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...on mission for transferring technology through training and education

International Training and Research Programme on Groundwater Governance in Asia: Theory and Practice

IIRS, in collaboration with International Water Management Institute (IWMI), Sri Lanka, hosted a training and research programme on "Groundwater Governance in Asia: Theory and Practice" during 24-28 October, 2006. The course was organized as a part of the project "Groundwater Governance in Asia: Capacity Building through Action Research in the Indo-Gangetic (IGB) and Yellow River (YRB) Basins" being supported by the CGIAR Challenge Program on Water for Food (CPWF) to IWMI. One week training session was part of the five weeks' class room training program, prior to 16 weeks of action research by the participants.

The course targeted people involved in groundwater development and management, research, training and awareness at various forums, representing 6 Asian countries (Bangladesh, China, India, Nepal, Pakistan and Sri Lanka).

During the training session, one day was dedicated towards imparting concepts of Remote Sensing and GIS and their applications in groundwater studies through lectures and demonstrations on image processing and GIS softwares. The remaining four days were devoted towards social sciences.

The course opened an opportunity for further collaboration with IWMI and other institutions in Asian countries involved in groundwater research.

S.K. Srivastav

Ist Row (Left to right)- J.L.Sabatier, Ronglin Sun, V.Selvi, L.D.Rajasooriyar, Cailing Hu, J.P.Chaudhary, V.K.Dadhwal (DEAN, IIRS), S.K.Govil, R.C.Lakhera, S.K.Srivastav, R.S.Chaterjee
IInd Row (Left to right)- Xufeng Li, Xianguo Cheng, Jianmin Cao, M.A. Haque, D.R.Sena, Sunderrajan Krishnan, M.S. Islam, Deepesh Machiwal
IIIrd Row (Left to right)- Nitin Bassi, Adlul Islam, Imtiaz Ahmad, YanFeng Liu, S.M.Kori, P.K.Champati Ray, R.S.Gautam, F.A.Shaheen, Mirza A.F.M.R.Hassan, Yungping Qian, Anantha K.H, V.Hariprasad, V.R.M.Ramchandrula, Anwar Zahid, A.R.Shaikh, V.K.Jha, I.C.Das

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- Technique for Change detection in Forest landscape

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EDITORIAL COMMITTEE

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M.Sc. in Geo-Hazards

On 12 January, 07, 3rd batch of 7 students successfully completed their M.Sc. course in Geo-Hazards which is a joint course between IIRS and ITC. The course with participants of Awareness course of 2 weeks, Certificate course of 4 months, PG Diploma course of 10 months and Master of Science course of 18 months duration, started on 4th July, 2005. After completion of all other courses 7 participants continued for their M.Sc. Among them 3 participants are govt. sponsored and 4 participants are self-financed candidates.

This course was organized as about 16 modules of 3 weeks duration and a dissertation of 6 months duration. Out of 16 modules, 12 modules and dissertation were conducted at IIRS during 4 July 2005 to 24 March, 2006 and 24 June, 2006 to 12 January, 2007 and 4 modules were conducted in ITC, The Netherlands during 27 March, 2006 to 23 June, 2006. The 12 modules were conducted almost by all the faculty of IIRS from 8 divisions, under the guidance of 12 module coordinators.

The officer trainees after successful completion of the course work have taken up the research work in June, 06. They have worked on the following topics.

- Damage Assessment and Monitoring the spread of damage of Sugarcane crop by Sugarcane Woolly Aphid (Ceratovacuna lanigera Zehnter.) in South Maharashtra **(Shivraj A Ghorpade)**
- Analysis of Hydrogeological System and Land cover for Assessment of Risks to Irrigated Areas in Thar Desert : Charanwala System of Indira Gandhi Canal Project (**Rajesh Bhakar)**
- Establishing Precipitation Thresholds for Landslide Initiation along with Slope Characterization using GIS based modeling **(Ms. Surabhi Kuthari)**
- Industrial Hazard, Vulnerability and Risk Assessment for Land use Planning: A Case Study of Haldia, West Bengal. **(Ms. Anandita Sengupta)**
- Hydrodynamic Modeling of the 2003 Nuna River flood using terrain information obtained from remote sensing sources **(A. Lesslie)**
- Defining a Flood Risk Assessment procedure using community based approach with integration of Remote Sensing and GIS based on 2003 Orissa flood **(Ms. Sreyasi Maiti)**
- Flood Extent mapping An Object Oriented Image Segmentation Approach towards mapping the 2003 flood in and around the Kendrapara District, Orissa, India.**(Ms. Chandrama Dey)**

Group photograph of M.Sc. Geo-Hazards participants with Chief guest Prof. Dr. Gajendra Singh, Vice-Chancellor, Doon Technical University, Dehradun and Prof. Victor Jettin, Chairman, AES, ITC, The Netherlands, Dr. Cees van Westen, Associate Professor, AES, ITC, The Netherlands.

All the course participants have completed the M.Sc. course successfully. Mr. Rajesh Bhakar has completed M.Sc. with Distinction.

V. Hari Prasad & I.C. Das.

4th JEP-Microwave Training Programme On "Radar Remote Sensing And Applications"

Microwave remote sensing in earth observation related to various applications has been established as an important tool to complement and supplement information presently being acquired from a host of optical remote sensing satellites. In order to strengthen the application potential of remote sensing technology in India, Department of Space(DOS) has planned for radar sensor for future Earth Observation satellite, RISAT. In order to explore the application potentials, develop relevant methodologies and processing techniques, it is required to train a large number of professionals, to derive maximum benefits in terms of radar data processing and applications of microwave remote sensing data, when available from Indian satellite.

In this regard, IIRS has already conducted two specialized and one advanced training programme on Microwave remote sensing during 2005-2006 as a part of the JEP-MW programme of DOS for persons mainly involved in the JEP-MW projects. However, it was felt that it is also necessary to train professionals other than those involved in the JEP-MW in order to familiarize with the concepts and application potential of microwave remote sensing, particularly Synthetic Aperture Radar (SAR).

Therefore, a specialized multidisciplinary training programme of 1 week duration on "Radar Remote Sensing and Applications" was organized between 12.02.07 to 16.02.07 at IIRS Dehradun to provide basic understanding and expertise leading to successful utilization of RISAT data when available in the near future. The course covered topics related to Geology and Terrain Analysis, Agriculture, Forestry, Soil, Urban, land use, Hydrology and Oceanography in fourteen lectures and four practical sessions.

In total, 31 participants from various user departments and DOS Centres (with experience in Optical Remote Sensing), and other interested faculty members of IIRS attended the course. The theory lectures were delivered by IIRS faculty and guest faculty from National Remote Sensing Agency and Space Applications Centre, Ahmedabad. The theory classes were supported by practical exercises using various types of radar data (Radarsat, Envisat, ERS etc.). Case examples were demonstrated highlighting the application potential of radar data using software such as ERDAS imagine, SARDA, Geomatica, and SARSCAPE. At the end, all course participants were provided with a CD containing all presentation material. Very positive feed back was expressed during the valedictory function and it was declared that more such courses would be organized in future with more emphasis on practical.

P.K.Champati Ray

Master of Science in Geoinformatics

4th batch of M.Sc Geoinformatics degree course, which started in July 2005, has been conducted successfully at IIRS with the collaboration of ITC, Enschede, The Netherlands after 18 months of dedicated effort, coordination and hardwork. In this 4th batch, there were 2 Govt. candidates (one each from Madhya Pradesh Forest Department and Chattisgarh Science and Technology Department), 1 Foreign national from Kenya (sponsored by WMO) and 4 private candidates. All students went to ITC during theoretical modules (April to June, 06) .The students planned their research proposals at ITC. The proposal was evaluated and approved by ITC Research board. After that they pursued their 6 months research thesis at IIRS. Students progress was monitored regularly and Mid-Term evaluation was also done by ITC-IIRS experts.

Final Graduation Ceremony group photo of 4th batch of M.Sc Geoinformatics

Student's research thesis was evaluated by IIRS & ITC experts and also the thesis were sent for evaluation to Indian experts in various institutions like Dr. Devendra Pandey, Director General from Forest Survey of India, Dehadun, Dr. P.K. Garg from IIT-Roorkee, Prof. Dr. S.S. Hundal from PAU Ludhiana, Dr. S.K. Bartaria from Wadia Institute of Himalayan Geology, Dehradun, Dr. D. Ashok Kumar from School of Planning & Architecture-Delhi, Dr. Milap Punia from JNU, Delhi. Finally Expert Committee through Defense-Presentation assessed the students on 11th January 2007 with Prof. Dr. Alfred Stein from ITC as Chairman of thesis evaluation board. All students have successfully defended , one with distinction and the remaining with first class. The ITC experts appreciated the overall quality of the thesis and the programme.

The student Research thesis details are

- Neighborhood Correlation Image Analysis technique for change detection in Forest Landscape **(R.R. Okhandiar)**
- Spatio-temporal gradient modeling of land cover change (**Divyani Kohli)**

- Atmospheric Correction Models for Retrievals of calibrated spectral profiles from Hyperion EO-1 Data **(Prashant Kawishwar)**
- Analysis of External Drift Kriging Algorithm with application to precipitation estimation in complex orography (**Bernard S. Majani)**
- Optimisation of Polarisation and Incidence Angle Configuration for estimation of surface roughness in sloping areas using ENVISAT-1 ASAR Data (**Rajiv Nair)**
- Dynamic Information Extraction for rugged topography from multi-sensor satellite data (**Pankaj Kumar)**
- Modelling Spatio-Temporal pattern of Drought using Three-Dimensional Markov Random Field **(Virat shukla)**

In the afternoon of 12th January 2007, "Graduation Ceremony" was organized and Dr. Gajendra Singh, Vice Chancellor of Doon University, Dehradun, graced the occasion as the chief guest. Prof. Dr. Alfred Stein, Prof. Dr. Victor Jetten and Dr. Van Weston from ITC also participated in the function. The M.Sc degree certificate were distributed to students along with a customary ITC memento. In the forenoon of 12th January 2007, a half-day seminar on "Recent Technological Trends in Geoinformatics & its Applications in Geohazards" was conducted in order to make the student community at IIRS to know about the research done under M.Sc programme. Prof. Dr. George Joseph, Director CSSTE-AP chaired the session and ITC professors also presented their invited talks.

Address by Chief Guest Dr. Gajendra Singh during the Convocation

Overall the programme was successful. The efforts put in by IIRS & ITC staffs and other guest lecturers, external experts are appreciated and duly acknowledged. Currently our 5th batch of M.Sc Geoinformatics course is running. The initial agreement between IIRS-ITC to conduct M.Sc Geoinformatics was only for 4 batches (2002-2005). Hence our first agreement of running 4 M.Sc Geoinformatics has successfully been completed. But IIRS and ITC collaboration will continue till 2010, in which MSc degrees will be awarded by ITC and the P.G. Diploma in Geoinformatics and Geo-Hazards will also come under joint logo program of IIRS and ITC. The eligible and interested candidates will only be considered under this IIRS-ITC joint logo for PG Diploma in Geoinformatics and non-eligible/other candidates will get IIRS PG Diploma Certificate. The next batch will start in July, 2007 along with other IIRS Certificate courses.

C. Jeganathan & P.L.N. Raju

International Workshop on Harmonization of Forest and Land Cover Classification using LCCS for Asia-Pacific Region

An international workshop was organized by the Indian Institute of Remote Sensing, Dehradun during 4-8 December 2006 jointly by Global Land Cover Network (GLCN), Monitoring, Assessment and Reporting Project (MAR) and Indian Institute of Remote Sensing (IIRS) under sponsorship of the Govt. of Italy, Govt. of Japan, Govt. of Netherlands, United Nations Environment Programme (UNEP) and the Food and Agriculture Organization (FAO) with support from the FAO representation in India, New Delhi. This workshop was the fifth in the series on Land Cover Classification System (LCCS) pilot testing under Letter of Agreement (LOA) between IIRS and FAO. Of the earlier four workshops on pilot testing in India, two were held at New Delhi and two at IIRS. A total of 40 technical personnel attended the Asia-Pacific Workshop, which included twenty course participants from 12 nations of the Region besides India and an equal number of resource persons from USGS, JRC, Italy, FAO, Rome, China and India. The main objectives of the workshop were to: (i) provide training on the use of the GLCN technologies including GeoVIS and LCCS software for land and forest cover classification in Asia-Pacific region and (ii) review the forest classifications and assist in harmonizing and standardizing the classification and mapping of forest cover using remote sensing in the countries of the Asia-Pacific Region.

Contact

The group discussions demonstrations and practice sessions on LCCS and GeoVIS were organized for harmonization of land and forest cover classifications across the countries. Several presentations were made by the resource persons on the GLCN/LCCS, GeoVIS, cartographic standards, the Vegetation Dynamics (VEDAS) software, Map Accuracy Program (MAR) and next Global Forest Resource Assessment (FRA-2010). The participants evaluated the workshop as excellent. It was concluded that GLCN-LCCS could be an effective tool for harmonizing and standardizing the classification and mapping of land and forest cover using remote sensing in countries of the Asia-Pacific Region. It was further suggested that FAO should organize follow up workshops at the regional and the sub-regional level for wider understanding and acceptability of LCCS.

First row L-R: Zagdaa Narangerel (Mongolia), Rina Djuariah (Indonesia), Anny Meilani (Indonesia) , Birendra Bajracharya (Nepal), Balak Ram (India), Subhash Ashutosh (India), Anoop Singh (India), Kailash Govil (FAO, Italy), V.K. Dadhwal (IIRS), Sonam Penjor (Bhutan), Teang Sokhom (Cambodia), Seungho Lee (Korea), Maung Maung Than (Myanmar), Alok Saxena (India), S.P.S. Kushwaha (IIRS). **Second row L-R:** Nagendra Paudyal (Nepal), I.J. Singh (IIRS), Trilok Bharadwaj (RRSSC-Dehradun), O.P. Gaba (India), B.A. Jayananda (Sri Lanka), Masahiro Otsuka (FAO, Thailand), Kachchakaduge Tilak Premakantha (Sri Lanka), Thavone Vongphosy (Laos), Utpal Sarma (India), Jose C. Cabanayan Jr. (Philippines), Xia Chaozong (China), K.D. Singh (India), Zhang Lei (China), C. Jeganathan (IIRS), Uttara Pandey (IIRS). **Third row L-R:** Suchismita Mukhopadhyay (IIRS), B.K. Payal (IIRS), Mohit Kalra (IIRS), Di Gregorio Antonio (FAO, Italy), Craig von Hagen (FAO, Kenya), Maxim Lobovikov (China), S.K. Srivastav (IIRS), Suresh Kumar (IIRS), Sandeep Maithani (IIRS), Rajiv Kumar (India), Pham Manh Cuong (Vietnam), Hans J•rgen Stibig (Italy), Chandra Giri (USA), Subrata Nandy (IIRS), Ranjeet Kumar (IIRS), Arun Kumar (IIRS)

S.P.S. Kushwaha

40 Years and Beyond IIRS-ITC Collaboration in Capacity Building

The collaboration between IIRS and International Institute for Geoinformation Science and Earth Observation (ITC) spans four decades now. During these forty years, four distinct periods or phases of collaboration can be clearly distinguished . The first marked the establishment of the Indian Photo-interpretation Institute (IPI, now known as Indian Institute of Remote Sensing, i.e. IIRS) in 1966 with Dutch Govt. collaboration. During initial period of 1966 to 1974, the emphasis was placed on creating basic facilities in training in aerial photo- interpretation. During second phase (1983 to 1990) emphasis was directed towards establishment of a new division, " Human Settlement Analysis Group-HUSAG" for study of urban and rural settlements for planning and developmental purpose. The third phase spanning from 1994 to 1999 was devoted to infrastructure upgradation and faculty improvement in the field of Geoinformatics for Natural Resources Development and Environmental Planning and Management. The fourth phase spanning from 2000 to 2004, was marked by collaboration with two more institutes of Netherlands apart from ITC, namely International Institute for Infrastructural ,Hydraulic and Environmental Engineering (IHE) and Wageningan University (WU) for capacity building in disaster management. This also led to initiation of Joint Educational Programme (JEP) under which IIRS students did three months' project work at ITC and received M.Sc. degree with joint IIRS-ITC logo.

Thus a commemorative workshop was organized on 28-29 November, 2006 at Indian Institute of Remote Sensing, Dehradun on Forty Years (1966-2006) Of Glorious Collaboration between IIRS and ITC in Capacity Building. The workshop had ten sessions. The Chief Guest Mr. G. Madhavan Nair, Chairman ISRO,Sec. DOS and Chairman NRSA Governing Body delivered his address via spacenet . In the Inaugural session, the Guest of Honour H.E. Eric F.Ch. Neihe, Ambassador, Royal Netherlands Embassy addressed the audience on the auspicious occasion and also released the souvenir brought out on this occasion. The souvenir contained historical landmarks and vintage photographs, besides messages from Chairman ISRO, Ambassador Dutch Government, Rector ITC, Ex-Director CSSTEAP, Program Director International Cooperation ISRO, present and past NRSA Directors and IIRS Deans , and also details of training, research and Ph. D. programmes under collaborative mode.

The workshop was graced by a number of national and international dignitaries viz. Mr Theo J.J. Groothuizen, Councellor S. & T., Dutch Embassy; Dr M. Molenaar, Rector ITC; Dr K. Radhakrishnan, Director NRSA; Prof B.L. Deekshatulu, Dr D.P.Rao; Ex Directors- NRSA, Dr P.Nag, Ex-Surveyor General SOI; Dr NS Virdi, Ex-Director WIHG; Dr G.S. Srivastava Ex- Dy. D.G. GSI; Prof A.Meijerink, and ITC Faculty Members ,besides approx 300 participants that included present and past IIRS Faculty and IIRS Alumni.

The second session was devoted to "Reflections & Milestones" with Dr Meijerink ,Dr DP Rao, Dr N.S. Virdi, Dr Srivastava, Prof AK Roy and Prof BM Singh sharing their experiences ."Shaping Future Indo-Dutch and IIRS-ITC collaboration and Panel Discussion", "Status of ITC- IIRS/NRSA Collaboration" were consecutively the third and the fourth sessions.

Poster Session included "Visit to Exhibition" and "Poster Presentations by students under JEP" respectively. IIRS & ITC faculty made presentations on "Recent Advances in E.O. applications" while three IIRS faculty made presentations related to their "IIRS-ITC sandwich Ph. D. programme". The concluding session concentrated on future directions of Indo-Dutch and IIRS-ITC collaboration activities.
DOS and Dutch Embassy also took keen interest in organization of above mentioned workshop, apart from programme committee of IIRS and ITC. The workshop was a great success.
The positive outcome of this workshop is that IIRS and ITC have signed another significant MOU for JEP for next five years (upto 2010) under which IIRS will continue to conduct joint logo M Sc and Diploma courses in Geoinformatics and Geohazards.

V.K.Jha

Rainfall thresholds for initiation of landslides and decoupling of spatial variations in precipitation, erosion, tectonics in Garhwal Himalaya

Understanding of rainfall induced landslides and coupling of erosion, tectonics and climate is of critical importance in Garhwal Himalaya for a proper understanding of geodynamics of the region. Due to lack of basic meteorological data, very limited progress or no progress has been made so far in this regard. Rainfall induced landslides cause immense loss to human life and property in Himalaya every year. It is necessary to study two aspects that are of critical importance to landslide hazard and risk assessment: magnitude-cumulative frequency of rainfall and initiation of landslides. Relationship of rainfall and sediment yield will also enable to define the threshold of landsliding in the region.

The hypothesis that abrupt spatial gradients in erosion can cause high strain rates in active orogens has been supported by numerical models that couple erosion processes with lithospheric deformation via gravitational manifestations leading to mass wasting in mountain belts of world. This is one of the prime causes of landslides and associated mass wasting in Garhwal Himalaya, which needs to be investigated with well distributed meteorological data sets, unavailable so far, thus limiting understanding of relation between climate, tectonics and erosion. Therefore, a project has been taken up by IIRS under Disaster Management System (DMS) of ISRO, that will enable to establish a relation of sediment yield with tectonics, landslides and earthquake in the region.

The study area comprises the Alkananda valley starting from Higher Himalaya to middle part of Lesser Himalaya covering one of the most structurally disturbed region experiencing very active mass wasting and wide variations in rainfall and erosion. Study area also covers the famous pilgrim route to Badrinath, important hydel power project sites and areas of strategic importance close to Tibet border. Therefore, strategically, 12 AWS are set up at different altitudes in the valleys of Alkananda and tributaries (Figure 1, 2 and 3). This augments the existing meteorological observatory of IMD and BRO in the region, thus providing very valuable data sets for above stated objectives.

Contact

All sensors of AWS are under test and data quality is being monitored. Some abnormality is data acquisition have been observed. Additionally 4 Vibrating Wire Piezometers have been received from AIMIL ltd. These instruments along with Extensometer will be installed at 7 locations after drilling 10-15 meters of depth for monitoring pore water pressure and sub-surface movement. Information on rainfall, landslides and damage are being collected from various sources, preliminary analysis show promising results on landslide threshold. The study aims to analyse data in real time or NRT during coming monsoon rain vis-à-vis landslide occurrences to understand the influence of rainfall in initiation of landslides.

The satellite based precipitation, available from CPC/NOAA will be compared with ground based observation for utilizing such information in inaccessible regions. Based on the rainfall and sediment yield, mass wasting as an indicator of landslides will be established. Attempts will also be made to establish the sediment yield and upliftment rates in different tectonic regime in order to understand the tectonic effect on landslides and mass wasting.

Figure 1. Network of Automated Weather Stations set up by IIRS for landslide monitoring in Alkananda basin.

Figure 2. AWS located on northeast slope at ITBP campus in Joshimath, background snow-glacier features such as cirque and arête.

Figure 3. AWS located at one of the highest rainfall receiving area of Chamoli district, Mandal.

P.K. Champati Ray

Hydrodynamic modelling of the 2003 Nuna River flood

The Natural Hazards are common and frequently occurring phenomenon, which leads to great loss of population, infrastructure, property, etc., termed as natural disasters and is to be controlled and managed. The research work towards preparedness, hazard prevention and mitigation has become prime importance. In India, one-eighth part of geographical area is prone to floods and annually almost 18.6 million hectares of land is flooded and 17.5 million people get affected due to flood. The flood is termed as the flow of water in the river, when exceeds its capacity and overtopping its banks, results in inundation of the floodplain which leads to loss in the form of property, infrastructure, agriculture and even life. In the present study dynamics of water in the river as well as in floodplain during floods using integrated Geoinformation and Hydrodynamic (HD) modeling are attempted. The latest Indian satellite CARTOSAT-1 with 2.5 meter spatial resolution and 30 km swath is used to generate digital elevation model (DEM), which is the primary input in hydrodynamic model. The MIKE Flood model is the combination one-dimensional (1D) and two-dimension (2D) hydrodynamic model. The one-dimensional model is based on the cross-sectional averaged Saint-Venant equation, describing the development of water level, discharge and mean flow

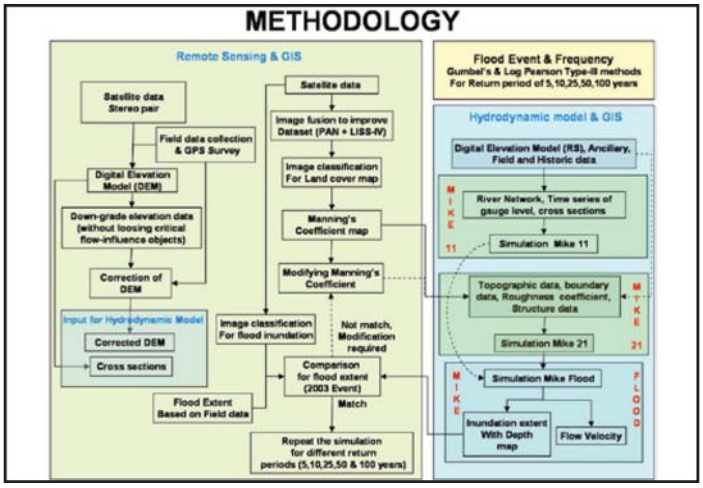


Figure 1: Flowchart of the general methodology

velocity. The two-dimensional model is based on the depth averaged Saint-Venant equations, describing the evolution of the water level and two Cartesian velocity components (along X and Y direction). The computed results from HD model can be used to generate flood inundation maps mapped for inundation using modeling geographic information system (GIS) components.

In the upper and lower catchments areas of the Mahanadi river heavy rainfall occurred during 27th August to 28th September 2003, due to this, 21 out of 30 districts in Orissa were affected. The present study is carried-out for year 2003 floods in Nuna river in Kendrapada District of Orissa, India.

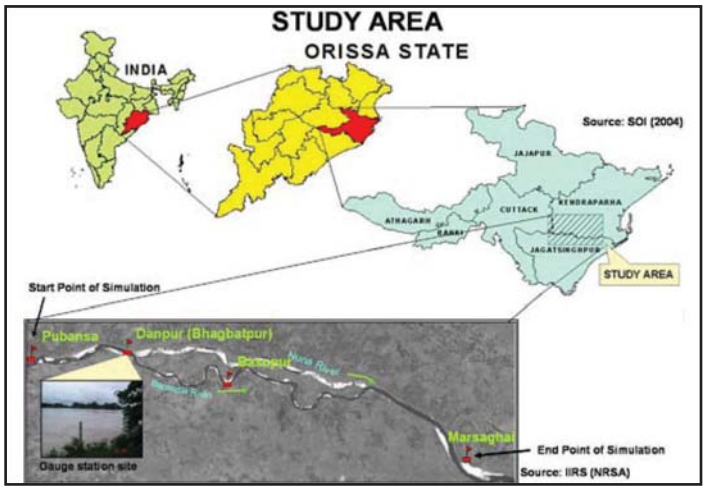


Figure 2: Map showing the study area and river stretch for flood simulation).

The study is designed into two basic components, Geoinformation and Modeling. In Geoinformation component, Generation of DEM of Cartosat-1 stereo pair with Ground control point (GCP) collected using Global positioning system (GPS) in differential mode. The GPS survey was conducted with the stationed time of 45 minute to an hour in each station and these data were post processed to resolved ambiguity of satellite coverage's. The Post processed GCP's were used for automated generation of DEM in different spatial resolutions (10m, 12.5m, 15m, 17.5m & 20m as showing in the figure 3) in WGS 84 datum, validated and the same GCP's were used to georeference the cartosat-1 data.

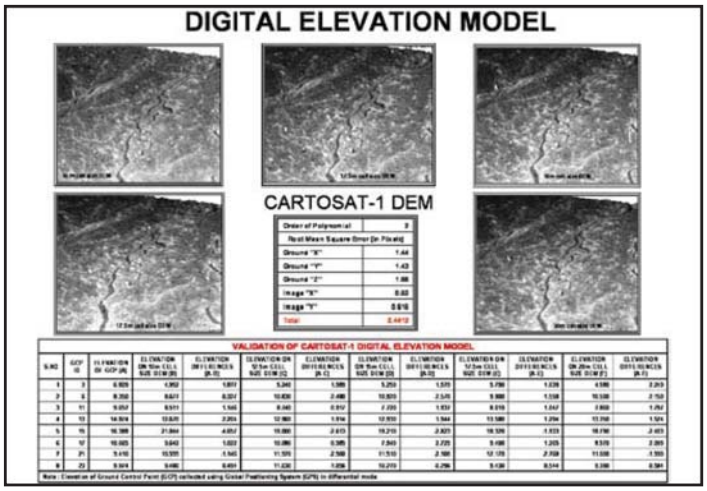


Figure 3: Map showing digital elevation model from Cartosat-1 stereo pair on different resolutions.

Further to obtain better accuracy, DEM derived using break lines in stereo work station on 10m cell size. The conversion of the WGS 84 datum to Mean Sea Level (MSL) is carried out using Earth Geoid Model 96 (EGM 96), WGS 84 to EGM 96 converter was used for collected GCP's and mean of the geoid surface calculated to bring the land surface to MSL, this procedure is adopted to preserve relative accuracy of the DEM. The Land use / land cover map is prepared to derive the manning coefficient which is the input for 2D HD model. In the Modeling component, Database generation of cross sections and observed hydrographs at gauge sites for the flooding event to define in the boundary conditions. GIS tools were used to extract the additional cross section from the DEM along river system to simulate 1D Hydrodynamic model. The coarse resolution DEM of floodplain is planned for use to simulate 2D Hydrodynamic model. The results of 1D & 2D hydrodynamic models is used to generate spatial flood extent (Figure 4: Map of Nuna river network system in Hydrodynamic model), which will be validated with the flood extent derived using Radarsat-1 satellite data of 4th and 11th September, 2003 of the event. From the designed inputs of the model, the flood extents are derived for 5, 10, 25, 50 & 100 years return periods of the study area.

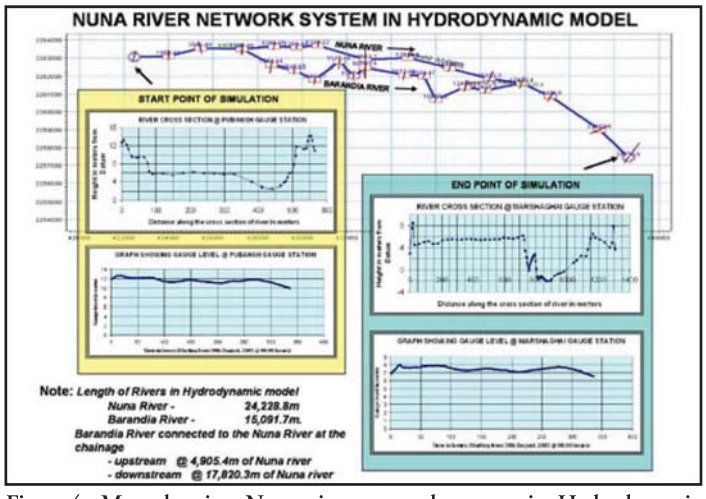


Figure 4: Map showing Nuna river network system in Hydrodynamic model

A. Lesslie & V. Hari Prasad

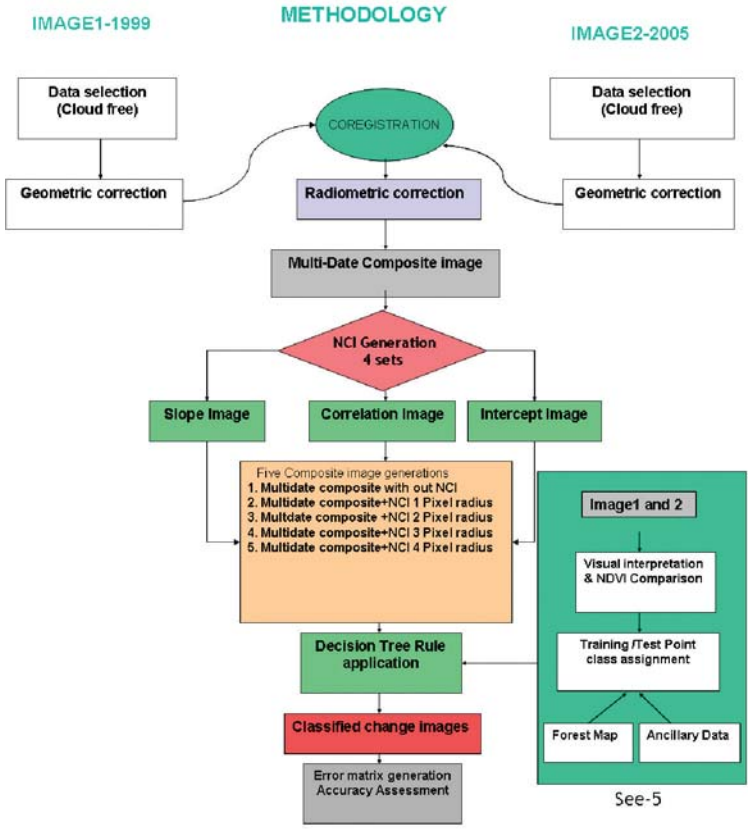
Neighborhood Correlation Image Analysis Technique for Change detection in Forest landscape

Background

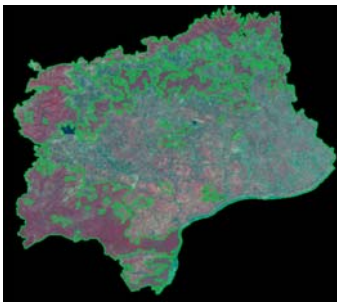
Climatic changes, drought, flood, loss of habitat, biodiversity, livelihood etc are some of the consequences of depletion of forest cover which has far reaching effect for survival of human kind. It is in this context monitoring of forest cover is very crucial. Strength and potential of RS and GIS Technology is well established in environmental monitoring system. In recent times advancement in RS technology and development of new mathematical algorithm has opened the door for new possibilities for change detection analysis.

Concept

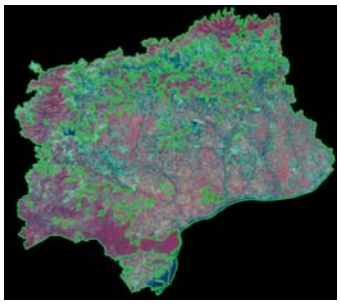
Neighborhood Correlation Analysis technique is such new technique which uses contextual information of Correlation, Slope, and Intercept in the neighborhood of a central pixel between two date images. The high/low correlation values give the information of no change/change and the information of slope and intercept gives the detail information about trajectory of change. NCI coupled with Decision Tree Classification is expected to give detailed information of **from to** change. This research proposes to investigate the usability of this technique in Forest landscape using medium spatial resolution (IRS-LISSIII).



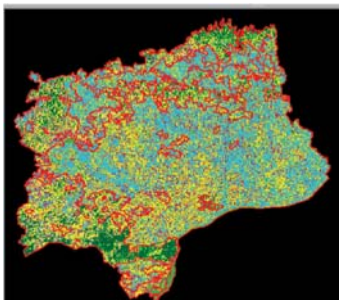
Band wise Correlation, Slope and Intercept images (NCI Images) are generated for each pair of bands between two date images for each neighborhood configuration. Four circular neighborhood configurations are considered for this study.Composite of original bands of two date images and NCI images generated are made for developing decision tree classifier 2191 random points are generated for training and testing the classifier. On visual inspection of FCC images of two dates and NDVI information of the random points pixels, change and no change classes have been assigned. Canopy density is considered to categorize forest cover into forest, open forest and non forest as no change classes and five other change classes i.e. forest to non forest, forest to open forest, open forest to forest, open forest to non forest and non forest to non forest.



FCC IMAGE 1999



FCC IMAGE 2005



Change Detection Map Without NCI

SEE5 software that is data mining software is used to generate Decision Tree Classifier. Knowledge base so developed then is used to generate the detail change detection map through ERDAS knowledge classifier. It is analyzed whether contextual information of correlation, slope and intercept improves the over all change detection process. Accuracy assessment is done on the basis of test random points. The most appropriate neighborhood configuration for change detection in forest

landscape is further analyzed.

Progress

On detail preprocessing of raw data NCI images have been generated. Four circular neighborhood configurations of 1, 2, 3 and 4-pixel radius are considered for this study. On generation of random points and assignment of various change and no change classes to these points, decision tree classifier has been made with use of SEE5 software. Trial change detection map has been generated with the use of ERDAS knowledge classifier. Further analysis on accuracy is being done

R.R. Okhandiar
P.L.N. Raju
Vandita Srivastava

Awards

Dr. P.K. Joshi Scientist/Engr. 'SD' received **GOLD MEDAL** of Indian Academy of Environmental Sciences (IAES) during International Conference on Current Issues in Zoology and Environmental Sciences, DDU Gorakhpur University, Gorakhpur, November 11-13, 2006. This has been awarded in recognition of his valuable contributions to the discipline of Environmental Sciences in general and remote sensing for Environmental Sciences in particular.

Ms. Vandita Srivastava, Scientist "SD", Geoinformatics Division, IIRS, Dehradun has been awarded with **Best Poster Presentation Award** by Indian Science Congress Association, Kolkata for her poster presentation on paper titled "A Novel Approach for evaluating result of Information Extraction Process from Satellite Images on Area Features and Demonstration of the Proposed Approach", presented during 94th Indian Science Congress, held during 3-7 January, 2007 at Annamalai University, Chidambaram.

Campus News

- Dr. A.P.Subudhi rejoined office on completion of deputation as Director, Jharkhand State Application Centre.
- Mrs. Sudesh Sethi , Sr. Adminsitative Officer on attaining superannuation retired on 29th December 2006.
- Mr. Anurag Gupta Sc/Engr "SD" has resigned and joined as design engineer modeling at Freescale Semiconductor India Pvt. Ltd , Noida.
- Dr. Milap Punia , Sc/Engr "SD" has resigned and joined as Assistant professor in JawaharLal Nehru University , New Delhi.
- Dr.P.K.Joshi Sc/Engr "SD" has resigned and joined as Associate Professor TERI University, New Delhi.

Contact

Calendar of training courses for the year 2007

Sl. No	Course Code	Course Name	Entrance Requirements	No. of Seats	Starting Date dd.mm.yy	Passing Out date dd.mm.yy	Course Fee			Apply Before Date
							Govt. Sponsored	Open Candidates	Foreign Trainees US $	
REMOTE SENSING & GIS MAPPING AND MONITORING OF NATURAL RESOURCES										
1.	C-PR	Basic Photogrammetry & Remote Sensing	Science/Engineering Graduate with mathematics up to higher secondary school level & 2 years experience (in service)	5	5.3.2007	29.6.2007	Nil	24,000	2400	29.12.2006
2.	D-AS	Agriculture & Soils	M.Sc in Agriculture/ Soil Sciences/ Geography /B.Sc Agriculture (4 years)	6	5.3.2007	28.12.2007	Nil	60,000	6,000	29.12.2006
3.	D-FE	Forestry & Ecology	M. Sc in Forestry/ Environmental Science/Ecology/ Botany/Wildlife/Geography / B.Sc. Forestry (4 years)	6	5.3.2007	28.12.2007	Nil	60,000	6,000	29.12.2006
4.	D-GG	Geosciences	M.Sc./M. Tech. in Geology/ Geography	6	5.3.2007	28.12.2007	Nil	60,000	6,000	29.12.2006
5.	D-MS	Marine Sciences	Post Graduate in Marine Sciences/Earth Sciences / any Natural Science	6	5.3.2007	28.12.2007	Nil	60,000	6,000	29.12.2006
6.	D-UR	Human Settlement Analysis	Post Graduate in Town & Country Planning / M.Sc. in Geography Civil Engg. or Architecture Graduates / B Planning	6	5.3.2007	28.12.2007	Nil	60,000	6,000	29.12.2006
7.	D-WR	Water Resources	B.E. / M.E. in Hydrology / Civil Engineering /Agricultural Engineering/ M.Sc. in Geology. Graduate Engrs with 2 yrs experience (in service).	6	5.3.2007	28.12.2007	Nil	60,000	6,000	29.12.2006
8.	D-DP	Digital Photogrammetry	M.Sc./M.Tech. Physics, Maths, App. Maths, Statistics, Geophysics, Meteorology, Oceanography, Gelogy, Geography or any Natural/Environmental Sc. or BE/B.Tech. Working Govt servants with Graduation in Science with 2 yrs experience	6	5.3.2007	28.12.2007	Nil	60,000	6,000	29.12.2006
9.	+M -RG (TEN-TATIVE)	M.Tech. in RS & GIS in all the disciplines of the above Post Graduate Diploma Courses except D-DP	M.Sc./M.E. in Natural Sciences- Geography / B.E. (Civil) /B.Tech/ B.Arch. (Planning) /M.Planning / B Planning in First Class or Master in Computer Applications (with Science at Graduate level) + B.Sc. (4 years)	10	5.3.2007	27.02.2009	Nil	1,44, 000+ 3,800 (Andhra Univ. Regn. Fee)	14,400 + 75 (Andhra Univ. Regn. Fee)	30.11.2006
GEOINFORMATICS : TECHNOLOGY AND APPLICATION										
10.	C-GG	GIS in Geosciences	M.Sc. in Geology/ Geography with Remote Sensing experience	3	2.7.2007	26.10.2007	Nil	24000	2400	27.4.2007
11.	C-GL	Land Information System	Post Graduate in Town & Country Planning/ M.Sc. in Geography with RS experience / B.E./ B.Arch. / B. Planning	3	2.7.2007	26.10.2007	Nil	24000	2400	27.4.2007
12.	C-GA	GIS in Soils & Landuse Planning	M.Sc. in Agriculture or equivalent with Remote Sensing experience	3	2.7.2007	26.10.2007	Nil	24000	2400	27.4.2007
13.	C-GW	GIS in Water Resources Management	B.E./M.E. in Hydrology/ Civil Engineering/ Agricultural engineering/ M.Sc. in Earth Sciences with Remote Sensing experience	3	2.7.2007	26.10.2007	Nil	24000	2400	27.4.2007
14.	C-GC	GIS in Coastal Zone Management	M.Sc. in Marine Sciences/ Earth Science / any Natural Science with Remote Sensing Experience	3	2.7.2007	26.10.2007	Nil	24000	2400	27.4.2007
15.	C-GF	GIS in Forest Management	M.Sc. in Forestry / Wildlife / Environmental Science / Botany / Ecology with Remote Sensing Experience	3	2.7.2007	26.10.2007	Nil	24000	2400	27.4.2007
16.	D-GI Joint IIRS-ITC Programme	Post Graduate Diploma in Geoinformatics	M.Sc./M.Tech. in Remote Sensing, Physics, Maths, Applied Maths., Statistics, Geology, Geophysics, Geography with Maths.upto graduation level or graduate in Civil engg / Planning / Arch.. or working professionals with Maths upto graduation level and minimum experience of 2 yrs in the field of photogrammetry.	10	2.7.2007	25.04.2008	Nil	80,000 (Rs. 65,000 payable to IIRS + Rs. 15000 payable to ITC	Euro 3000	13.04.2007
17.	*M-GI Joint IIRS-ITC Programme	M. Sc. in Geoinformatics	M.Sc. in Physics/ Computer Science (or applications)/ Maths/ Natural Sciences, Geology, Urban & Regional Planning / B.Arch. / B.E./B.Tech (Civil / Electronics/ Computers) + B.Sc. (4 years) in First Class	10	2.7.2007	26.12.2008	Nil	1,20,000 payable to IIRS + Euro 1250 payable to ITC +2,00,000 towards living allowance & visit to ITC	Euro 6250	29.12.2006
PROGRAMMES IN GEOINFORMATIC APPLICATIONS IN GEO-HAZARDS										
18.	C-GH	Certificate course on "Geo-Hazards" 3 Optional streams : Hydrometeorological/ Geological/ Environmental	P.G. In Natural Sciences, Earth Science, Urban & Regional Planning/M.E./B.E./ B.Arch & Planning or Post Graduate in Science	10	2.7.2007	26.10.2007	Nil	24,000	2400	27.4.2007
19.	D-GH Joint IIRS-ITC Programme	PG Diploma in "Geo-Hazards" 3 Optional streams : Hydrometeorological/ Geological/ Environmental	P.G. in Natural Sciences, Earth Science, Urban & Regional Planning /M.E. / B.E /B.Arch/ B.Planning/ M. Planning	10	2.7.2007	25.4.2008	Nil	80,000 (Rs. 65,000 payable to IIRS + Rs. 15000 payable to ITC	Euro 3000	13.4.2007
20.	*M-GH Joint IIRS-ITC Programme	M. Sc. in Geo-Hazards 3 Optional streams : Hydrometeorological/ Geological / Environmental	P.G. in Natural Sciences, Earth Science, Urban & Regional Planning /M.E. / B.E /B.Arch/ B.Planning/ M. Planning	10	2.7.2007	26.12.2008	Nil	1,20,000 payable to IIRS + Euro 1250 payable to ITC +2,00,000 towards living allowance & visit to ITC	Euro 6250	29.12.2006

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REMOTE SENSING APPLICATIONS : Theme Specific Orientation Course										
21.	O-NRM	Orientation Course in any area of Natural Resource Management, Environmental Assessment and Disaster Management	Middle Level Managers involved in Natural Resource Management (minimum five years experience in service)	The theme based short courses of 2 weeks duration for a minimum of 5 to 10 participants may be organized on request basis as per the actual expenses						
AWARENESS COURSE/WORKSHOP / DECISION MAKERS COURSE										
22.	O-GH	Awareness course on "Geo-Hazards"	Administrators/Decision Makers/Middle Level Managers with 5-10 years of professional experience	10	9.7.2007	13.7.2007	2000	2000	200	27.4.2007
23.	O-DM	Overview for decision makers	Decision makers in organizations (with 10 years experience in service).	10	18.9.2007	21.9.2007	7,000@	7,000@	700@	13.7.2007
INTERNATIONAL PROGRAMMES										
24.	S-RS	Short Course in Remote Sensing with special emphasis on Digital Image Processing (ITEC Sponsored)	Middle level officers	20	08.1.2007	02.3.2007	12,000	12,000	1200	30.11.2006
25.	S-GI	Short Course on Geoinformatics (ITEC Sponsored)	Middle level officers	20	2.7.2007	24.08.2007	12,000	12,000	1200	27.4.2007
NNRMS - ISRO SPONSORED COURSES : FOR UNIVERSITY FACULTY ONLY										
26.	N-GI	GIS Technology and Applications	P.G. in Science/Engineering Graduate	8	7.5.2007	29.6.2007	Nil	12,000	1200	23.02.2007
27.	N-WR	RS & GIS Applications to Water Resources	B.E. (Civil), Agricultural Engineering, masters in Hydrology/Hydrogeology with 2 years teaching experience	8	7.5.2007	29.6.2007	Nil	12,000	1200	23.02.2007
28.	N-FE	RS & GIS in Forestry/ Botany/Ecology/Wildlife /Environmental Science	P.G. in Botany/Ecology/Forestry/ Environment/ Wildlife with 2 years teaching experience	8	7.5.2007	29.6.2007	Nil	12,000	1200	23.02.2007
29.	N-UR	RS & GIS in Urban & Regional Planning	B.E.(Civil)/B. Arch./P.G. Planning / B Planning PG Geography with 2 years teaching experience	8	7.5.2007	29.6.2007	Nil	12,000	1200	23.02.2007
30.	N-PR	Cartography and Mapping	P.G. in Science/Geography with 2 years teaching experience	8	7.5.2007	29.6.2007	Nil	12,000	1200	23.02.2007
31.	N-GG	RS & GIS in Geosciences	P.G. in Science/Geography with 2 years teaching experience	8	7.5.2007	29.6.2007	Nil	12,000	1200	23.02.2007
32.	N-GA	RS & GIS in Soils and Land Use Planning	P.G. in Science/Geography with 2 years teaching experience	8	7.5.2007	29.6.2007	Nil	12,000	1200	23.02.2007

Due to in adequate response any programme may be dropped or may be rescheduled.

+ M. Tech. accredited by Andhra University. M. Tech. is offered in six major disciplines (Agriculture and Soils, Forestry and Ecology, Geomorphology and Geohydrology, Marine Sciences, Urban and Regional Planning and Water Resources).Please log in : www.iirs-nrsa.gov.in for details and application form

@ Includes boarding and lodging.

NOTE: - If the date of commencement falls on holiday, course will start from next working day.

Sponsoring organizations are required to meet all expenses viz., traveling allowance, daily allowance, contingent expenses, medical expenses etc., for their candidates EXCEPT course fee. However Sl. Nos. 22, 23, 24 & 25 are paid courses for all.

Govt. organizations include Central / State Government bodies / Autonomous Institutions and Universities and can sponsor only permanent staff.

Private & Self sponsored candidates have to pay full course fee.

Security deposit (i) @ Rs. 2000/- in respect of Certificate Courses (ii) @ Rs. 4000/- in respect of PG Diploma Courses and (iii) @ Rs. 6000/- in respect of M.Sc./M.Tech. for Self Financed candidates, have to deposited/remitted one month prior to the commencement of the course; failing which seats would be offered to waitlisted candidates.

Boarding and lodging charges at IIRS Hostel comes to Rs. 2000 p.m. (approx.). Local candidates will be considered for hostel accommodation, only if available.

For further details, please contact:

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