these events as anomalies in a time series. Images are available through the Indian Satellites (IRS-series) at regular short time intervals, and can be used for the prediction of disasters.

IIRS is now gearing up to start new, short as well as long duration, training programmes in Disaster Management from year 2001.



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### The Meeting of Advisory Committee and Governing Board of UN Centre for Space Science & Technology Education for Asia & the Pacific Region

The Second Advisory Committee Meeting was held on 4th July, 2000 in IIRS Campus. The meeting was chaired by Dr. Mazlan Othman, the Director of UN-OOSA, Vienna. The Committee appreciated the academic excellence of the Centre's educational programmes. Then on 6th July, 2000 the meeting of the Governing Board was also held. The Governing Board meeting was chaired by Dr. K. Kasturirangan, Chairman, Indian Space Commission and Chairman the Governing Board. The Governing Board extended its wholehearted support to the progressing activities of the Centre.

### A NEW LOOK IIRS TECHNICAL LIBRARY

IIRS Central Technical Library got a fillip on 5th July, 2000 when Dr. D.P. Rao, Director, National Remote Sensing Agency, Hyderabad inaugurated the renovated library. In the library 195 sq. mt. of covered area has been added. For the benefit of the readers the activities have been divided into different sections viz., Book/documents section, Journal/periodical Section, General Reading Hall, Serious Reading Section, Display Section, Circulation/issued return section, Documentation and Information Section. Entire library is now air-conditioned support by DG-power supply. Arrangement / shelving of books is now as per Dewy Decision Classification System. Accessibility is by computer Libsys Programmer basis.

### HIGHLIGHTS

- ❖ Accession of book on your finger tips (computerized)
- ❖ Libsys programme
- ❖ Xerox facility
- ❖ Intercom / e-mail
- ❖ Audio-Video facility
- ❖ DG-Power supply
- ❖ More than 10,000 books on RS, GIS and its applications
- ❖ International and National Journals Related to RS and GIS
- ❖ Fully air conditioned.



### SPECIAL TRAINING

Under the aegis of National Natural Resource Management System (NNRMS) the Indian Institute of Remote Sensing every year organises special short courses of 4 to 8 weeks duration in various disciplines. This year the following courses were organised for university/college faculties.

<input type="checkbox"/> Cartography & Mapping	06	participants
<input type="checkbox"/> Forestry & Ecology		20 participants
<input type="checkbox"/> Water Resources		12 participants
<input type="checkbox"/> Geoinformatics		14 participants

The basic aim of these courses is to appraise the teaching staff of various universities / institutes about the role of remote sensing and GIS technology and help them to introduce these in their course curriculum as well as to encourage the use of these technologies in research work.



# IIRS RESEARCH PROJECTS

*GIS aided land evaluation modelling based on biophysical characteristics using temporal remote sensing data*

Land evaluation is the process of predicting the potential use of land on the basis of its attributes. Better use of land resources demands appropriate information related to biophysical parameters of terrestrial surface. A variety of analytical models can be used in these predictions. But these models are purely based on physical characteristics of soil and land. These evaluation results sometimes do not correspond to actual performance being achieved at site due to better crop management. Thus, land evaluation models should consider biophysical attributes of land surface besides physical characteristics. Biophysical characterization of various LUTs are now possible by the availability of temporal and high resolution remote sensing data on spatial basis.

The present study is being carried out by Agriculture & Soils Division of IIRS with the objectives of (i) to characterize biophysical environment for various land utilization types, (ii) to incorporate biophysical parameters derived from temporal remote sensing data in land evaluation to improve land evaluation results (iii) to develop GIS methodology based on biophysical attributes in assessing land suitability for various LUTs.

## SOFTWARE DEVELOPMENT

### *Development-Crop Production Model (SW-CROP) Software*

The software (SW-Crop) module for the computation of soil – water – crop production model has been designed in the Agriculture & Soils Division of IIRS, using the language “Turbo C” and “Visual Basic 5.0”. This SW-CROP software integrates both soil – water balance and crop yield estimation routines. This software allows users to compute decade wise maximum crop evapotranspirations based on Penman – Montaiith, growth stage specific water balance components and finally water limited yield potential based on multiplicative Stewart model.

### *Soil Erosion Risk Assessment Using RS & GIS Techniques*

Modelling soil degradation is of great value in assessing regional environmental impact assessment. A study was under taken on mapping soil erosion process on a watershed basis. Both deterministic USLE and process based model, Morgan model, were compared for soil erosion assessment using satellite data and GIS technology. It was found that soil loss estimation is much higher under almost all terrain and vegetation cover conditions by USLE than process based Morgan model. USLE derived average soil loss is 3.3 tons/ha/yr among different micro watershed. While soil loss estimated using Morgan model ranges from 15.4 to 37.1 tons/ha/yr among different watershed.

### *Assessment of Water limited Yield Potentials – a GIS Approach*

A study was under taken as R & D activities using modern tools such as RS & GIS together with soil – water – crop modelling. These system tools have been found promising in spatially assessing water limited yield potential and extent of water deficit in rainfed agriculture. This information would support regional Agro meteorological Information Systems to help farmers’ decision on irrigation.

The water limited yield potentials obtained in the range of 50.2 to 67.3% and 32.2 to 62.0% of maximum yield potential of sugarcane and paddy, respectively.

Whereas yield levels of maize has not so far been limited due to seasonal water availability.

## *Readers’ Corner*

I had an opportunity to read CONTACT Newsletter of IIRS, March 2000 issue, and found it very interesting and informative. I feel that this newsletter would be useful to our faculty and post-graduate students working in Remote Sensing and GIS areas.

**Dr. P.K. Garg**

*Coordinator, Centre for Remote Sensing, Deptt. Of Civil Engineering, University of Roorkee, Roorkee*



## TRAINING IN REMOTE SENSING AND GIS AND ROLE OF IIRS

Remote Sensing (RS) and Geographic Information System (GIS) technology have progressively expanded their application areas in urban and regional planning, utilities planning, etc. Currently, the data generated from IRS IC & ID with 5.8 metres resolution in panchromatic mode is quite useful and future satellites planned for higher resolutions would further increase application area. However, to encourage the large scale use of this data the constraints are non availability of trained technical personnel besides finances for setting up facilities. For trained manpower major constraints are inadequate and un-coordinated training facilities.

The Town & Country Planning Organization under the Ministry of Urban Development & Poverty Alleviation is involved in the development of Urban and Regional Information System (URIS) at the Central, State and Local levels since 1971. To promote this concept, this organization, has been continuously striving to update the skill of town planners in the country through pilot studies and training. In 1989, TCPO setup an Urban & Regional Information Systems Division (URIS) and since then, a number of pilot studies have been carried out to analyse and test the present data systems including Land Information System (LIS) both at town level as well as at regional level.

TCPO has been conducting training programme periodically in various specialised fields including Geographic Information System (GIS) and Data Base Management System (DBMS). Upto now, two training programmes on DBMS and six training programmes on GIS have been conducted. In the training programme on GIS Application in Urban and Regional Planning held from 15th to 19th November, 1999, 20 participants comprising of senior and middle level officers of Town and Country Planning Departments at national and state levels, Urban Development Authorities and other allied govt. organisations participated.

TCPO is actively involved in GIS projects and has conducted a study on GIS based Information System for Regional Planning : Case study of Bharatpur District, Town level GIS Development Digital map of Lutyen's Delhi Bungalow Zone and Anand : Gujarat Town Planning Scheme GIS Database. Currently it is involved in a Pilot Project on Urban Mapping to cover 50 towns to be aerially photographed and mapped at 1:2500 scale.

A Standing Committee on Urban Management SC-U, was constituted under the National Natural Resources Management System (NNRMS) of ISRO, with the Secretary, Ministry of Urban Development, Govt. of India as its Chairman to take up new initiatives for urban areas. In its first meeting three Sub Committees viz (i) Technical Sub-committee (ii) State Department Coordination Sub-committee and (iii) Training and Human Resource Development Sub-committee were setup. Following the recommendations of the Sub Committee on Training, the town & Country Planning Organization (TCPO) organized a four weeks Training Programme on "GIS Application in Urban and Regional Planning" in collaboration with HUSAG, IIRS, Dehradun on networking basis in terms of use of facilities and specializations available with different agencies. The 4 weeks training programme was split into two weeks each for the portions covering Remote Sensing, Image Processing, etc. and GIS and Urban Applications and Project Work in the IIRS and TCPO respectively, in which 25 participants comprising of senior and middle level officers of Town and Country Planning Departments at national and state levels, Urban Development Authorities and other allied govt. organisations involved in urban and regional planning participated. Such collaborative training programme with HUSAG, IIRS, Dehradun and TCPO need to be encouraged on large scale.

**D.S. Meshram**

*Chief Planner,*

*Town & Country Planning Organization, Govt. of India  
Ministry of Urban Development & Poverty Alleviation, New Delhi*

## VISITORS

✦ Prof. Karl Harmsen, Rector, International Institute for Aero-Space Survey and Earth Sciences, Enschede, The Netherlands, visited IIRS during July 28 – August 4, 2000. He had elaborate discussions with Dean, IIRS and faculty of various divisions of IIRS regarding training / research/ consultancy activities. He was provided with reports / training material, in order to understand and incorporate the details in the future five year collaborative project on "Geoinformatics for Environment Assessment and Disaster Management". As a member of Advisory Committee, he also participated in the IInd Advisory Committee Meeting of Centre for Space Science and Technology Education in Asia and the Pacific (CSSTE-AP) at IIRS Campus on 4.7.2000.

✦ A Dutch team of following persons :

- Mr. Mark Noort - ITC, Enschede
- Ir. Paul Van Itofwegan – IHE, Delft
- Ms. Yola Georgiadou – ITC, Enschede
- Mr. Peter J. Van Oevalen – Wageningen University
- Mr. Geert Sterk – Wageningen University

Visited IIRS, Dehra Dun from 24th July to 28th July, 2000 for discussion on 2nd phase of a collaborative project titled "Geoinformatics for Environmental Assessment and Disaster Management".



## REPORT OF INTERNATIONAL WORKSHOP ON EARTH OBSERVATION EDUCATION AND TRAINING

Committee on Earth Observation Satellite (CEOS) is a concept and consensus opinion of about 41 members mainly from space agencies of various countries and other institutes all over the world. The 14th CEOS Plenary meeting was held in Stockholm from 10-12 November, 1999. During this an ad-hoc Working Group on Education (WG-Edu) was set up. Keeping in view, as the education holds the key to future space technology development and its applications. The first meeting of this working group on Earth Observation (EO) Education and Training was held at Indian Institute of Remote Sensing, (NRSA), Dehradun, India on 11th August 2000 proceeding the CEOS WG-Edu meeting an "International Workshop on EO Education and Training" was hosted by Indian Institute of Remote Sensing (NRSA), Dehradun.

This workshop was organised by CEOS working group on Education and Training (WG-Edu) and Indian Space Research Organization (ISRO), India and was sponsored by Asian Institute of Technology (AIT), Thailand, International Institute for Aerospace Survey and Earth Sciences (ITC), The Netherlands, United Nations Office for Outer Space Affairs (UN-OOSA), Austria, Centre for Space Science and Technology Education – Asia Pacific (CSSTE-AP), India and Indian Institute of Remote Sensing (IIRS), India.

About 29 delegates from 7 countries have participated in the workshop. The international participants were mainly from National Oceanic Atmospheric Administration (NOAA), USA, Centre for Remote Sensing, Canada, German Space Agency (DLR), ITC, The Netherlands, French Space Agency (CNES), France and GDTA, France, Asian Institute of Technology (AIT), Thailand and NASDA, Japan.

The Indian participants were from Indian Space Research Organisation (ISRO), National Remote Sensing Agency, Centre for Space Science and Technology Education – Asia Pacific (CSSTE-AP), and Indian Institute of Remote Sensing (IIRS). In addition to the above, India was represented by 4 universities which are involved in the Earth Observation (EO) education and training in India. During this workshop, about 20 technical presentations were made on the following topics. They are:

- ✧ EO Education and Training – the need for international coordination.
- ✧ Space Agency Efforts in EO Education and Training
- ✧ Institutional programme in EO education and Training
- ✧ Debate on EO Education and Training

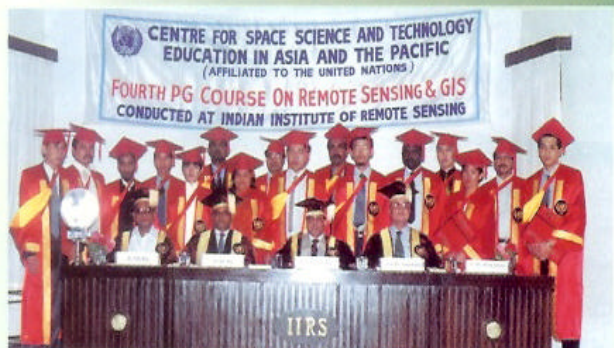
Towards the end of the workshop a Panel Discussion on "Road Map for EO Education and Training Activities" was organised. The results of the deliberations during the workshop were summarized and resulted into the following recommendations.

- Need for effective coordination mechanism of the EO Education and Training Efforts – such as space agencies could develop/promote material, teaching aids and also EO data to strengthen the educational institutes which are offering programmes on EO Education
- To keep pace with the technology trends and application needs educational institutions need to update the curricula on regular basis and also exchange of curricular information. The curriculum design should take into consideration of the region dependent socio-economic constraints to the adoption of space based technologies at the local level and emphasize on more large and community awareness of the potential benefits of "EO".
- Institutions and Universities to consider tailor made customized training programmes for professionals to support application needs. University systems may formalize the educational programmes leading to the award of degree/diplomas.
- Specific educational/training programme are essential to cover the area of global change, disaster management, sustainable development and earth processes/system science. This requires combined support of space agencies, national governments and inter-governmental institutions like IGBP, WCRP, IGOS etc.
- Training of trainers is important and institutions need to enable their faculty to acquire additional knowledge, newer skills and this could be integrated with specific training programmes or embedded into research programmes.
- Efforts are required for increasing the awareness of EO Technology and applications in different countries – especially in developing countries and a coordinated programme is essential to address this at national and international level.
- Enable the emergence of regional hubs of EO Education / training by committing support to national / international and UN regional centres. These centres can effectively enable the outreach of EO data/services/tools to the developing countries in the world.
- Involve private sector for enhancing out reach of EO education and Training activities and products





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### CSSTE-AP CONVOCATION

In a glittering ceremony on 6th July, 2000, 4th batch of RS & GIS Course consisting of seventeen participants from eleven countries received their Post Graduate Diplomas. Dr. K. Kasturirangan, Chairman, ISRO and Chairman Governing Board, CSSTE-AP was Chief Guest and gave away diploma certificate to the participants. In a packed to capacity IIRS auditorium. Dr. P.S. Roy, Dean, IIRS delivered his welcome address, while Prof. B.L. Deekshatulu, Director CSSTE-AP delivered his speech and presented a course report. Dr. D.P. Rao, Director, National Remote Sensing Agency, Hyderabad released the "Memoirs" on the occasion. Dr. K. Kasturirangan congratulated the participants in his valedictory address and proposed larger cooperation among developing countries in the field of Space Technology Applications. He assured that India will do its best to share the experience. He highlighted the importance of remote sensing and GIS technology in resources mapping and management especially in the developing countries.

#### Alumni Response.....

After undergoing training at IIRS, Dehra Dun. I encouraged and supervised a Ph.D. scholar to carry out research in "Application of Remote Sensing and GIS in Vegetation Analysis and Ecology of Godavari Valley, Warangal District, Andhra Pradesh".

**Dr. Vatsavaya S. Raju**

Associate Professor  
Deptt. Of Botany  
Kakatiya University, Warangal

Newsletter "CONTACT" helps to bring together and know all about the activities of IIRS alumni. As regards work achievements in the field of RS & GIS, I was involved in curriculum development and conducting two courses viz. "Remote Sensing Fundamentals and Agricultural Application" at Post - Graduate level and "Soil Taxonomy, Soil Survey and Remote Sensing" at Under-Graduate level. Two research projects involving use of Remote Sensing & GIS Technology in Land Resources Management are likely to be approved under NATP (ICAR)

**Dr.V.K. Sharma**

Assistant Professor  
Dept. of Soil Sciences.  
H.P. Krishi Visvidyalaya, Palampur

I am in receipt of the newsletter "CONTACT" and very much thankful to you for the same. It is indeed a very nice gesture and reminded me of the very nice time in my life I spent at IIRS Dehra Dun. I was there for my P.G. Diploma in Applications of Remote Sensing and GIS applications in Geology, Geomorphology and Hydrogeology and indeed proud to be a student of IIRS Dehadun. The duration of the course was Mar. '1996 to Jan. '1997. Immediately after coming back I was assigned a responsibility to assess the utility of a GIS software named "GRAM" developed by the C.S.R.E., I.I.T., Powai from Ground water utility point of view. After this I participated in a joint GIS Project of M.R.S.A.C., Central Ground Water Board, C.R., Nagpur and our department i.e. Groundwater Surveys and Development Agency Govt. of Maharashtra. The project was entitled "Water Source Finding in Ramtek Taluka of Nagpur District". Another such project in respect Barshi taluka of Sholapur District is in progress this time with R.R.S.S.C., Nagpur instead of M.R.S.A.C., Nagpur.

**D.B. Arkatkar**  
NAGPUR



## TRAINEES' PILOT PROJECTS

### POST GRADUATE DIPLOMA COURSE

#### *Agriculture & Soils*

- Soil Survey and Land Evaluation Using RS & GIS Techniques : A Case Study of a Part of Nasik District, Maharashtra : Man Singh.
- Crop Discrimination and Yield Prediction for Onion Using Satellite and Agro meteorological Data : Pradeep Patil.
- Application of Remote Sensing and GIS in Soil Resources Inventory and Land Evaluation : A Case Study of Part of Saharanpur District, Uttar Pradesh by G. Bhairwa & R.K. Dikshit.

#### *Human Settlement Analysis*

- Role of Remote Sensing and GIS in Solid Water Management : A Case Study of Haridwar by Prasun Ranjan.
- Wasteland Management and GIS : A change Detection Approach Using Remote Sensing and GIS : A Case Study of Haridwar by Jyotsana.
- Urban Sprawl Mapping and Landuse Distribution Study Using Remote Sensing and GIS Techniques : A Case Study of Roorkee by Dr. N.K. Shivhare.
- Land Transformation Process in Haridwar and Surrounding Using Remote Sensing and GIS by N.K. Sharma.

#### *Water Resources*

- Performance Evaluation of Irrigation Command Using Remote Sensing and GIS
- Rainfall Runoff Modelling
- Irrigation Water Supply and Demand Analysis Using Remote Sensing and GIS.

#### *Geosciences*

- The Spanish External Sierra by Kapil Khare
- RS & GIS Based Study of Tectonics and its Impact on the Mass Wasting Process Around Sundernagar – Mandi Area by T.S. Bisht & Bhajbhakre N.S.
- Mapping, Classification and Characterization of Chambal Ravines – A Case Study of Chambal Valley, M.P. by Padimini Pani.
- Change Detection and Accretion Zone Analysis in Chilka Lagoon & Surroundings by Roollee Tripathy.
- Groundwater Resources Evaluation of Song Watershed Using RS & GIS by M.K. Beg., D.K. Uma & Shail Saxena.
- Spectral Characterization for base Metal Mineralization and its Probable Extension in Udaipur District, Rajasthan by Dr. A.S. Jasrotia.

#### *Forestry and Ecology*

- Forest cover type and landuse mapping and stock estimation in Kerala forests, by Sreekumar Nair, Khomkone & Doan Hoai Nam.
- Forest management planning using remote sensing and GIS in Barbatpur range, M.P. by Sanjay Moharir.
- Biodiversity characterization at landscape level using RS & GIS in Shimla district, H.P. By Lalit Kumar & Deepshikha.
- Surface temperature mapping and detection of surface and sub-surface coal mines of Raniganj coal belt, W.B. Using RS & GIS, by Prasun Kumar Gangopadhaya
- Mapping of sal heartwood borer infested, part of Thano forest range using RS & GIS, by Gana Prakash.
- Impact analysis of coal mining of Raniganj and Asansol block, W.B. By A.K. Kaushal.

### GEOINFORMATIC COURSES :

#### *Agriculture and Soils :*

- Developing Soil Information System (SIS) for Agricultural Landuse Planning using GIS by S. Srinivas.
- Cropping System Analysis and Agro-ecological Zonation for Landuse Planning Using Temporal IRS-WiFS Data and GIS by A.V.M. Subba Rao.
- Land Capability and Land Use Adjustment for Land Use Planning Using RS & GIS – A Case Study of part of Song Watershed, by S. Mohan & V.K. Rai.

#### *Geosciences*

- Terrain Suitability Analysis : A GIS approach by S.K. Patnaik.
- Landslide Hazard Zoning using GIS Approach : A Case study of Song Catchment by A.M. Patnaik.

#### *Human Settlement Analysis :*

- Urban Facilities Analysis and Needs of New Township of Mirzapur Using GIS Technique by Sanjay Kumar Tripathi.
- Landuse and Facility Mapping Analysis of Amritsar City Using GIS Technique by Bikramjit Singh.
- Site Suitability Analysis For Urban Development : Nagpur Metropolitan Area – 1999 by J.N. Gupta.

#### *Geoinformatics Technology :*

- Change in Forest Cover of Lohardaga District and its Impact on Socio – economic Conditions of the Schedule Tribes by Richa N.K. Sharma.
- Accuracy Assessment of DEM Generated Using Soft Copy Photogrammetry Techniques and Automated Extraction of Drainage network and Watershed from DEM by Khadiya Sultana Khan.
- Change Detection of Forest Cover as a Part of Environmental Impact Assessment by M. Ram Prasad.
- Digital Atlas of Shimla District and Customization in ARC/INFO by S. Priyadarshi & Paramver Singh.
- A Study on Suitable Sites for New Fire Stations : Delhi Area by Mrs. Subhadra Kowta & Mrs. Monica Agarwal.

#### *Marine Science*

- Unesco Bilko Resource Book : An Index to Computer Based Learning Medules in Remote Sensing of Coastal Marine Environment.