

CONTACT

on mission for transferring technology through education & training



INDIAN INSTITUTE OF REMOTE SENSING
(National Remote Sensing Agency) Dehradun e-mail : dean@iirs.gov.in

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Dear Alumni,

Hello !! The past three years have seen the emergence of 'CONTACT'. We are once again amongst you with the March, 2002 issue of the IIRS Newsletter. This time IIRS is starting a new course in Remote Sensing and GIS in all thematic disciplines from March 2002 which can lead to M.Tech. It will aid to promote the ongoing professional excellence programme at the Institute.

Similarly, another new course in Geoinformatics - is being introduced from 1st July, 2002 which can lead to M.Sc. under IIRS - ITC joint logo.

We have been receiving overwhelming response from the ambassadors of IIRS, about their experiences and achievements using RS and GIS Technology. Your response is our strength. Your contribution in the form of news, achievements, small article/abstract, data information is welcome. I hope you will find Contact a useful reference about the Institute's current activities.

With good wishes

and belated

"Happy New Year"

EDITOR

SATELLITE DATA FOR MONITORING PHENOLOGY

The use of satellite data provides a unique advantage in observing the seasonal variation in the vegetated landscape that has implications on the global environmental issues. Satellite derived data products provide evidence of terrestrial vegetation increase from 1981 to 1991 due to duration of active growing seasons and plant growth.

Traditionally, ground observations of seasonal characteristics have provided information concerning specific plants over a limited spatial area. Satellite data analysis, provides the means to measure broad scale changes at the ecosystem level. However, the wide field sensors have capability to see the wider area in temporal domain. These observations have allowed researchers to qualify seasonal extents and to characterise vegetation according to its seasonal patterns.

Satellite derived products viz. Vegetation indices such as Normalization Difference Vegetation Index (NDVI) are obtained by simple ratio based on the contrast in spectral reflectance of photosynthetically active vegetation that characteristically have low reflectance in the red (R) portion of the spectrum and high reflectance in the near - infrared (NIR). Thus, variation in green vegetation density can be analysed with the following equation.

$$NDVI = (NIR - R) / (NIR + R)$$

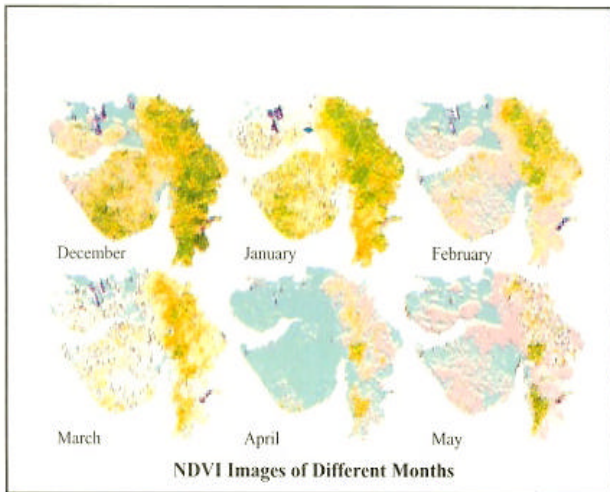
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The NDVI is affected by a number of phenomena including cloud contamination, atmospheric perturbations and variable illumination and viewing geometry. To overcome these affects, NDVI data are often composited using the maximum value over a specified time period. It helps in increasing data quality and information content during data compressing.

$$NDVI_{max} = \text{MAX} (NDVI_1, \dots, NDVI_n)$$

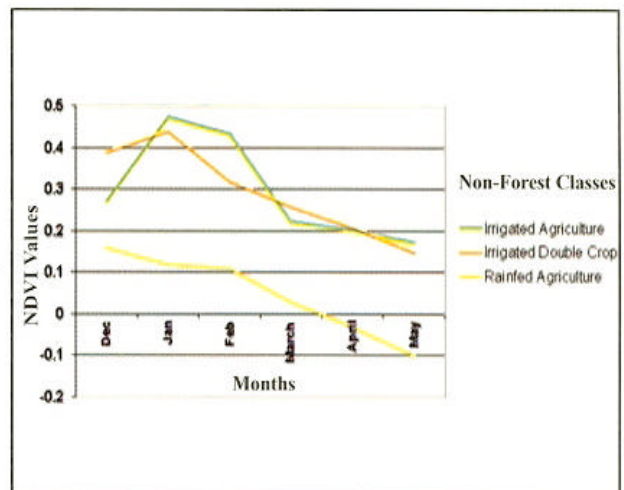
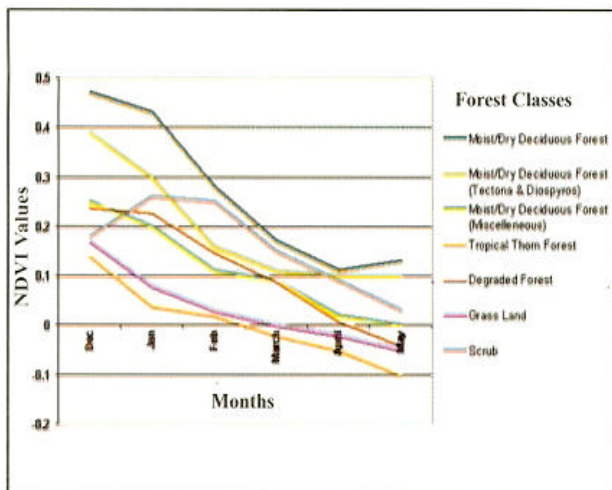
The integration of NDVIs with high temporal resolution (5 days) and regional spatial resolution (~188m) makes the Wide Field Sensor (IRS - 1C WiFS) satellite sensor well suited for regional to global scale studies that assess the vegetation dynamics.

The trend in the seasonal characteristics becomes apparent when analysed according to the land cover type. The land data used to stratify the Western India - Gujarat was derived from a database developed for ISRO-GBP project entitled "Biome level characterization of India vegetation using IRS 1C WiFS data" at IIRS, Dehradun. Time series IRS 1C WiFS data of 1998 was used to characterise the land cover with the methods that can be described as a multi-temporal, unsupervised classification of the NDVI_{max} data with post classification refinement using ground truth and multi-source reference data.

The NDVI values for different types of forest viz. moist dry deciduous (0.292±0.067) dry deciduous (0.423±0.056) dry deciduous-miscellaneous (0.197±0.064) were easily differentiated from irrigated agriculture crops (0.456±0.058), irrigated double crop (0.449±0.095) and rainfed agriculture (0.121±0.039). The maximum discrimination among the classes was found in the month of January where NDVI values were showing maximum segregation with respect to each other.

The images do show some distinct land cover phenological variability in the entire region. The graphs depict the seasonal characteristic features and inter-seasonal variability of the land cover type in the region. The time of the onset and the offset of growing season can be determined using the plotted NDVI values. The graphs show the inter-seasonal variability at the time of the start of the growing seasons over the study period.

This methodology in conjunction with the ground parameters can be used to monitor the impact of global climate change on the landscape. The method described in this study provides means of quantifying the seasonal characteristics of the land surface at a spatial resolution of 200 m for the entire India.





NEW COURSE IN GEOINFORMATICS FROM JULY, 2002

Geoinformatics is a powerful tool to create maps, integrate information, visualise scenarios, solve complicated problems, present powerful ideas, and develop effective solutions. The geoinformatics technology is most relevant where decisions are to be taken on issues like, natural resources assessment, surveying, monitoring, and more importantly protection of natural environment including disaster reduction and mitigation. IIRS has been playing a most crucial role in generating the trained manpower in the application of this technology in India. There is a growing need for professionals in the field of Geoinformation technology, who can prepare, maintain and update geographic databases, and develop new geoinformatics tools. There is growing awareness in government and non-government sector on generation and use of such database.

The course aims the target group in state/central government organisations involved in building up Geospatial Infrastructure and GIS for Decision Support System. A few selected seats are also open for self sponsored candidates who wish to pursue profession in this important area.

The course is a joint logo program of Indian Institute of Remote Sensing (IIRS, NRSA) & International Institute of Geo-Information Sciences and Earth Observation (ITC) and can lead to M.Sc. The details are given below :

Programmes Offered

S. No.	Name of the Program	Duration	Course Fee		
			Indian Participants		Foreign Nationals
			Govt. Sponsored	Self Sponsored (Rs)	
1.	M. Sc.	18 Months	Nil	Rs. 1,08,000	US\$ 10800
2.	PG Diploma	10 Months	Nil	Rs. 60,000	US\$ 6000
3.	Certificate course	4 Months	Nil	Rs. 24,000	US\$ 2400
4.	Any Module	3 Weeks	Rs. 6000	Rs. 6000	US\$ 450

Minimum Qualification required :

M. Sc/M. Tech Degree in-

- ❖ Physics, Mathematics, Applied Mathematics
- ❖ Statistics, Geophysics, Meteorology,
- ❖ Oceanography, Geology, Geography, Urban and Regional Planning,
- ❖ Remote Sensing
- ❖ Any Natural/Environmental Science

OR B.E/B. Tech Degree in -

- ❖ Civil Engineering,
- ❖ Electrical Engineering
- ❖ Computer Science
- ❖ Computer Engineering,
- ❖ Electronics, Agriculture Engineering
- ❖ Urban and Regional Planning,
- ❖ B.Sc Agriculture or Forestry (4 years)

IIRS ANNOUNCES COURSES IN GEOINFORMATICS FOR ENVIRONMENTAL ASSESSMENT AND DISASTER MANAGEMENT

In recent times India has witnessed large scale disasters such as the frequent floods in the Indo-Gangetic plains, the cyclones of the Orissa and Gujarat, the earthquakes of Latur, Chamoli and Gujarat and small scale hazards such as landslides in the Himalayan range and forest fire in almost every part of the country. Although the natural disasters cannot be prevented fully, their impact can be minimized with sound disaster management strategy aided by latest technological development. One such technology, geoinformatics, offers a powerful toolbox to create maps, integrate information, visualize scenarios, solve complicated problems, and develop effective solutions. Advanced techniques like Remote Sensing and Global Positioning Systems, if integrated with Geographic Information Systems, can provide valuable information on earth surface features and processes involved.

Realising the tremendous potential of emerging geoinformatics technology to meet the challenges of sustainable development and disaster management, Indian Institute of Remote Sensing in collaboration with International Institute for Geoinformation Science and Earth Observation (ITC), International Institute for Infrastructural, Hydraulic and Environmental Engineering (IHE), and Wageningen University, The Netherlands has introduced 1) Awareness Course (2 weeks duration), 2) Certificate Course (4 months duration), and 3) Post Graduate Diploma (10 months duration) in "Geoinformatics for Environmental Assessment and Disaster Management".

The courses are designed to provide adequate theoretical and practical knowledge on the utility of geoinformatics in disaster management and environmental assessment. The geoinformatics technological inputs at all stages of disaster management are explained with Indian and foreign examples. After attending the courses the participants are expected to participate actively in various activities dealing with disaster management. The faculty for the course is drawn from IIRS and other centers of Dept. of Space and many reputed scientists, experts from India and abroad also deliver guest lectures on specific topics. The courses are modular in structure and each module is of three weeks duration, the last module of 4.5 months duration encourages course participants to take up projects of their own choice. During the project work of PG Diploma and certificate course, three specialisations such as hydrometeorology (flood, drought etc.), geology (earthquake, landslides etc.) and environment (deforestation, land degradation etc.) are offered.

The target groups include decision makers, senior level executives and managers for Awareness course, and working level professionals, researchers and students for Certificate and PG Diploma courses. In order to encourage sponsored candidates from government departments and research scholars sponsored by VC from recognized universities, there is no course fee for the Certificate course and PG Diploma course. However, for Awareness course, which is organized in the form of a workshop for mostly decision makers, a course fee of Rs. 4000/- is charged and for self sponsored private candidates, there is separate course fee structure of Rs. 60,000/- for PG Diploma and Rs. 24,000/- for Certificate course. The minimum qualification for all the courses is PG in Natural Resources, Earth Sciences, Urban and Regional Planning/ ME/BE/B Arch. However, the final selection criteria are based on the percentage of marks at qualifying examinations and relevant experience in government departments, if applicable.

All the courses are scheduled to start on 1.7.2002 and the last date for receiving filled up application form at IIRS is 15th May 2002. More details about courses can be obtained from Dean, Indian Institute of Remote Sensing, (National Remote Sensing Agency, Dept. of Space, Govt. of India), 4-Kalidas Road, Dehradun, Phone: 0135-744583, Fax: 0135-741987, e-mail: dean@iirs.gov.in.

....P.K. Champati ray



CONTRIBUTION OF IIRS IN LANDSLIDE HAZARD ZONATION

Landslides are one of the most common natural hazards in the Himalayan terrain across the northern India starting from north-eastern region to the north-western Himalaya in Jammu and Kashmir. Geosciences division of Indian Institute of Remote Sensing (formerly known as Indian Photo-interpretation Institute) ever since its inception in 1964 has taken up various studies related to this natural phenomenon. In earlier days studies focusing on the geological and geomorphological mapping of Himalayan terrain have considered landslides as one of the most important geomorphological feature reflecting the underlying geology and exogenic terrain conditions.

In one of the most fundamental attempt, at IIRS for the first time aerial photographs of various scales have been interpreted to identify old, active and potential landslides areas based on the photo and geotechnical elements. This primary classification using aerial photographs helps to assess the landslide hazard potential in a broader sense covering wide stretch of inaccessible Himalayan terrain. Many course participants from premier geological organizations like Geological Survey of India and State Geology Departments were trained to identify and map different type of landslides on aerial photographs. However, in those days landslides were occurring mostly due to natural causes of mass wasting (toe cutting, bank erosion, head ward erosion etc.) and therefore considered as natural phenomena. Secondly, their effect on human lives and property were hardly a matter of great concern. However, with passage of time in late 70s and 80s, due to developmental activities mainly connected to road construction and hydel schemes, at many places new landslides started occurring causing loss of life and property. This resulted in well placed concern that the areas close to hydel schemes be investigated thoroughly with respect to geotechnical set up of the region, which in turn, emphasised on landslide assessment of the region.

In one such study during 1978-1980, Parbati Valley Project was taken up for geotechnical investigation *vis-a-vis* landslide survey in Himachal Pradesh using large format aerial photographs. The study was unique in the sense that for the first time in a very systematic manner landslides were interpreted on aerial photographs and studied in detail with respect to terrain condition and geology of the region. The final maps were produced on 1:10,000 scale.

During 1980-81, in another important project related to Highway alignment in Nepal, landslides were assessed with respect to road construction in high mountain regions.

In late 80s with the successful launch of IRS-1A satellite, and improvement in the spectral and spatial resolution, attempts were made to investigate satellite data products for landslide mapping in Himalayas. However, with spatial resolution of around 30-40m, the satellite data products had a very limited usage in landslide monitoring and mapping. The SPOT satellite data at 20m and 10m resolution showed some promise in this direction, but with lesser accuracy than the result obtained through aerial photo interpretation. However, digital techniques and interpretation skill were developed for satellite data analysis with a hope of producing better results with high-resolution data in future.

A new era ushered in early 90s, with the advent of GIS, various attempts were made to integrate a number of data layers related to landslides to predict landslide prone areas based on which areas were demarcated as per their hazard potential. The resultant map was later known as "Landslide Hazard Zonation" map as per D.J. Varnes's most popular definition published in UNESCO document. Such LHZ map using integrated approach was first produced for parts of Chamoli region in IIRS using USEMAP GIS (supplied by ITC, The Netherlands). The method was further refined and a complete quantitative approach was implemented using information value method in USEMAP GIS for a test area around Pipalkoti near Main Central Thrust region. Similar methodology was also adopted in Dadhau region in HP near Main Boundary Fault and LHZ maps were produced for a pilot area. The result of these studies indicated that the statistical relation between landslide occurrences and other parameters like lithology can be established and around 60% of the landslides can be predicted based on integrated approach. Around the same time in 1991 using similar methods, A. Carrara, a renowned expert in LHZ, reported very encouraging results in a pilot study from Italy.

Based on the success of the approach, a project titled "Spatial Statistical Prediction Model (SSPM) for Landslide Hazard Zonation" was taken up in Neera basin in Himachal Pradesh. In this study using IRS- LISS-II and aerial photographs various data layers such as geology, geomorphology, slope, aspect, drainage influence zone, lineament influence zone, lineament intersection, land use were integrated using information value method and Discriminant Function Analysis (DFA). The result showed that around 60% of the slides could be predicted and it was interesting to note that information value method helped in knowing the ranks of different classes in a thematic map and DFA helped to know the weightage of the individual layer with respect to landslides in quantitative terms.

In 1995-96, under IIRS-ITC collaborative project, a study was undertaken in Giri valley in Sataun region, where fuzzy logic and probabilistic methods (information value and weights of evidence modelling) were applied for landslide hazard zonation. Various experiments were carried out at ITC, on using data driven and knowledge driven approach and finally a hybrid method using fuzzy logic was found most satisfying.

Based on the success of the approach, a case study was carried out in Sikkim in 1998 to demonstrate the potentials of the methodology to foreign students under CSSTEAP programme. One of the CSSTEAP student is applying similar approach in landslide prone areas of Bhutan in M.Tech Project. In 1998, subsequent to the landslides in Okhimath region, a study was carried out to demonstrate how new landslides can be mapped digitally using change detection analysis of pre and post event IRS-LISS-III data.

As explained above, the GIS based modelling for landslide hazard zonation was applied to many areas in Himalayas using inputs derived from remotely sensed data products and very cost effective methodology has been demonstrated to technical persons from various agencies and institutes, who are today using similar approach in different parts of the country. Based on the inputs of such studies, a National Landslide Project was launched, funded by Department of Space for most important areas of Uttaranchal and Himachal covering over 1800 km of road length on strategic routes. This project was implemented by various government agencies with NRSA being the nodal agency and IIRS contributed significantly in methodology development, database generation and result analysis in around 300 km of road length.

In the present context, our aim is to produce landslide hazard zonation maps at a very large scale i.e., less than 1:10,000 using high resolution satellite data products. Secondly all attempts are being made to map subtle surface changes associated with landslide movement using InSAR methods. Thirdly we look forward to link spatial model with deterministic models to estimate factor of safety and make temporal predictions with respect to rainfall and earthquake (seismic induced landslides).

....P.K. Champati ray

News

- ◆ A Special Course for IAF personnels was designed and conducted by Photogrammetry and Remote Sensing Division during 26 November, 2001 — 4th Jan, 2002. A total no. of 10 officers trainees attended the course.
- ◆ Photogrammetry and Remote Sensing Division of the Institute conducted the 2nd Short Course on Remote Sensing (of eight weeks duration) with special emphasis on Digital Image Processing, from January 7th to March 1st 2002. The training program is recognised by ITEC (Indian Technical and Economic Cooperation), Ministry of External Affairs, Government of India. Twenty Trainees(17 from 9 countries and 3 from India) participated in the course.
- ◆ Agriculture and Soils Division of IIRS conducted a special paid course of three weeks duration (October 2001) for the officials of Land Evaluation Division, Sri Lanka.
- ◆ **Retired** : Prof. K.C. Bhagra, Photogrammetry and Remote Sensing Division, IIRS, who taught Aerial Photography, Photogrammetry, GPS, Image Interpretation, retired on 31.3.2001, after serving as IIRS faculty for about 28 yrs. His students would always remember him as sincere, hard working, energetic teacher and a task master.
- ◆ **On Deputation** : Dr. Jitendra Prasad, scientist SG, who was a faculty in Agriculture and Soils Division since 1977 has joined Haryana State Remote Sensing Centre, Hisar as Chief Scientist w.e.f. Jan. 2002.





INTERNATIONAL WORKSHOP ON TROPICAL FOREST COVER ASSESSMENT AND CONSERVATION ISSUES IN SOUTHEAST ASIA (12th -14th FEBRUARY, 2002)

Indian Institute of Remote Sensing in collaboration with Joint Research Center, ISPRA, Italy organized an International workshop on “*Tropical Forest cover Assessment and Conservation issues in Southeast Asia*” from 12th-14th February, 2002 at Indian Institute of Remote Sensing, Dehradun. This workshop was organised as a part of International efforts on Tropical Ecosystem Environment Observations by Satellite (TREES). The primary objectives of the TREES project is to produce relevant accurate information of the state on the tropical forests ecosystems, analyze this information in terms of deforestation trends and its possible impacts and make this information available to the user community. IIRS as one of the collaborator of this international project has carried out forest cover assessment and mapping in the Northeastern India and Northern Myanmar using IRS 1C/1D WIFS data.



The main objective of the workshop was to deliberate on issues related to forest cover mapping and monitoring, role of remote sensing and its institutionalization in Asia Pacific region. The main themes of the workshop were:

- ◆ Forest cover mapping and monitoring techniques and accuracy issues
- ◆ Changing scenario due to land use changes
- ◆ Habitat change and Biodiversity loss
- ◆ Institutionalization of forest cover information for management and decision making

The workshop was attended by 39 participants, including 17 foreign delegates from The Netherlands, Italy, Japan, Bangladesh, China, Indonesia, Malaysia, Mongolia, Myanmar, Philippines, Srilanka, Thailand, and Vietnam. The workshop was inaugurated by Dr. Sjaak Beerens, Director, International Affairs, ITC, The Netherlands, who delivered the inaugural address on “Towards a Geo-spatial Information System for Sustainable Management of Forests”. On this occasion, Shri K.R. Sridhar Murthy, Executive Director, Antrix Corporation, Bangalore, delivered a lead talk on “Indian Space Programme and Remote Sensing Applications”. The inaugural session was followed by three technical sessions. The first technical session on “Forest cover Assessment- Methodologies” had 7 presentations followed by technical session-2 on “Country Presentations” which had 13 presentations from 12 countries. The technical session-3 on “Conservation issues and strategies” had 2 presentations. Various issues related to the main theme of the workshop were discussed and concerns were expressed on institutionalization of remote sensing and allied technology in Southeast Asian region. Capacity building, participatory forest management policies, initiation of interdepartmental dialogue, and networking of state forest departments were identified as some of the key issues for achieving sustainable forest management in Southeast Asian region.

....*Shefali Agarwal*

WORKSHOP ON

"SPATIAL DATA INFRASTRUCTURE FOR DISASTER MANAGEMENT"

OF ISPRS TECHNICAL COMMISSION IV-WG-4 HELD ON DECEMBER 13,2001 AT SPACE APPLICATIONS CENTRE,
AHMEDABAD, INDIA DURING THE NATIONAL SYMPOSIUM OF INDIAN SOCIETY OF REMOTE SENSING

The main themes for discussion during the workshop were: Prioritization of SDI for Disaster Management (International and Indian Scenario), Quality Evaluation Procedures and Standardization of SDI and Data exchange policies and Networking of Institutions for virtual Spatial data warehousing. There were four speakers including the session chairman Dr. P. S. Roy, Chair, ISPRS-WG 4/IV and Dean, IIRS, Dehra Dun (India). He presented on *Spatial Data Infrastructure -Indian Scenario* which covered different kind of thematic data available at various scales and the gap areas. He also illustrated on how the National Spatial Data Infrastructure (NSDI) is going to facilitate towards a seamless databases and presented a vision towards the evolution of a *web-enabled digital earth* for sustainable development of society. Dr. Cees van Westen from ITC, Netherlands, presented on *Spatial Data Infrastructure for Natural Hazards Risk Management -Some Observations* which emphasized on the role of geo-spatial data infrastructure in disaster management and the key elements required for preparedness and risk assessment. Dr. S. Manikiam from ISRO Headquarters, Bangalore spoke on *Space Applications: Natural Resources and Disaster Management*. He presented a broad overview of the space programme in India, both present and future, in the communications and the remote-sensing domains, towards providing connectivity as well as observations, at times of disasters. He also illustrated how the existence of a disaster management system would reduce the gaps in information usage for decision making, among the different agencies involved, at times of natural disasters. Brig. Gopal Rao, Director, Survey of India talked on *Indian Spatial Data Infrastructure -Role of Survey of India and Its Relevance to Disaster Management*. His presentation highlighted the various kind of topographical maps being generated by Survey of India and their drawbacks. The NSDI vision and objectives, the core contents and components of NSDI, as envisaged in India were presented. It also highlighted on the different kind of digital data standards adopted by SOI and the new map series of digital topographical maps to be released by SOI.

....*Shefali Agarwal*

....ALUMNI RESPONSE

I read the Newsletter 'Contact' with great interest since we are able to know about the various activities of Remote Sensing and GIS. The column 'Alumni Response' is very interesting to know all about the activities of IIRS alumni. I underwent a one year training in Aerial Photo Interpretation in (Geology) during 1971. In fact the one year training at IIRS paved the way for my successful career in PWD Groundwater, Govt of Tamil Nadu and the IRS - 'Anna University.

Presently my activities are :

- ◆ *As an entrepreneur preparing Groundwater prospects maps using Remote Sensing and GIS (NRSA Rajiv Gandhi Drinking' Water Mission joint programme.)*
- ◆ *As a Secretary SPRINGS (NGO) co-ordinator working in the World bank aided TNWRCP project titled Assessment of Groundwater Potential by Groundwater Resources Estimation Committee Norms in Kaveripattinam Minor Basin Dharmapuri District.*
- ◆ *As a GIS Consultant in Tahal Consulting Engineers Ltd, assisting WRCP in Remote Sensing studies & in the creation of GIS data base for the selected river basins in Tamil Nadu.*

WITH GOOD WISHES

Dr. S. Thillaigovindarajan, 19/10 3rd East Street, Chennai-600041,

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INTERNATIONAL WORKSHOP ON "TECHNOLOGY, APPLICATIONS, DEVELOPMENTS AND ISSUES RELATED TO CAPACITY BUILDING IN GEOINFORMATICS"

The workshop was organized under IIRS-ITC Project Phase 2 (IIRS 2) on "Geoinformatics for Environmental Assessment and Disaster Management" during October 18-19, 2001, in order to finalise M.Sc. Geoinformatics Course Syllabus. Members of the National Advisory Committee (constituted in order to advice on the course curriculum and implement the program), in addition to the advisory committee, experts from ITC, special Invitees and Invitees from IIRS participated in the workshop.

The workshop was held in two parts. In the first part, presentations were made to review the present status of Geoinformatics technology, applications and issues related to capacity building. At the end of presentations, two working groups on: 1) Curriculum and 2) Course Material were constituted. The second part was devoted to discuss the course curriculum and strategies to implement.

Implementation document was prepared based on the suggestions and recommendations to implement the M.Sc. in Geoinformatics jointly with ITC from July 2002.

For details, contact : geoinformatics@iirs.gov.in



....P.L.N. Raju

IIRS TRAINS NE-SAC SHILLONG PERSONNEL IN "REMOTE SENSING & GIS"

IIRS organized a special course on "RS & GIS" for NE-SAC personnel during 17 January - 27 February. The course was inaugurated on 17 January in the presence of Dr. George Joseph, ISRO Distinguished Professor, who delivered the



inaugural address, Mr. K.C. Bhattacharya, Director, NE-SAC, Dr. P.S. Roy, Dean, IIRS & Dr. A.K. Verma, Director (Science & Technology North-Eastern Council) NEC,. This course was organized as a part of the familiarization / induction programme for freshly recruited one scientist & fifteen research scholars of the North Eastern Space Application Centre (NE-SAC), which was recently set up at Shillong with the initiative of Deptt. of Space to promote & provide benefits of remote sensing, satellite communication & space science in the north eastern region. The course was of six

weeks duration of which the first four weeks were dedicated to technological aspects of remote sensing & GIS. The remaining two weeks were dedicated to RS & GIS applications in geology, forestry, agriculture, soils, water resource, marine science, & human settlement analysis.

The main highlight of the course was that it was a special packaged course with main objective of introducing the geoinformatics technology & providing enough insight to take up challenging research topics in relevant applications. Thus the course covered wide ranging topics starting from basic RS, GIS to very advance topics like digital photogrammetry & SAR Interferometry. All the lectures were followed up by practical demonstrations & field visits. All the lecture materials were provided in print form as well as on CD, specially generated for this course, for easy accessibility and ready reference. Additional study materials were also provided on CD such as : 1) ITC Text Book on Remote Sensing & GIS, 2) GIS Tutor, 3) DIP Tutor, 4) In SAR workshop proceedings (by Dr. K.S. Rao, IIT Bombay). Ample opportunity was provided for self-learning & library reference.

Apart from the IIRS faculty, guest faculty from other reputed organizations also delivered lectures on topics such as: SAR-Interferometry by Dr. K.S. Rao, IIT, Bombay; Remote Sensing Data Products by Mr. R. Joseph Arokiadas, NRSA Hyderabad; Global Positioning System and its application by Mr. S.K. Singh, Survey of India, Dehradun; National Spatial Data Infrastructure by Dr Nanda Kumar, Space Application Centre, Ahmedabad; Satellite Meteorology by Dr. C. M. Kisthawal, Space Application Centre, Ahmedabad; Satellite Communication by Mr. M.S. Arora & Mr. R. Gupta, Delhi Earth Station (Space Application Centre), New Delhi; Remote Sensing applications in Geomorphology by Dr. D. P. Rao, former Director, NRSA; & Remote Sensing applications in Groundwater targeting by Prof. A.K. Roy. The course



participants had the unique opportunity to attend series of lectures on fundamentals of remote sensing given by ISRO Distinguished Professor, Dr. George Joseph.

As the course was organized as a part of the familiarization / induction programme for the NE-SAC personnel, get together functions & a cultural evening were also organized for informal interaction and socializing with faculty, research scholars & course participants of other courses including foreign participants from various countries under CSSTEAP & ITEC programme.

The first part of the induction programme, which was organized as a special course was successfully completed on 27.2.2002 and after which the participants are scheduled to visit SAC, NRSA & ISRO HQ. At the end of the induction familiarization programme, the certificates will be awarded by Dr. K. Kasturirangan, Chairman, ISRO at ISRO HQs, Bangalore.

....P.K. Champati ray

IIRS-ITC REFRESHER COURSE ON "GEO-INFORMATION FOR DISASTER MANAGEMENT (IN INDIA)"

IIRS in collaboration with ITC, conducted an International refresher course on "Geo-Information for Disaster Management (In India)" during 10-21st Dec, 2001 at IIRS, Dehradun . The course was attended by 31 course participants from India and neighbouring countries such as: 3 from Bangladesh, 3 from Sri Lanka, 1 from Japan, 3 from Nepal, 1 from Bhutan and 20 from India. During the course Indian disaster management scenario was presented with facts and figures for better appreciation of the problem and role of RS and GIS in Disaster Management was also demonstrated with Indian and relevant foreign examples by IIRS and ITC faculty such as Dr. C.J. van Westen. Mr. Luc Boerboom and Mrs Lorena Montoya, Dr. P.K.Champati ray and Mr. Sandeep Maithani.

The unique feature of the training programme was the attempt to demonstrate the potential of GIS in seismic risk assessment using RADIUS methodology. For risk analysis in Dehradun region, course participants conducted survey in every ward of the city and collected relevant information which was analysed in ILWIS 3.0. The Dehradun city master plan *vis-à-vis* seismic hazard in the region was discussed with senior officials of MDDA and Town and Country Planning Department. Seismic risk of the northern India and Dehradun region was further highlighted by eminent speakers such as Prof. K.N. Khattri and Dr. Mahajan from Wadia Institute of Himalayan Geology. The Refresher Course achieved all its objectives as envisaged and was completed on a successful note.

....P.K. Champati ray

SPECIAL COURSE FOR TOWN PLANNERS OF NATIONAL CAPITAL REGION PLANNING BOARD

Special Course for the Town Planners of NCR Planning Boards were organized in two batches of nine officer-trainees each who participated in these courses from 14-19, November, 2001 and 18-22, December, 2001. The participants were apprised of the Remote Sensing, GIS and GPS Technologies and their application in Urban and Regional Planning. Since NCR Planning Board comprises of four states, therefore, participants came from various departments like Town & Country Planning Deptt., Uttar Pradesh, & Rajasthan, Town & Country Planning Organization, New Delhi; Haryana State Industrial Development Corporation; and Rajasthan and Industrial Development Authority.

....B.S. Sokhi

NNRMS -TCPO TRAINING PROGRAM FOR TOWN & COUNTRY PLANNERS

Under joint initiative of TCPO & IIRS, 3rd NNRMS Course for Town & Country Planners was organized in IIRS from 4th February 2002 to 15th February 2002. This program was actually of 4-weeks duration but initial two weeks were conducted in IIRS where the participants were exposed to RS, GIS, Digital Photogrammetry, GPS technologies. Last two weeks they would work in TCPO, New Delhi in the on an actual planning related problem in a GIS environment. Total nine participants from various organizations like, Town Planning & Valuation Deptt., Maharashtra, School of Architecture & Planning, Chennai, Auroville Town Planning Service, Auroville, Mussoorie - Dehradun Development Authority, Dehradun took part in this program.

NATIONAL SCIENCE DAY CELEBRATION

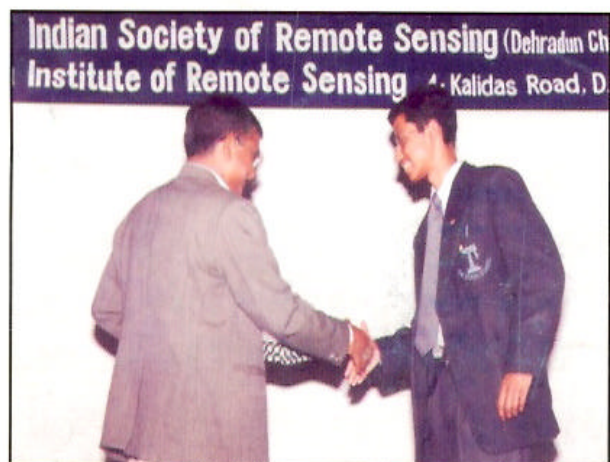
National Science Day was celebrated on February 28, 2002 at Indian Institute of Remote Sensing, Dehradun organised by Indian Society of Remote Sensing, Dehra Dun Chapter. To mark the occasion of Science day an Exhibition for the school



management and Natural Resource Management was also organised. Various Satellite data products and instrumentation namely, Global positioning system (GPS) and radiometer were also demonstrated.

In addition to this various satellite and launch vehicle models were also kept in the exhibition for display. A debate on the topic "Space Science is a Boon for Socioeconomic Development of the country" was organised. This was followed by a science quiz competition. Debate was evaluated by panel of judges namely, Prof. L.M. Pande, Prof. V.K. Jha of IIRS and Dr. V.B. Mathur of Wildlife Institute of India (WII). A brief introduction of the society was given by Er. B.S.Sokhi of IIRS.

On the occasion Dr. P.S. Roy, Dean IIRS and Chairman of ISRS, Dehradun chapter emphasized the importance and need of such type of activities to bring awareness. Various leading schools of Dehradun viz., The Doon School, Welham boys School, Scholars Home, Welham Girls School and Central Schools participated in the celebration. This was also attended by Citizens of Dehradun and members of Indian Society of Remote Sensing. At the end of the programme Dr. S.P. Aggarwal, Secretary, Indian Society of Remote Sensing, Dehradun Chapter proposed Vote of Thanks.



....S.P. Aggarwal

Dean/Technical Staff Officer

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