



❖ CSSTE - AP Newsletter ❖

Quarterly Newsletter of Centre for Space Science and Technology Education in Asia and the Pacific (Affiliated to UN)

Volume 1 Issue 4

December, 1998

ESCAP'S Regional Space Applications Programme for Sustainable Development: Moving the Asia Pacific Region Towards the New Millennium

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The United Nations Economic and Social Commission for Asia and the Pacific (UN ESCAP) has long recognised the importance of space technology applications such as remote sensing for providing information needs essential for natural resource accounting, environmental management, disaster monitoring and prevention, land use mapping and sustainable development planning. To promote regional cooperation in the use of space technology, ESCAP collaborated with the United Nations Development Programme (UNDP) for more than a decade in the implementation of the Regional Remote Sensing Programme which initiated an effective networking mechanism and established a strong foundation for regional cooperation in space technology applications in the Asia-Pacific.

Building upon the success and strength of the Regional Remote Sensing Programme, the First Ministerial Conference on Space Applications for Development in Asia and the Pacific held in Beijing in September 1994 launched the Regional Space Applications Programme for Environmentally Sound and Sustainable Development in Asia and the Pacific. In response to the call made by the Beijing Declaration which was adopted at the Conference, the Regional Space Application Programme for Sustainable Development (RESAP), is implemented to promote national capacity building in the countries in the ESCAP region through a regional approach to make increasing use of space technologies for addressing the urgent problems and environmental issues confronting them.

Since the First Ministerial Conference, UN ESCAP through its Space Technology Applications Section has actively pursued within the framework of RESAP, the formation and strengthening of the national and regional institutional mechanisms for space technology applications in the region. Several strategies have been adopted to ensure that the institutional and organizational requirements of the Programme are met. Being acknowledged as an effective strategy, the regional three-tiered network mechanism is adopted to support the implementation of RESAP to include, a) the Intergovernmental Consultative Committee (ICC), b) the Regional Working Groups, and c) the Regional Information Service and Education Network.

The ICC meets annually to advise the ESCAP secretariat on matters related to the implementation of RESAP including recommendations on the medium-term work plans of the regional programme. Moreover, it assists in soliciting funding support from both donors and participating governments for the implementation of RESAP.



The Regional Working Group on Satellite Communication Application holding their annual meeting

Within the framework of ICC, ESCAP has organized four working groups to address the needs of major space technology applications sectors, namely : a) Regional Working Group on Space Sciences and Technology Applications, b) Regional Working Group on Satellite Communication Applications, c) Regional Working Group on Meteorological Satellite Applications and Natural Hazards Monitoring, and d) Regional Working Group on Remote Sensing, GIS and Satellite-based Positioning. All the working groups meet annually with representation from the national contact points.

An expanded and strengthened Regional Information Service and Education Network has institutionalized the sharing the information among countries of the region. Thus, in order to provide a medium for information exchange, ESCAP's Space Technology Applications Section (STAS) comes out with two regular publications, namely the Space Technology Applications Newsletter, and the Asian and Pacific Remote Sensing Journal. These are in addition to the proceedings and related publications for various seminars, workshops and symposia which STAS regularly conducts.

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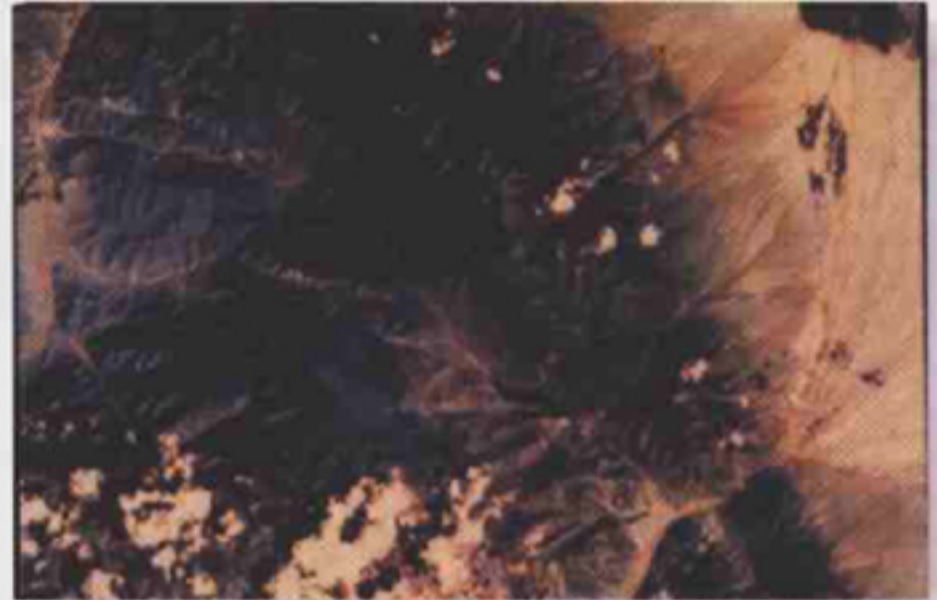
FOREST FIRE RISK MODELLING IN PART OF WEST AND CENTRAL MONGOLIA USING REMOTE SENSING AND GEOGRAPHICAL INFORMATION SYSTEM

By Ms. Narangerel Davaasuren

SUMMARY

The report embodies results from a study which was undertaken with the objective to develop a reliable method for the fire risk mapping in a temperate forest environment. The study deals with the application of remote sensing techniques and GIS for the generation of indices related to forest fire risk, and for fire risk mapping. Two test areas were used : (i) south-east Harhira mountain from Uvs Nuur Basin, and (ii) Bogd Uul mountain ecosystem near Ulaanbaatar city, in Mongolia. Thus a fire prone area (Bogd Uul mountain range), and an area free from fire for more than 200 yr were investigated.

Vegetation, slope, aspect, elevation, road and habitation were considered important characteristics determining fire risk, and were respectively provided weightage factors of 100, 50, 40, 30, 20 and 10. Vegetation mapping was carried out using LANDSAT TM data. Road and settlements were extracted from Survey of Mongolia topographic maps. Slope and aspect maps were generated using a digital elevation model. Each of these was given a coefficient between 1 and 4 representing high, medium, low and no fire risk. Final fire risk map was constructed on the basis of fire hazard index (H) which was calculated as : $H = 1 + 100v + 50s + 40a + 30e + 20r + 20h$, where v, s, a, e, r and h are the coefficients for vegetation, slope, aspect, elevation, road and habitation respectively. Accuracy assessment and sensitivity analysis was carried out to validate the results.



This is a summary of the one year follow up project being reviewed for the award of M.Tech degree to the students of first RS & GIS course (1996-97).

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Hard copy publications are supplemented with information through the electronic media. News and information on national and regional projects as well as other RESAP activities are included and regularly updated in the RESAP web-site and respective web-sites of the four working groups.

Through the Regional Space Applications Programme, ESCAP also actively supports national programmes directed toward national capacity-building and human resources development. Its long-standing partnership with the UNDP has contributed immensely to the establishment and sustainability of various national remote sensing programmes particularly in the developing member countries of the region. In close collaboration with donor agencies and member countries, ESCAP also organizes and conducts various workshops, seminars, short-term courses and long-term fellowships.

Among other institutions in the region, it has established partnerships with Wuhan Technical University of China, the Gadjah Mada Univeristy in Indonesia and the Remote Sensing Technology Centre of Japan. More recently, ESCAP has been providing fellowships for participants of courses at the Centre for Space Science and Technology Education in Asia and the Pacific (affiliated to the United Nations) in India. Several workshops have been conducted with support from the National Space Development Agency of Japan (NSDA), the European Space Agency (ESA), and the French Space Agency (CNES).

The implementation of RESAP has contributed immensely to raising the status of the region in the use of technology for sustainable development, making it one of the more dynamic regions in this field. With the successful implementation of RESAP, space technology and applications have become an integral part of the vibrant economic development in the region. ESCAP now looks forward to further preparing Asia-Pacific region for expanded and effective practical uses of space technologies for the next millennium. In this regard, the Second Ministerial Conference on Space Applications for Sustainable Development will be held in New Delhi in December 1999. Imbued with a fresh new vision, the Ministerial Conference is aimed to help the region to develop a programme and an implementation strategy suitable for the regional conditions that will allow the countries to benefit from space development in the coming years.

In all of these endeavours, the active participation and cooperation of member countries are crucial in the continued success of RESAP. Through RESAP and with the region's common vision, cooperative spirit and technological dynamism, ESCAP feels confident that countries in the region will be able to attain their goals towards sustainable development.

FIRST POST GRADUATE COURSE ON SPACE SCIENCE**A REPORT**

The first post graduate course on space science was held at the Physical Research Laboratory, Ahmedabad during June-November, 1998. The eligibility criteria for this course include either a Master's Degree in science or equivalent qualifications relevant to the field of Space Sciences followed by a minimum of 5 years of teaching/research/working experience or a Doctorate with minimum of 2 years experience in any of the related fields. The course was of one year duration and was organised in two phases of six months each. The Phase I, was completed at PRL in November, 1998, had four modules spread over two semesters. The scientific topics covered in these four modules were (1) Atmospheric Science, (2) Ionosphere and Solar Terrestrial Interactions, (3) Instrumentation, Techniques and Data Processing and (4) Modelling. On an average 50 contact hours were devoted to the theory and 50 for the laboratory work of each module. Phase II will be conducted in the home country of the participants.

The faculty for this course included experts in different fields drawn from India and abroad. The core faculty has a strong scientific background with a number of publications, experience of participating in International scientific programs, organising a number of courses, etc. to their credit.

The performance of the participants was assessed through class tests, seminars, practicals, viva and written examinations at periodic intervals during the entire Course duration.

As a part of this course, scientific visits to a number of research institutes in India were made. The students were taken to the Infrared Observatory, Gurushikhar, Mt. Abu and Udaipur Solar Observatory (USO), Udaipur, in the first semester and to the Giant Meterwave Radio Telescope (GMRT), Pune, Inter University Centre for Astronomy and Astrophysics (IUCAA), Pune Space Physics Laboratory (SPL) and Vikram Sarabhai Space Centre (VSSC), Thiruvananthapuram, National MST Radar Facility (NMRF), Gadanki, Tirupati, and the Laboratory for Electro-optical Systems, ISRO, Bangalore in the second semester to have an exposure to the various advanced facilities in the field of space science.

On completion of Phase-I of the course, a Valedictory function was held on 28th November, 1998 at PRL under the Chairmanship of Dr. K. Kasturirangan, Chairman, ISRO/Governing Board, CSSTE-AP and Secretary, DOS, Professor R. Radhakrishna, Vice Chancellor, Andhra University, Waltair, the guest of honour, awarded the certificates to all successful participants. On the successful completion of the Phase-2, which involves carrying out of a 6 month's Project in the home country and writing a thesis, the participants may be awarded the degree of M.Sc. (Tech.) by the Andhra University Waltair, India subject to the fulfilment of the University eligibility criteria.



Participants of the Space Science Course

Following projects will be undertaken by the participants in their home countries

- 1. Titiek Setiawati (Indonesia) :** *Title :* Geomagnetic storms and their effects on the F region of the Ionosphere, *Supervisors :* Mr. M. Syarifuddin (Indonesia), Prof. V.V. Somayajulu (India)
- 2. Turdimurat - M. Tursumuratov (Uzbekistan) :** *Title:* Theoretical aspects of astrophysical problems. The first cycle of solar proton-proton reaction with outgoing neutrino flux, *Supervisors :* (Dr. Igor A. Ibragimov), Dr. Anjan S. Joshipura (India)
- 3. Eduardo R. Palenque (Bolivia) :** *Title :* Ozone layer over the Bolivian Altiplano: a model, *Supervisors :* Prof. Francesco Zaratti (Bolivia), Dr. R. Ramesh (India)
- 4. Ms. Bujidmaa Borkhuu (Mongolia) :** *Title :* Influence of tropospheric parameters on total ozone content, *Supervisors :* Dr. L. Natsagdorj (Mongolia), Prof. Shyam Lal (India)
- 5. Sarantuya Ganjuur (Mongolia) :** *Title :* Study of long term climate change over Mongolia, *Supervisors :* Prof. D. Dabaadorj (Mongolia), Prof. D.K. Chakrabarty (India)
- 6. Hong Bong Ki (D.P.R. Korea) :** *Title :* Study of the radiative properties of the atmosphere, *Supervisors :* Prof. Choe Tae Song (DPR Korea), Dr. A. Jayaraman (India)
- 7. Sin Sun Chol (D.P.R. Korea) :** *Title :* Studies of ionisation irregularities in the middle latitudes, *Supervisors :* Prof. J.M. Hak (DPR Korea), Prof. H.S.S. Sinha (India)
- 8. Rambabu Rao Chittathuru (India) :** *Title :* Lidar studies of the lower atmosphere, *Supervisors :* Prof. P.B. Rao (India), Dr. A. Jayaraman (India)
- 9. P.K. Rajesh (India) :** *Title :* Optical Imaging of Plasma Depletions, *Supervisors :* Prof. H.S.S. Sinha (India), Prof. H. Chandra (India)
- 10. T.C. Peiris (Sri Lanka) :** *Title :* Photometric study of eclipsing binary stars, *Supervisors :* Prof. Sam Karunaratne (Sri Lanka), Prof. U.C. Joshi (India)

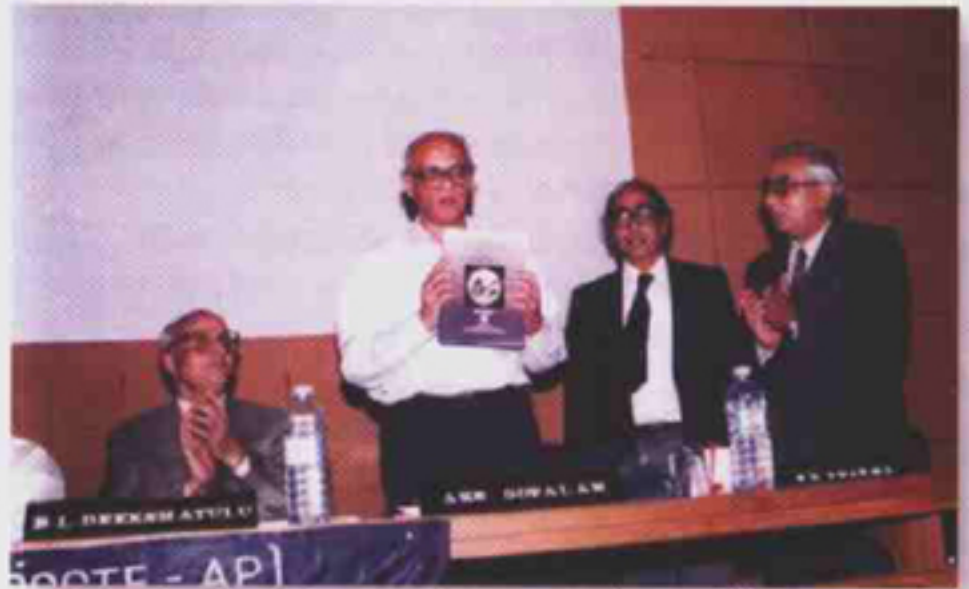
COURSE ON SATELLITE METEOROLOGY AND GLOBAL CLIMATE (1998)

A REPORT

On the occasion of the completion of the first Post Graduate Course on Satellite Meteorology and Global Climate, under the aegis of the UN affiliated CSSTE-AP, a valedictory function was held on November 28, 1998 at Ahmedabad. The function was graced by Dr. K. Kasturirangan, Chairman, ISRO/Governing Board, CSSTE-AP and Secretary DOS and Prof. R. Radhakrishna, Vice Chancellor, Andhra University. Out of 17 candidates, 10 secured Distinction and the remaining 7 First class. On this occasion a CSSTE-AP diploma was awarded to all the successful candidates.

This first 9 month PG Course was conducted at the Space Applications Centre (ISRO), Ahmedabad from March 2 to November 28, 1998. 17 participants from 10 countries (including two from India) of the Asia-Pacific region attended the Course.

The course began with a 4-day workshop on "Emerging trends in Satellite Meteorology-Technology and Applications", conducted during March 9-12, 1998. This workshop was dedicated to the memory of Prof. Verner E. Suomi, the father of Satellite Meteorology for his outstanding path breaking contributions in Space Technology. The Course participants, a number of delegates from India and abroad and Governing Board members of CSSTE-AP participated in the deliberations. The dignitaries included Dr. Abiodun, UN-OOSA and Dr. R. R. Kelkar, Director General, India Meteorological Department. A memoir highlighting various facets of Prof. Suomi's life, specially brought out by Space Science and Engineering Center, University of Wisconsin-Madison, USA on the occasion was released.



Sh. A.K.S. Gopalan, Director, SAC, releasing the Memoir of the SATMET Course

The 9 month Course was divided into 3 units, each of three months duration. The first two units covered fundamentals of Satellite Meteorology, image interpretation, Radiative transfer, Meteorological parameter retrievals, digital data applications etc. To carry out practicals involving satellite data, a new computer lab with ten workstations and a server was specially established. The main workhorse for the practicals were data from INSAT and NOAA satellites. The daily INSAT pictures provided an excellent opportunity to the participants in monitoring the onset and progress of south-west monsoon over India. They also experienced the excitement of witnessing the crossing of a Super Tropical Cyclone across the Gujarat coast on June 9, 1998 and used INSAT imageries to study the life cycle of this storm in real time.

As a part of the educational tour, participants undertook three technical visits. During the first tour they visited Goa and Bangalore. They also spent two days on ORV-Sagarkanya of DOD, Govt. of India and learnt about the various instruments for marine environment measurements. In Bangalore they visited ISRO Satellite Centre (ISAC) and Regional Remote Sensing Service Centre (RRSSC). They also met Chairman, ISRO at Bangalore. The second trip took the participants to Delhi and Dehradun. In Delhi they visited India Meteorological Department and got acquainted with the operational scenario and the various activities of Satellite Meteorology Division. They also took time off to visit world famous Taj Mahal at Agra. At Dehra Dun they visited CSSTE-AP, Indian Institute of Remote Sensing (IIRS) and the RRSSC. During the third technical tour, participants visited the observatory at Mt. Abu. In addition to visiting various important laboratories/Institutions in the country, the candidates also had a glimpse of India's diverse rich culture and heritage.

The last three months were devoted to Pilot Project. The various themes covered in these projects included SST Applications, Cyclone track prediction, Rainfall studies, modelling and monsoon studies.

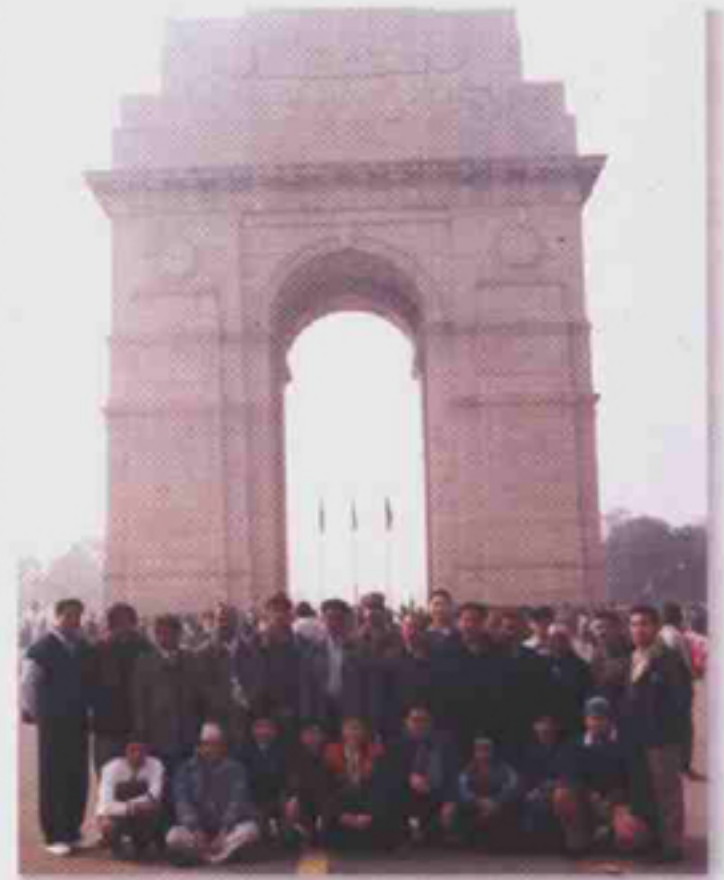
In addition to the Indian faculty, two distinguished scientists Dr. Cheang Boon Khean of Malaysia and Prof. Kenji Nakamura of Nagoya University, Japan delivered a number of lectures and conducted tutorials/discussions. At the end of the course, a CD-ROM containing all the lecture notes, practical reports, tutorials etc. was prepared and given to all the participants.

Based on the periodic evaluations, which included tests, theory and practical examinations, seminars and Viva-Voce on the Pilot Project, results of these candidates were announced at the Valedictory function. On this occasion, a memoir, CD Rom and the Proceedings of March'98 Suomi Workshop were also released.

This CSSTE-AP course demonstrated excellent cooperative effort among the Asia Pacific Countries in realising the goals of CSSTE-AP to train and educate the participants in various aspects of Space Science and Technology that can enhance social and economic development in the region.

THIRD RS & GIS COURSE

The third post graduate course (1998-99) on Remote Sensing and Geographic Information System (RS & GIS) of CSSTE-AP is in progress at Indian Institute of Remote Sensing (IIRS), Dehradun, the host institution of CSSTE-AP. The course started in October, 1998 and the first module of Phase I of the course of three months duration ended in December, 1998. 21 officer trainees representing 11 countries of Asia and Pacific region are participating in this course. Fundamentals of Remote Sensing and GIS are covered during first module of the course. Second module of three months duration consisting of thematic areas viz., Agriculture and Soils, Forestry and Ecology, Geosciences, Water Resources, Human Settlement and Marine Sciences is in progress. Experienced faculty of IIRS undertakes the major load. In addition to major faculty members drawn from IIRS, some specialised faculty from several organisations of India such as SAC, Ahmedabad, ADRIN, Hyderabad and SOI, Dehradun were also invited to deliver guest lectures during first module of the course. International experts like Dr. Gottfried Konecny, Institute of Photogrammetry and Engineering Surveys, University of Hannover (Germany) and Dr. Franz Lanzl, Institute of Opto-electronics, (Germany) also delivered specialised lectures. The participants also attended ISPRS (Working Group VII/2) tutorials on "RS & GIS in decision making for sustainable rural development" during the early October, 1998 and Indian National "Geoinformatics-98" during late October '98. In order to have little diversion from the very hectic academic schedule, the participants were taken for a trip to Taj Mahal at Agra and Delhi city during the month of Dec.'98.



THE ISPRS TUTORIAL FOR CSSTE-AP TRAINEES

D.P. Rao, Director, National Remote Sensing Agency,
(Department of Space, Govt. of India), Balanagar, Hyderabad - 500 037



A Tutorial course on "Remote Sensing and Geographic Information System in decision making for sustainable rural development" was conducted by ISPRS Working Group VII/2 which deals with "Applications of Remote Sensing and Geographic Information System for Sustainable Development", at the Indian Institute of Remote Sensing, Dehradun, India, during the period 7th to 9th October, 1998. Seventeen earth Scientists from nine countries of the Asia-Pacific region, namely Bangladesh, Fiji, India, Indonesia, Myanmar, Nepal, Philippines, Sri Lanka and Vietnam participated in the course. The tutorial course was suitably designed to cover a wide spectrum of the topics ranging from fundamentals of remote sensing through various data products available, image interpretation/analysis techniques to applications of the technology for sustainable rural development. The course commenced with the inaugural address on "Space technology and sustainable development" by the author, Chair Working Group VII/2. Topics covered include-Overview of remote sensing technology, Profile of Indian Satellites catering to the developmental needs, Satellite data products, Information extraction techniques, Applications of remote sensing in the natural resources management, Bio-diversity and environmental aspects and Socio-economic aspects.

The course has stimulated the interest of the participants in the role of remote sensing and GIS in sustainable rural development. The participants expressed the view that the well-designed course covering remote sensing, GIS and various applications supported by ample number of case studies, has, indeed, helped them comprehending the basic requirements of the sustainable development of natural resources and environment, and the role of remote sensing and GIS in achieving it. They were also of the opinion that the methodology adopted is very relevant to many developing countries. Lack of reliable and planimetrically accurate cadastral maps, and remote sensing data with matching spatial resolution are the main stumbling blocks in the generation of reliable information on natural resources for a sustainable rural development. Future indigenous as well as foreign space missions with relatively higher spatial resolution (1 to 2.5 m) data may help in improving the implementation of various developmental programmes. The course was concluded with the distribution of certificates to the participants and a social get-together.

CSSTE-AP

- ❖ **Centre for Space Science & Technology Education in Asia and the Pacific**
- ❖ **Come Stay Study Tour Enjoy, All Participants**
- ❖ **Climate, Satellite Signals, Terrestrial & Environmental, Atmospheric Physics**
- ❖ **Complete Successfully Studies, Take Experience & Apply Practically**
- ❖ **Concluding Session for Students & Teachers but Execute Applications Projects**
- ❖ **Count Surely on the Strength and Technical Expertise And Pursue**
- ❖ **Continue Sending Short Technical Excerpts of Allied Programmes**

- Prof. B.L. Deekshatulu

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 Centre 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 also completed while the IV PG course in RS/GIS has to begun on the 1st October, 1999.

DIRECTOR SPEAKS

At the CSSTE-AP, opportunities to grow never cease to emerge. After our successful linkages with UN, ESCAP, ICIMOD and a host of India and foreign organisations, we are now on the anvil of joining hands with reputed knowledge centres of Europe. The Centre is exploring possible collaboration with GDTA of France. During my visit to Europe in November 1998, a number of areas of mutual interest were discussed with International Centre for High Technology (ICS/UNIDO), Trieste, Italy, and International Space University (ISU) at Strasbourg, France. All these institutions, the pioneers in various space related matters in Europe, have shown enormous interest in the working of CSSTE-AP. Even as I am writing this, we are exploring possibilities for concrete steps to realise the goodwill showered on us.

With this development in the background, I feel it is essential to reiterate my earlier request that the organisations and interest groups in Asia-Pacific countries have to join hands with us in capacity building in the region. The centre is no more in its infancy. Owing to the willing and spontaneous co-operation from all quarters, and under the guidance of the Governing Board it has grown rapidly into a formidable engine of education & training. It has been possible to attract worthy students, best of resources and global attention and today I am proud to say, we are conducting educational programmes in all important aspects of space sciences. The need is now to contribute to the field projects, information synthesis, addressing critical human concerns and finally to the development process.

Therefore I am happy to once again request all concerned to write to us and suggest ways and means of furthering mutual interest.

- Prof. B.L. Deekshatulu

The CSSTE-AP has recently released a multicolour brochure on its activities. Interested organisations willing to form linkages with the Centre may request for a copy.

ANNOUNCEMENT

4th P.G. Course in Remote Sensing and Geographic Information System

Duration 9 Months
(1st, Oct. 1999 to 30th, June 2000)
Venue Indian Institute of Remote Sensing,
Dehradun, India

Short course on Digital Image Processing for Environmental Management - A Remote Sensing Perspective

Duration 30th Aug., 1999 to 24th Sep., 1999
Venue Indian Institute of Remote Sensing,
Dehradun, India

*For inquiries on the above courses,
please contact :*

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CSSTE-AP welcomes the views and opinions of the readers of the Newsletter. Short communication 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.

New Year Greetings