



❖ CSSTE-AP Newsletter ❖

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IIRS linkages with CSSTE-AP – Prospects

By Dr. P.S. Roy, Dean, IIRS

The Indian Institute of Remote Sensing (IIRS) is a premier Institute for training of scientific and technical personnel in the application of remote sensing, photo-interpretation and GIS, the first and only institute of its kind to be set up in the entire south-east Asia. The institute has very strong established technical collaboration with the International Institute of Aerospace Survey and Earth Sciences (ITC), Enschede, the Netherlands since 1966. Geographic Information System (GIS) emerged as a new and powerful computer-aided tool for inventory, monitoring and management of natural earth resources and environment during nineties. IIRS-ITC worked together to develop courses on Geoinformatics and augment facilities.

IIRS education and training are imbued in the philosophy of "transfer of state-of-art technology". Such an approach requires research to identify appropriate technology and methodologies. Hence, IIRS maintains closer interaction with various user groups. Around 50 dedicated scientific staff impart training on the application of the frontier technology. More than 3800 students including 250 from 45 developing countries of Asia and Africa have graduated from the institute since 1966. There are more than 27 specialised courses in the field of Remote Sensing and GIS (Technology and application). The institute offers these programmes for different target groups i.e., for decision makers, supervisors, middle level officers to young scientists and engineers. This includes several professionals and researchers from neighbouring countries under UNESCO, Commonwealth, UN-FAO, UN-ESCAP, ISRO-SHARES and other collaborative or aid programmes. IIRS has a multidisciplinary and problem oriented research agenda. Scientific staff members guide research scholars under various fellowship programmes.

Thus, over the years, the institute has built up adequate infrastructure and facilities for conducting efficient, high quality training programmes, research and development and consultancy projects. The institute provides excellent opportunities to the students to keep abreast with current literature through multidisciplinary literature and Internet.

The institute is extending as a host centre - scientific, technical and infrastructural support to the CSSTE-AP (affiliated to the United Nations). To achieve Centre's objectives, IIRS offers best possible education, research and application experience to its participants through rigorous theory, research, applications, field exercises and pilot projects in the field of Remote Sensing and GIS applications in environmental management. This will surely enhance social and economic development in south east Asia and Pacific region.

Through the concerted efforts of the institute, already 48 participants from 18 Asia-Pacific countries have passed out from the two nine months' diploma courses on remote sensing and GIS conducted so far. Several of these participants are pursuing their M.Sc./M.Tech. programme under the guidance of IIRS faculty, in their home countries. The Institute would like to contribute to the continuing education programme for its graduates and awareness programmes for policy and decision makers

from Asia-Pacific region. IIRS intends to establish network with other institutes of the region for exchange of knowledge, expertise and literature. It is also proposed to organise theme based workshops and conferences to establish interface with decision makers and planners. Alumni of CSSTE-AP are our ambassadors. We will be keen to keep in touch and interact with them regularly.



2nd PG course in RS/GIS concludes

The Valedictory function of second PG course in RS/GIS was held on June 30, 1998 at Ashoka Hotel, New Delhi. It was presided over by Dr. K. Kasturirangan, Secretary, DOS and Chairman, Governing Board of CSSTE-AP. Governing Board members, representatives of various embassies, Director of CSSTE-AP, Dean of IIRS, senior officers of ISRO and senior faculty members of IIRS also attended the function. Dr. K. Kasturirangan distributed certificates and delivered the key note address. Director, CSSTE-AP and Dean, IIRS described organisational achievements of CSSTE-AP and the role of IIRS in CSSTE-AP activities in their addresses. The feed back about the course was given by two participants from Sri Lanka and Mongolia. A memoir was brought out on this occasion.

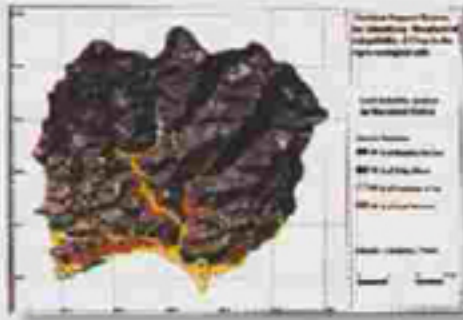
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Characterization of Mountain Agro-ecosystem

The main objective of the study was to develop a methodology for mountain agro-ecosystem development and to develop a case study demonstrating the application of agricultural planning at a district level.



Carried out by *Iftikar Uddin Sikder* of ICIMOD, Nepal, it had reflected all the possible biophysical constraints of importance to agriculture and in terms of crop & non crop activities under various agro-climatic situation which will be helpful for planners & management to focus on development potential. The micro scale differences are often more predominant than the macro scale differences because the agro-ecological zoning at district hierarchical level allows one to incorporate the increasing complexity of biophysical and socio-economic processes which is difficult to integrate at macro scale or regional scale. Decision Support System was developed at district level (micro scale) for identifying biophysical adaptability of crop in the Agro-ecological cells. An interactive DSS is developed which gives multiple options to user in a graphic and spatial environment for land resource assessment. Large number of determinant parameters were considered which gained the accuracy in the map. This information system may also be required for landuse planning, farm management and crop production, soil conservation and plant and animal conservation. The framework has been developed for characterization at varying scale. This study also offers certain guideline to do future study. Integration of intelligent systems with the existing framework would definitely give rise to significant results with the varying scale. After having higher spatial and temporal resolution of the sensor, it may reduce the higher complexity and increase more variability of the data. Future study should direct towards the above said framework.

Urban Growth, Landuse Change and Impact on Environment - A Case study of Kathmandu



The Kathmandu valley is losing its fertile agricultural lands in the process of urban expansion over the last four decades (1955-1996). Using various remote sensing data products

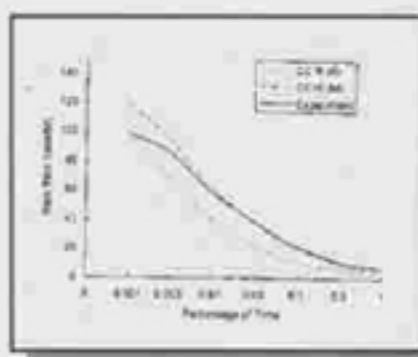
and GIS techniques, this project work was carried out by *Trilok Man Tamrakar*, National Planning Commission, Nepal to study the environmental deterioration and changes in the land uses due to rapid growth of population and urban sprawl. While the annual population growth rate in entire Kathmandu valley is 5.11 percent, it is 4.8 percent in the Kathmandu District which is only the part of the valley. It is 6.0 per cent in the Kathmandu municipality. Urbanization has brought many environmental problems like air pollution, noise pollution, river pollution and loss of fertile agricultural lands. Cement factories emit 10 tonnes of Carbon, 80 tonnes of particulates, 7 tonnes NO₂ & SO₂ per year causing serious health problems. Noise level has reached 90-95 db near Bir Hospital while it is 80-90 db near Trichandra Campus. The entire sewage system of Kathmandu urban area is connected directly to rivers; which has deteriorated the quality of river water beyond human use. The growth of urban area during 1991-96 was 5.8 per cent per annum. It is projected that by 2010 A.D., 53 Per cent of fertile land of Kathmandu Valley would be under urban or Semi-urban uses.

The summaries appearing on this page are of the one year follow up projects being reviewed for the award of M.Tech degree to the students of first RS/GIS course (1996-97) and first SATCOM course (1997)

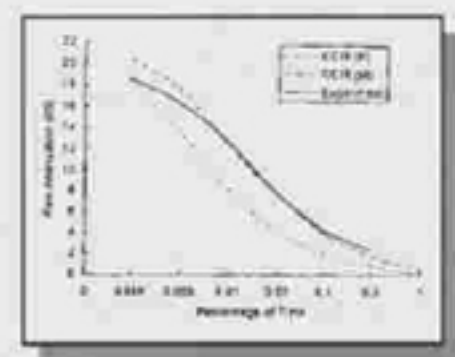
Study on Rain Attenuation on Earth-Space Link Operating via 12 GHz band in Korea

Phenomenon of propagation mechanism through the troposphere, characteristics of rain, rain rate distribution and rain rate models are described in the chapter of basic theory of rain while, the classical theory of rain-attenuation, methods of measurement of rain attenuation on Earth-Space path and predictions of rain attenuation are described in the chapter on Basic Theory of Rain attenuation in his thesis by *Min Kung Hyun* of Republic of Korea. KOREASAT F2 earth station located at Seoul, Korea, used for collection of attenuation data 12.7495 Ghz (ku-band) and rain rate data for one year, i.e., July 1997 to June 1998. Block schematic of the earth station alongwith levels have been presented in the work.. Receive equipment give a dynamic range of about 45dB which is found quite adequate for this

experiment. The rain data and attenuation data have been analyzed for different percentage of time as prescribed by CCIR. The respective distribution as shown in enclosed figures correspond to CCIR recommended K and M region distributions. Experimentally studied statistical distribution fall in between K & M region, which is as per expectation. Overall work is quite comprehensive and brings out all concerned factors appropriately.



Percentage of time for rainrate



Percentage of time for rain attenuation

Students for this course have come from

Bolivia
DPR Korea
India
Indonesia
Mongolia
Sri Lanka
Uzbekistan

First PG Course in Space Science, Ahmedabad

The first CSSTE-AP course in Space Science started at the Physical Research Laboratory, (PRL) Ahmedabad from June 1, 1998. 11 participants from 7 countries came for attending the six months course. As part of facilities for the conduct of this course, an international hostel was provided by the Physical Research Laboratory. The students have access to the state of the art IBM personal computers as well as a powerful IBM RS/6000 system with facilities for e-mail and internet. The course is of two semesters of three months each. In the first semester, students have to study three major disciplines, viz., (1) Neutral atmosphere, its structure, composition and dynamics, (2) Plasma aspects of the Earth's environment and (3) Astronomy and Astrophysics. The faculty for the space science course is drawn from Indian and foreign institutes of international repute.

As part of this course, in the first phase, the students were taken on a study tour to PRL's IR observatory at Gurushikhar, Mt. Abu and Udaipur Solar Observatory, Udaipur in the month of August 1998. In the second phase, it is planned to expose the students to some of the state of art laboratories in India including, Giant Meter Wave Radio Telescope (GMRT) of National Centre for Radio Astronomy, Pune, Inter University Centre for Astronomy and Astrophysics (IUCAA), Pune, Vikram Sarabhai Space Centre (VSSC), Trivandrum, National MST Radar Facility (NMRF), near Tirupati, ISRO Satellite Centre (ISAC), Bangalore and Indian Institute of Astrophysics (IIA), Bangalore.

After completing the six months course in Space Science in India, the students have to undertake a six months project in their home country. After successfully completing the six months course in India and six months project in their home country, the students would be considered for the award of M.Sc (Tech.) degree in Space Science.



At the Finder telescope of the 1.2m IR telescope

First PG Course in Satellite Meteorology and Global Climate, Ahmedabad

The first CSSTE-AP Course in Satellite Meteorology & Global Climate started at Space Applications Centre, Ahmedabad from March 2, 1998. 17 participants from 10 countries are attending this 9 months course. This course is divided into 3 units each of 3 months duration. The first unit covers concepts in meteorology, satellite meteorology, imagery interpretation etc., and the second module deals with various meteorological parameter retrieval, digital data applications and numerical modelling. Both these units have been completed by Sep. 4, 1998. The participants also completed six months practical session involving handling INSAT-VHRR, NOAA (AVHRR & TOVS) and GMS data. This has given them a good exposure to the data extractions, imagery generation and interpretations of various meteorological phenomena including a tropical cyclone and parameter retrievals like cloud vectors winds, temperature humidity profile, OLR etc. Hands on exercises involving use of various graphic packages, like Grads, for displaying model output were also completed.

Monthly visits to local Airport Meteorology Office for chart discussions were also undertaken. The participants had a rich experience in monitoring the onset and progress of southwest monsoon over India and also witnessed through imageries the crossing of a tropical cyclone across the Gujarat coast in the second week of June 1998.

A number of examinations including theory and practicals were also completed by the second week of September. As part of the 3rd module, each participant has undertaken a pilot project in satellite meteorology. All the 17 participants have completed the project definition in consultation with their guides, have made a presentation of the proposals and have provided the execution schedule.

After the successful completion of their first study tour to Goa and Bangalore, the participants are eagerly looking forward to the second study tour to New Delhi and Dehradun beginning October 2, 98. During this visit, they would get a first hand experience of operational work being carried out at Satellite Meteorology Division and Northern Hemispheric Analysis Centre (NHAC) of India Meteorological Department. They would also visit the premier Institute - National Centre for Medium Range Weather Forecast (NCMRWF), New Delhi besides visiting world famous Tajmahal at Agra. A visit to the Head Quarters of Centre for Space Science and Technology Education in Asia and the Pacific (CSSTE-AP) and Indian Institute of Remote Sensing are also planned.

The participants celebrated the National (Revolution) Day of Mongolia on July 11 and India's Independence Day on 15 August.



Student on a tour of Bombay

Students for this course have come from

Bangladesh
India
Indonesia
Iran
Kazakhstan
Mongolia
Nepal
Philippines
Sri Lanka
Uzbekistan

Activities in Progress

Background of CSSTE-AP

In response to the UN General Assembly Resolution (45/72 of 11th December, 1990) endorsing the recommendations of UNISPACE-82 the United Nations Office of Outer Space Affairs (UN-OOSA) prepared a project document (A/AC.105/534) envisaging the establishment of Centres for Space Science & Technology Education in the developing countries. The objective of the Centres is to enhance the capabilities of the member states in different areas of space science & technology that can advance their social and economic development. The first of such centres, named as Centre for Space Science & Technology Education in Asia & the Pacific (CSSTE-AP) was established in India in November, 1995. Government of India has made available appropriate facility and expertise to the Centre through the Indian Institute of Remote Sensing (IIRS), Space Application Centre (SAC) & Physical Research Laboratory (PRL). The Centre is an education and research institution that is capable of high attainments in the development and transmission of knowledge in the fields of space science & technology. The initial emphasis of the Centre shall be to concentrate on in-depth education, research and applications programmes, linkages to the global programmes/databases, execution of pilot projects, continuing education and awareness and appraisal programmes. The Centre offers Post Graduate level courses in the fields of (a) Remote Sensing and Geographic Information System, (b) Satellite Communications, (c) Satellite Meteorology and Global Climate, (d) Space Sciences. A set of standard curricula developed by the United Nations is adapted for the educational programmes. The Centre is affiliated to the United Nations and its education programmes are recognised by Andhra University, India. As of now, the Centre has already conducted two PG courses in Remote Sensing & GIS and one in Satellite Communications. The 1st PG course in Satellite Meteorology and 1st PG course in Space Sciences are in progress while the third PG course in RS/GIS is slated to begin on the 5th October, 1998.

Director speaks

Large areas in Asia-Pacific region are disaster prone and huge losses of life and property caused by natural calamities are not uncommon. Applications of space technology, viz., remote sensing, satellite meteorology and satellite tele-communication etc., are gaining importance in several countries in Asia-Pacific region for monitoring, assessing and predicting natural disasters as well as rescuing and rehabilitating disaster affected people. For example, China has developed a Natural Disaster Monitoring and Evaluation System (NDMES) by combining satellite remote sensing and Geographic Information System (GIS) techniques for monitoring and evaluating natural disasters such as floods, forest fires, drought, earthquakes, snow hazards and desertification. Recently, satellite remote sensing and GIS technology helped to tackle the unprecedented natural disaster - haze in Indonesia. While space science and satellite meteorology studies helped to understand the course of haze formation in Indonesia, now the people have come to know that the haze was due to *El-nino* effect, forest fire and drought conditions. Integrated disaster management approaches using satellite remote sensing, GIS and Spatial Decision Support System (SDSS) are being used in India to assess, monitor and manage several natural disasters, viz., cyclone, landslide, flood, earthquake, etc. Indian Space Research Organisation (ISRO) has developed a novel concept and designed a INSAT satellite based Disaster Warning System (DWS) for cyclonic hazards which provides information in the local languages through the receiver sets installed at a number of villages in the coastal areas. These are some of the examples. In the Asia-Pacific region, which is highly prone to natural disasters, there is an urgent need for more and more of trained scientific personnel in various space technologies, viz., remote sensing & GIS; satellite communication, space science, satellite meteorology etc., for effective monitoring and evaluating consequences and also saving human life and property in the disaster prone regions. CSSTE-AP, through various educational programmes in several areas of space technology since its inception, is acting as a positive catalyst for generating trained manpower in Asia-Pacific region for tackling various problems of natural resources management and environment including natural calamities.

-Prof. B.L. Deekshatulu

SHORT COURSE ON DIGITAL SIGNAL PROCESSING

Duration	4 weeks (Jan. 18 - Feb. 12, 1999)
Venue	Space Application Centre, Ahmedabad, India
For Enquiries	Dr. Dipti Rustogi Deputy Director, SATCOM Applications Area, Space Application Centre, Ahmedabad Fax : +91-79-6448970

SECOND POST GRADUATE COURSE ON SATELLITE COMMUNICATIONS

<i>Phase -1</i>	
Duration	9 months (July 1999-March 2000)
Venue	Space Application Centre, Ahmedabad, India
<i>Phase -2</i>	
Duration	1 year (April 2000-March 2001)
Venue	At the country of the participant
For Enquiries	Prof. B.L. Deekshatulu Director, CSSTE-AP

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CSSTE-AP (Affiliated to UN)
IIRS Campus, 4, Kalidas Road,
Dehradun 248001, INDIA
Phone: +91-135-740737,
Fax: +91-135-740785
e-mail: cssteap@del2.vsnl.net.in



CSSTE-AP welcomes the views and opinions of the readers of the newsletter. Short communications on space science and technology education which may be relevant to Asia Pacific region are also welcome. Views expressed in the articles of the newsletter are those of the authors and do not necessarily reflect the official views of the Centre