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CONTACT

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Editorial Column

Hello ! IIRS alumni. We wish you all Happy New Millenium. Hope this would be colourful, therefore, we decided to bring the 3rd issue of CONTACT as colourful as possible. We are introducing few articles of interest which are burning topics of this millennium, like bio-diversity, land slide etc. Since this newsletter has got an objective of interaction with alumni, you are requested to send your work achievements in the field of RS & GIS. If there is any change in your address please inform us and also tell your friends and colleagues who are not getting CONTACT but are IIRS alumni, so that we can update our mailing list. With good wishes.....”

Editor

“The aim of this newsletter is to reach a cross section of scientific and user community working in the field of remote sensing and allied areas. And to provide a platform for exchanging ideas, and harnessing our common objectives”

..... P.S. Roy
(Dean, IIRS)

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Remote Sensing :

Opening up new vistas in the 21st century

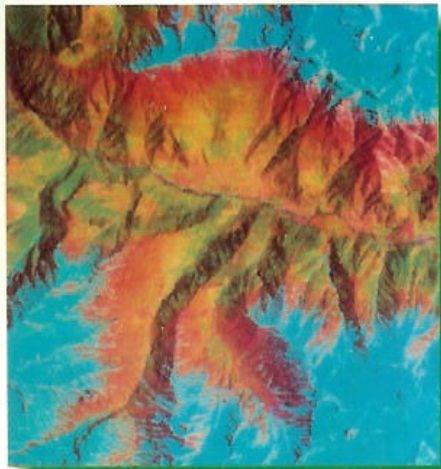
More precision, more choice, more applications are the buzz words in the future Remote Sensing programs. The common objectives of the new high resolution satellites include:

- + Improved global coverage at increased temporal resolution
- + The possibility of off-nadir viewing (i.e. to acquire imagery that is not directly linked to the sub-track of the satellite.
- + Standard resolution in the order of 1 meter.

The sale of data by square kilometer enables the user to buy what they need. Supplied data will be Geocoded and ortho-corrected, eliminating the need for users to invest in costly and complex image processing software. A GIS will be sufficient to visualize the data. Given the small size of the data sets, they can be transmitted directly to the users. PC or workstation via an internet connection, with ordering and billing transacted entirely by e-commerce.

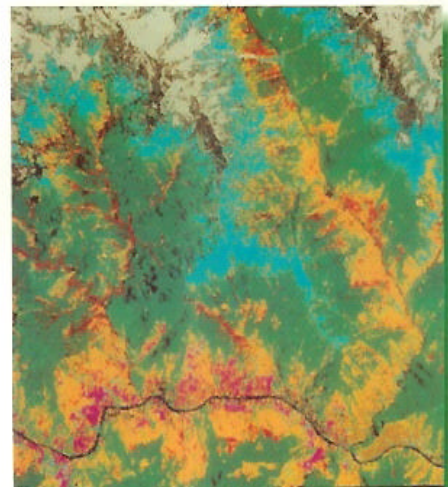
Grassland Mapping Project in Himachal Pradesh

The project on Grassland Mapping in Himachal Pradesh using Remote Sensing is being executed at Indian Institute of Remote Sensing, Dehradun at the behest of Ministry of Environment and Forests (MOE&F) under Government of India with Space Application Centre, Ahmedabad as the nodal centre for coordination of the project. The state of H.P. falls within 30°20' N to 33°145' N latitude and 75°32' East to 79°2' East longitude respectively and consisting of an area of 55763 sq.km. Comprising Kinnaur, Chamba, Lahul and Spiti, Kulu, Shimla, Kangra, Sirmaur, Solan, Mandi, Una, Hamirpur and Bilaspur districts.



Mapping on 1:50,000 scale using IRS-1C LISS III geocoded images is being carried out using standard visual interpretation techniques. The area is covered in

around 100 full and part Survey of India toposheets. It is also proposed to do carrying capacity estimation in one of the districts. All the 110 scenes are visual interpreted for generation of grassland maps as per the legend generated for nationwide covering. Out of the total scenes around 50 scenes have been procured from NDC and the ground truth has been collected for the 6 districts. It is in progress for 3 districts. It is observed that the alpine pastures distributed between 3600 to 5200 metres altitude and are identifiable as dominated by grasslands, shrubs and the mixture of the two under different climatic and topographic situations. Interpretation of images in alpine, sub-alpine, temperate and sub-montane regions is in progress.



CSSTE-AP TRAINING PROGRAMME

Under the 9-months Post Graduate Diploma Course in Remote Sensing & GIS 17 participants from 11 countries of Asia and the Pacific region are undergoing training in IIRS. The participants from Bangla Desh, India, Lao PDR, Mongolia, Vietnam, Sri Lanka, Mynamar, Philippines, Krgystan, Nepal, Bhutan are engaged at present in their pilot project having select case study areas in various parts of India.

Geoinformatics Facility at IIRS :

A STEP AHEAD ON THE MILLENNIUM ROAD

The Geoinformatics division was established in the year 1998. The Division is a Center of Excellence in the field of Geographic Information Systems (GIS) and Digital Image Processing (DIP). There are three Education Labs equipped with software such as ARC/INFO, ARCVIEW, ILWIS, ERDAS IMAGINE, GEOMEDIA, ENVI Image processing software and IMAGE ANALYST. Also these labs are equipped with Multimedia Tutorials on different topics essential for the training of GIS and DIP. This Division has a Production Lab having a Multimedia Workstation System and a Resource Lab with Alpha Workstations catering to the needs of Research Activities. A separate Server room has a centralised Digital Server for control. In total there are 5 alpha workstations, 24 Personal Computers with A3 and A0 size Digitizers, Scanner, Plotter etc. All the systems are connected through the network.



Data input in progress.....



Spatial Data Analysis



Output Device

Visitors

- ★ Mr. Erik van der Zee, Geoinformation consultant representing SAIL, Netherlands, visited Geoinformatics Division regarding evaluation of the present IIRS-ITC PROJECT (Duration 2nd week of February 2000).
- ★ Dr. Miyatake Susumu, Team Leader of ITTO Project, JOFCA, Japan, visited regarding special training held on "FCD MAPPER : A semi Expert System" at Geoinformatics Division.
- ★ Prof. K. Radhakrishna, Vice Chancellor, Andhra University visited IIRS on 1st November, 1999.
- ★ Dr. Cristine Pohl, Netherlands visited IIRS to deliver lectures on Image Fusion.

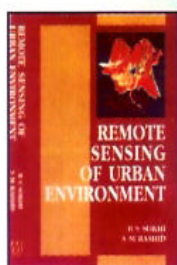
International Workshops



- An international workshop on “Natural Disasters and their Mitigation : A RS & GIS Perspective” has been organised jointly by ITC Netherlands and IIRS from 11.10.1999 to 13.10.1999. Total 31 participants attended the workshop from The Netherlands and India.
- An international workshop on “Subtle Issues in Coastal Management” has been organised jointly by IIRS, India and ITC, The Netherlands from 3.2.2000 to 4.2.2000. Total 32 participants attended the workshop from various countries namely The Netherlands, France, Ireland and India. A book entitled “subtle issues in coastal management” was released by Dr. D.P. Rao, Director NRSA alongwith the CD-Rom of the same book.
- An international workshop on “Biodiversity and Environment” has been organised jointly by ITC, The Netherlands and IIRS from 8.2.2000 to 9.2.2000. Total 52 participants attended the workshop from various countries namely The Netherlands, Japan and India.
- A Hindi Technical Workshop on “Ikkiwi Sadi Main Vigyan Ke Naye Aayam” has been organised by Official language implementation committee at IIRS, Dehradun on 10th Dec. 1999. Total 36 papers from various disciplines of science namely Space Science, Medical Science, Remote Sensing Applications, GIS, GPS and Astro-Physics were presented in this Workshop. This workshop was attended by 96 participants from various organisations.

PUBLICATIONS

A Knowledge base for all.....



REMOTE SENSING OF URBAN ENVIRONMENT

Editor

B.S. Sokhi & S.M.Rashid

This book contains seventeen chapters contributed by various resource persons on various application areas on Remote Sensing and GIS

Publisher : Manak Publications Pvt. Ltd. Delhi



SUBTLE ISSUES IN COASTAL MANAGEMENT

Editor

R. Sudarshana, D. Mitra
A.K. Mishra, P.S. Roy & D.P. Rao

This book contains 17 articles written by several eminent authors. These articles mainly deal with the hidden risk in coastal zone studies.

Publisher. IIRS

SPATIAL STATISTICAL MODEL FOR LANDSLIDE HAZARD ZONATION

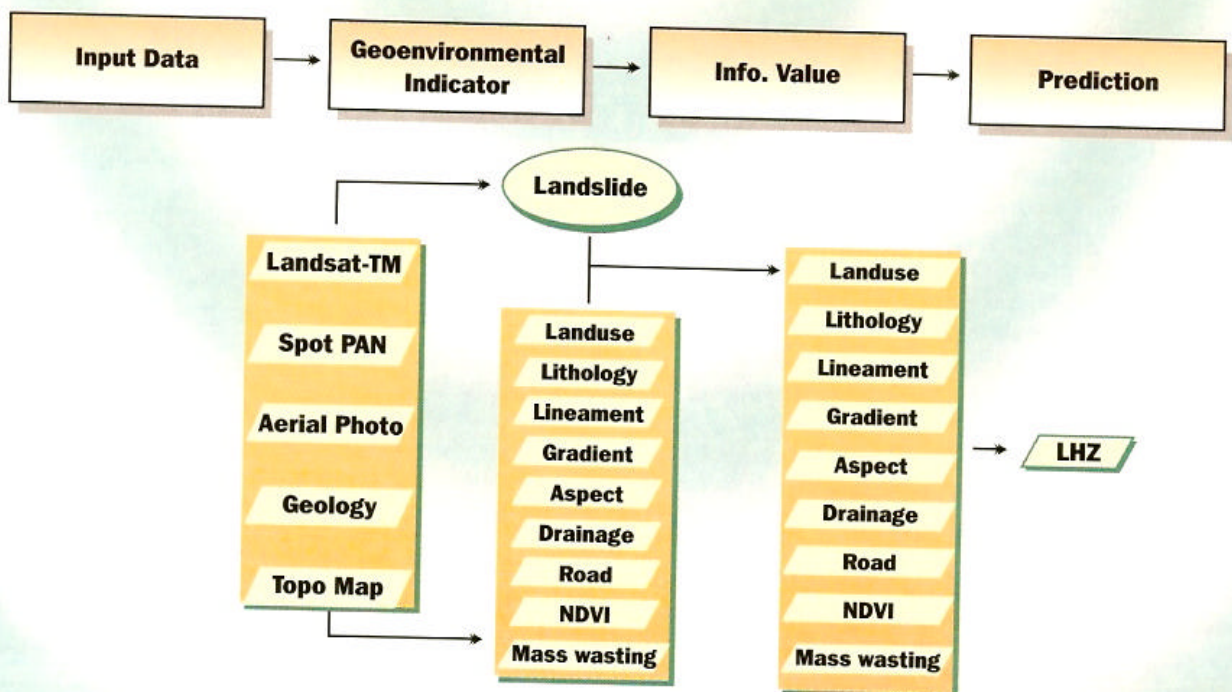
Landslides are one of the prominent natural hazards that are triggered by extreme rainfall, earthquakes, volcanic eruptions, and land-use changes and the whole process is dependent on several geological, topographical and environmental related factors. In order to understand slope failure phenomena, particularly landslides, in a comprehensive way, various influencing parameters are to be analyzed in an integrated manner. Most of these factors are spatially distributed and can be represented as map layers or data layers in GIS. In recent past there has been good progress in the field of data integration techniques for various geological applications such as mineral exploration, resource assessment, and natural hazard assessment.

Many methods and techniques have been proposed to evaluate the landslide hazard and produce maps portraying its spatial distribution and depicting the probability of occurrences of landslides (landslide hazard zonation). Principally, these methods can be divided into two groups: knowledge driven and data driven. In the present case emphasis is on developing a methodology that will allow objective analysis of the landslides' occurrences and spatial prediction of landslide phenomena.

Various geoenvironmental parameters such as lithology, structure, slope, aspect, land-use, drainage, road

excavations, vegetation cover and mass wasting areas are considered to predict landslides at a medium scale. The methodology was applied in a landslide prone area of Sikkim Himalaya and many parameters were obtained from remotely sensed data products such as IRS-1C, LISS-3 and PAN using digital image processing techniques such as principal component analysis, image classification, and vegetation coverage estimation (NDVI). Terrain parameters such as slope, aspect and slope curvature were derived from DEM. Except a lineament and lithological map, other maps were obtained through digital techniques thus reducing the subjectiveness associated with manual interpretation and preparation of data layers.

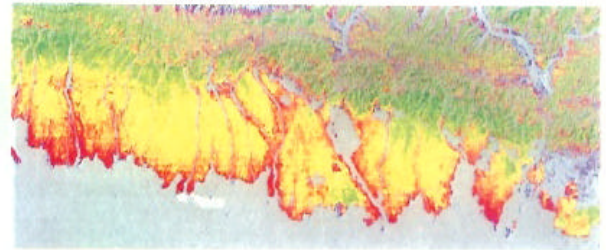
To understand statistical relationship between landslides' occurrences and geoenvironmental parameters such as lithology, structure, slope, aspect, land-use, drainage, road excavations, vegetation cover and mass wasting areas, information values were calculated using ILWIS GIS. Based on these spatial statistical parameters, landslide hazard zonation map was prepared using information value method. The resultant map shows around 60-65% of actual landslides in 20% of the predicted high hazardous area. The study has reached a important conclusion that information from remotely sensed data products can be integrated directly in a GIS based spatial predictive model for preparation of landslide hazard zonation map.



FCD MAPPER:

A Semi Expert System for the Forest Canopy Density Stratification

Forest Canopy density is one of the most useful parameters to consider in the planning and implementation of rehabilitation. As generally applied in forestry, conventional remote sensing methodology is based on qualitative analysis of information derived from "training area" i.e. ground truthing. This has certain disadvantages in terms of time and cost required for training area establishment and the accuracy of results obtained. At present remote sensing assessment of forest conditions is a task reserved for personnel who have received special training in remote sensing analysis. Furthermore, the images derived from conventional remote sensing analysis have rarely been simple enough to be readily understood by practicing foresters, planning officers and other concerned individuals. The Japan Overseas Forestry Consultants Association (JOFCA) has been implementing ITTO project and has developed the semi-expert system to make the new methodology available to persons who are not remote sensing experts. The Semi-expert System, Forest Canopy Density Mapper or simply FCD Mapper, is a computer software package compatible with window type personal computer. The



FCD (Forest Canopy Density Map) | 50 100%

FCD Mapper contains the algorithms and other formulas utilized to computer values of the several indices contained in the FCD Model for the analysis of satellite imagery data.

To impart training to the personnel of South-east Asian countries on utilisation of FCD Mapper two short duration training programmes of one week each were organised by IIRS, Dehra Dun from 29.11.1999 to 31.12.1999 and 6.12.1999 to 10.12.1999. During these programmes 24 participants from 12 countries, namely, Cambodia, China, Fiji, Indonesia, India, Laos, Myanmar, Malaysia, Nepal, The Philippines, Thailand, and Papua New Guinea participated and learned the use of FCD Mapper. The system is now available on CD-ROM format.

Guest Column

ROLE OF IIRS IN PROPAGATING THE USE OF RS & GIS

The Indian Institute of Remote Sensing (IIRS) formerly known as Indian Photo-interpretation Institute (IIP), Dehradun is a nodal agency for imparting training and education in South-East Asia, under the aegis of NRSA, Dept. of Space, Govt. of India. The institute has completed 34 years and zoomed in the year 2000 to accept the challenges of the new millennium.

The last decade has witnessed many advancement in collection of information regarding the earth's surface. From technological point of view, the main driving forces of these advancement have been the development of new sensors and the technology revolution. Today, we have digital photogrammetry, GPS, high-resolution imagery, GIS and computer technology. Only 'haves' are not sufficient. These 'haves' are to be put in use in the discipline of interest. This is where educational institute plays a significant role. Integration of Remote Sensing with Geographic Information system has enhanced the capabilities many folds in resource management, advancement of the technology for their end use. IIRS is an inter/multi disciplinary organization working in the areas of RS & GIS and creating awareness in the use the technology of today and the future. The last decade has witnessed a sea change in the number of training courses and post-graduate courses offered by IIRS. Administrators, resource managers and scientists at various levels are today aware of the potentials of RS & GIS. The Decision-makes course at the top, facilitates the managers to sharpen their attitude towards applications of RS and GIS. The post graduate diploma programmes provide training at the working level. The state of art infrastructure at IIRS provides a right environment for learning the latest.

As an educational institute, IIRS is on the super highway of information age. A day is not for off when IIRS will open a chapter of distant learning by means of communication, not only in India but also in the Asia Pacific region.

M.L. Manchanda
Head, RRSSC, DEHRADUN

Biodiversity Characterisation at Landscape Level Using Remote Sensing and GIS Techniques

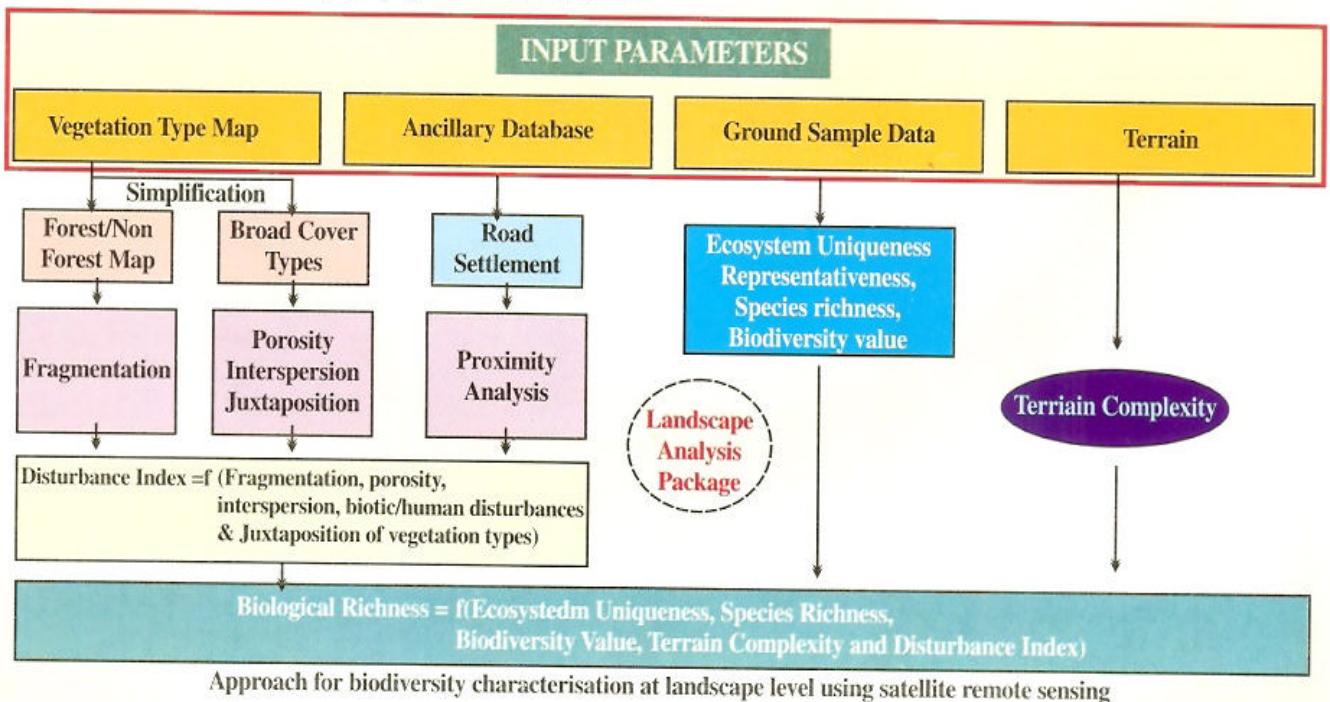
Forest plays most important role in regulating environment and is the key factor in sustaining the life on the earth. However, excesses human interventions have lead to the fragmentation of forests and therefore loss of biodiversity. Hundreds of seminars, symposia/workshops are organized world over indicates concern. Convention on Biological Diversity (CBD) has given the highest priority on the sustainable management of nature and natural resources. India is among the 12 megabiodiversity centres in the world. And thus it is important to conserve our biodiversity for human welfare specially in the age of rapid biotechnological advancements. A step in this direction has been taken up by the Department of Space at the behest of Department of Biotechnology, Ministry of Science & Technology, Government of India. The project is an inter-institutional to prospect biological resources for *in situ* conservation.

The project is a pioneering effort to generate baseline data on the Biological Richness in "biodiversity hotspots" in the country (North-Eastern Region, Western Ghats, Western Himalayas and Andaman & Nicobar Islands). The project aims at preparation of landscape level biodiversity maps by combining habitat, disturbance regimes and environmental complexity. The habitat is being primarily derived from vegetation cover type maps generated from remote sensing and ancillary information like, topography and biogeographical

classification. The geospatial database on habitat, disturbance regimes and environmental complexity will be combined with knowledge-base on each stratum acquired through ground sampling. Biodiversity richness, disturbance gradient and also "Biodiversity Gap" areas will be able to guide management and decision making for bioprospecting. Biologically rich areas will be prime focus for *in situ* conservation species – genetic variability, gene marking and *in situ* multiplication.

The project has two phases. Phase-I consists of mapping on 1:250,000 scale using IRS multispectral data for characterizing vegetation cover and the landscape characteristics like, fragmentation, patchiness, porosity, juxtaposition and interspersions. The detailed ground inventory in different stratum is being collected on species richness, ecosystem uniqueness, endemism, total importance value etc. of plants. To bring in uniformity in the project execution a methodology manual and a customized software named "BioCAP" have been developed to generate various layers and execute the biological richness model.

During Phase-II detailed inventory in 8-10 important biologically rich sites will be carried out. Community level variations, species proportions and quantitative details on the economic value of plants will be attempted. Ecological limitations in conservation and bioprospecting will be brought out.



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Digital Photogrammetry at IIRS

With the Launch of high resolution satellites (IRS 1C/D), satellite Photogrammetry has gained popularity among Remote Sensing Data users. During last decade, the advancements in computer technology have resulted into replacement of Analogue/Analytical Photogrammetric systems by Digital (soft copy) Photogrammetric systems.

Soft copy Photogrammetry system, "Intergraph TDZ-2000" was acquired in PRS Division of IIRS in September

1999. The capabilities of the systems are:

i) orientation of the images, ii) Stereoscopic observations, iii) Identification and interpretation of features, iv) Aerial/spatial triangulation including GCP generation by GPS, v) Vectorisation of details and feature extraction, vi) DEM generation, vii) Production of Orthophoto/Photo Maps.

IIRS is conducting a special 4 weeks short course on Digital Photogrammetry starting this year.

COURSE CALENDER

- Post Graduate Diploma Course in (a) Agriculture & Soil (b) Forestry & Ecology (c) Water Resources (d) Watershed Management (e) Eco Development
Duration : 1.8.2000 to 1.6.2001 **Seats :** 5-10
- Four months GIS : Technology and Application Courses in (a) Water Resources Management (b) Coast Zone Management (c) Forest Management
Duration : 1.8.2000 to 1.12.2000 **Seats :** 5
- Three months course in (a) Basic Photogrammetry and Remote Sensing
Duration : 1.8.2000 to 27.10.2000 **Seats :** 5
- 2 Weeks Orientation course on Remote Sensing Applications Course in (a) All Natural Resource Disciplines
Duration : 3.7.2000 to 14.7.2000 **Seats :** 30
- 1 Week Decision Makers Course in
(a) Overview for Decision Makers
Duration : 10.7.2000 to 13.7.2000 **Seats :** 10
- Photography Course in
(a) Colour Photography
Duration : 3.7.2000 to 21.7.2000 **Seats :** 4
(b) Special Course in Photography
Duration : 3.10.2000 to 30.10.2000 **Seats :** 8