International Training Course

Application of Space Technology for Disaster Risk Reduction

9 April – 4 May, 2012

COURSE REPORT

Organized by

Centre for Space Science and Technology Education in Asia and the Pacific (CSSTEAP)
(Affiliated to the United Nations), IIRS Campus, Dehradun, India

Conducted by

Indian Institute of Remote Sensing (IIRS)
ISRO, Department of Space, Govt. of India, Dehradun, India

United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER)
Beijing, China

United Nations Economic and Social Commission for Asia and the Pacific (UN-ESCAP)
Bangkok, Thailand

United Nations University - DRM Centre for Spatial Analysis and Disaster Risk Management, ITC (University of Twente)
Enschede, The Netherlands

Venue

Indian Institute of Remote Sensing (IIRS)
ISRO, Department of Space, Govt. of India, Dehradun, India

UN Our Hope for Mankind

ITC an Associated Institution of the United Nations University

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Dr. P. S. Roy
Director, CSSTEAP
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Foreword

The Asia-Pacific region is one of the disaster-prone regions in the world. Thus, the necessity of mainstreaming the disaster risk management processes in sustainable development planning in the region need not be emphasised. A number of international initiatives focussing on disaster risk reduction have been launched world over to reduce the loss of life and property due to potential disasters. Space-based information and services along with enabling ICT and geospatial technologies have proven to be vital in dealing with natural disasters, not only during the response and recovery phase but also to reduce the potential risks from impending disasters. Human capacity building in developing countries is recognised as an area requiring immediate attention so as to effectively use the space technologies for such an important issue. 'Disaster Risk Reduction' was identified as the theme for the short course this year.

I am extremely happy to note that the training course on "Application of Space Technology for Disaster Risk Reduction" has been successfully conducted during 9 April - 4 May, 2012 by Indian Institute of Remote Sensing (IIRS), a Unit of ISRO, on behalf of CSSTEAP.

I am also very happy that the United Nations organisations dealing with disaster management, *viz.* UN-ESCAP, UN-SPIDER and UNU-DRM Centre (ITC) have joined hands with CSSTEAP in this endeavour. The faculty list for the course is very impressive as many international experts have also shared their knowledge and experience from different parts of the globe with the course participants.

I have personally discussed about the course with the course participants and the feedback was quite satisfying. I am sure that the participants will be able to use space-based data and services for taking effective measures, especially during the preparedness and mitigation phases of the DRR cycle, to reduce disaster losses in their home countries and the region.

I congratulate all the course participants for successfully completing the course and wish them the best in their future endeavours.

(P.S. Roy)

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Acknowledgements

Building human capacity to access and use the space-based information and services to reduce disaster risks in Asia-Pacific region is one of the high-priority agenda among the developing nations. Considering this, Centre for Space Science & Technology Education in Asia and the Pacific (CSSTEAP) identified 'Disaster Risk Reduction' as the theme for the short course in 2012. Accordingly, a four-week International Training Course on "*Application of Space Technology for Disaster Risk Reduction*" was conducted during 9 April - 4 May, 2012 at CSSTEAP, Dehradun (India). Indian Institute of Remote Sensing (IIRS), a constituent Unit of Indian Space Research Organisation (ISRO), located at Dehradun, was the host institute for the course.

The course was attended by 27 participants from 17 countries in the Asia-Pacific region. We sincerely thank all the Heads of organisations/ institutions for nominating the suitable candidates for the course.

Besides the faculty from IIRS and other ISRO centres, many experts from leading organisations in India and abroad contributed in the course. We especially thank all invited faculty and their Heads of organisations for joining hands in such an endeavour of capacity building in the region. Thanks also to the guests and dignitaries who have motivated the course participants with their presence during the inaugural and valedictory functions and in the workshop at the end of the course.

The financial support provided by the UN-SPIDER (United Nations Platform for Space-based Information for Disaster Management and Emergency Response) and UN-ESCAP (United Nations Economic and Social Commission for Asia and the Pacific) towards air travel for five participants each from different countries in the Asia-Pacific region is highly appreciated.

We thank the faculty and staff of all the Departments/ Groups/ Sections of IIRS and CSSTEAP for rendering their valuable help and support for conducting the course successfully.

(Sarnam Singh)

(Sushil K. Srivastav)

Contents

Course Report

1. Background

Disaster risk reduction (DRR) is the central theme of many international initiatives undertaken in the last two decades with an overall aim to reduce disaster risks and losses. The disaster losses can be prevented or at least reduced considerably if reliable and timely information about the natural resources, terrain, environment and socio-economics are available along with an understanding of the patterns and behaviour of different types of natural hazards. Space technologies have unambiguously demonstrated their capability in providing vital information and services required not only in the response phase of the disaster risk management cycle but also in mitigation, preparedness and early warning stages. However, to access and use the space technology-based information, services and solutions for DRR, there is an urgent need to build human capacity, especially in developing countries. With this in view, an International Training Course on ***"Application of Space Technology for Disaster Risk Reduction"*** of 4-weeks duration was conceptualized and conducted within the framework of education & training programmes of the *Centre for Space Science & Technology Education in Asia and the Pacific* (CSSTEAP), Affiliated to the United Nations, Dehradun.

The course was organised jointly with Indian Institute of Remote Sensing (IIRS), a constituent Unit of Indian Space Research Organisation (ISRO), Dehradun (India); United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER), Beijing (China); United Nations Economic and Social Commission for Asia and the Pacific (UN-ESCAP), Bangkok (Thailand); United Nations University - DRM Centre for Spatial Analysis and Disaster Risk Management of the ITC (University of Twente), Enschede (The Netherlands). IIRS was the host institute.

2. About the Course

The course was of 4-weeks duration; it started on 9th April 2012 and ended on 4th May 2012. The overall objective of the course was to strengthen the capacity of participants in understanding how space-based information, services and solutions can be used to reduce disaster risks and losses.

The course was modular in structure and had a balanced treatment of theory and practice. The 4-weeks were divided in the following five modules:

- Module 1: Overview of DRR;
- Module 2: Overview of space technology in the context of DRR;
- Module 3: Application of space technology for DRR and case studies-I;
- Module 4: Application of space technology for DRR and case studies-II;
- Module 5: Short Group Project.

The topics in Modules 1-4 were covered through lectures, demonstrations, hands-on-sessions and field-excursions. In the last module (last week), the participants were divided in five groups to work on different problems, such as geological hazards, hydro-meteorological hazards, environmental hazards, geodatabase creation and Web GIS application development in the context of DRR.

Besides space-based technologies, adequate emphasis was also given to: (i) socio-economic data analysis for vulnerability and risk assessment based on disaster loss databases and (ii) spatial planning, environmental impact analysis (EIA) and national databases to mainstream the disaster management in developmental planning process.

Field excursions in the eastern and western parts of the Doon Valley, Mussoorie and its surroundings were organised to show and demonstrate the operational use of ground instrumentation and mobile-GIS in studying the mountain hazards.

An educational-cum-cultural visit to Agra and Delhi was also organised to familiarise participants with the rich cultural heritage, diversity and scenic beauty of the country.

For details of topics covered in the course and the schedule, refer Annexure-I.

3. The Participants

The course was attended by 27 participants representing 17 countries of the Asia-Pacific region. They include: one participant from Afghanistan; two from Bangladesh; two from India; two from Kazakhstan; two from Kyrgyzstan; one from Lao PDR; one from Mongolia; one from Myanmar; one from Nepal; two from Phillippines; one from Solomon Islands; three from Sri Lanka; two from Tajikistan; one from Thailand; one from Tuvalu; two from Uzbekistan; and two from Vietnam. Nine participants of 16th RS & GIS course of CSSTEAP, which completed in March 2012, formed part of the 27 participants.

For details of course participants, refer Annexure-II.

4. The Faculty

The faculty for the course was drawn from many leading organisations from India and abroad. These organisations, apart from different ISRO centres (IIRS, NRSC,

SAC and ISRO Headquarters), include: UN-ESCAP, Bangkok (Thailand); UN-SPIDER, Beijing (China); UNU-DRM Centre for Spatial Analysis and Disaster Risk Management of the University of Twente, Faculty of Geo-Information Science and Earth Observation (ITC), Enschede (The Netherlands); UNDP, Bangkok (Thailand); International Water Management Institute (IWMI), Colombo (Sri Lanka); International Centre for Integrated Mountain Development (ICIMOD), Kathmandu (Nepal); Japan Aerospace Exploration Agency (JAXA), Tokyo (Japan); Indian National Centre for Ocean Information Services (INCOIS), Hyderabad (India); Indian Institute of Science (IISc), Bangalore; and Wildlife Institute of India (WII), Dehradun. Most of the faculty from abroad travelled at their own cost.

For details of faculty, refer Annexure-III.

5. The Travel Support and Fellowship

The travel support for five participants was provided by UN-ESCAP, Bangkok (Thailand) and for five participants by UN-SPIDER, Beijing (China). The travel support for remaining participants and the fellowship for meeting living expenses to all the participants were provided by CSSTEAP.

6. The Inaugural and Valedictory Functions

The course was inaugurated by Dr. Nagesh Kumar, Chief Economist of the Economic and Social Commission for Asia and the Pacific (ESCAP) and Director of its Sub-regional Office for South and South-West Asia, based in New Delhi. Dr. Shirish A. Ravan, Head of Office, UN-SPIDER (UN-OOSA), Beijing, and Dr. Sanjay K. Srivastava, Regional Advisor, UN-ESCAP, Bangkok, were also present during the inauguural function besides the faculty and staff of IIRS.

Dr. D.P. Rao, former Director, National Remote Sensing Centre (NRSC), ISRO, Hyderabad, gave away the cerificates to the participants and delivered the valedictory speech. Mr. Timothy Loh and Mr. Youshik Kim of UN-ESCAP, Bangkok, were also present during the valedictory function as special guests.

7. The Course Material

The lecture material provided by the faculty was compiled and brought out in the form of lecture notes volume, which was given to all the course participants at the start of the course. The handouts for the practical exercises/ demonstrations were provided during the individual sessions. At the end of the course, the participants were also provided the soft copy of the lecture and practical notes/ handouts, exercise data and presentations.

8. The Course Feedback

A formal feedback was taken at the end of the course. The course was evaluated in terms of fulfilment of the objectives of the course, programme design, methodology, duration of the course, reading material, relevance of the topics covered, logistics/ administrative arrangements, and strengths and weakness of the course. Overall, the course was rated excellent to very good. The course participants appreciated the quality of the information content and delivery; however, most of them felt that the duration of course could have been more so as to have more hand-on-experience. The summary of course feedback is provided in Annexure-IV.

9. The Course Workshop

A Workshop was organised on 5th May, 2012 to discuss the strengths and gaps existing in different countries for DRR and the way forward to strenghthen the collaboration among the countries and also with UN and other international agencies. The workshop was chaired by Dr. P. S. Roy, Director CSTEAP / IIRS. Mr. Timothy Loh and Mr. Youshik Kim from UN-ESCAP also participated in the workshop. It comprised of a technical session followed by a group discussion and conclusions. The technical session included the presentations by the course participants (representing Afghanistan, Bangladesh, Myanmar, Nepal, Phillippines, Sri Lanka, Tuvalu and Central Asian countries) who briefed about their country profile including different initiatives taken towards disaster risk reduction. Mr. Timothy Loh also made a presentation on the roles and activities of UN-ESCAP in disaster risk reduction. It was observed that while considerable efforts have been made by each and every country in the last decade, however, access to and/ or ussage of space technology to its full potential and non-availability of national/ regional databases still remain the major issues to deal with natural hazards. A consensus emerged that a mechanism or common platform should be created in the region to share the minimum data at reasonable resolution (including satellite data) during the disasters. Further, a mechanism for creating and sharing multi-layer GIS databases needs to be developed/ strenghthened in most of the countries. Capacity building to increase the use of space-based information and services in support of disaster risk reduction is to be given a high priority. CSSTEAP may take a lead in developing internet based learning material for wider dissemination of the existing knowledge.

Annexure-I

Course Details

A. Overview

9 April 2012	Registration & Inauguration
9 - 12 April 2012	Module 1 : Overview o f DRR
13 - 18 April 2012	Module 2: Overview of Space Technology in the Context of DRR
19 - 28 April 2012	Module 3: Application of Space Technology in DRR-I
29 April 2012	Country Presentations by Participants and Group Discussion
30 April - 4 May 2012	Module 4: Application of Space Technology in DRR-II (part of forenoon) Module 5: Group Project & Course Evaluation
4 May 2012	Valedictory Function

B. Schedule

Date	0930-1100 hrs	1130-1300 hrs	1400-1530 hrs	1600-1715 hrs
09.04.2012	Registration & Inauguration (0915-1130 hrs)	M1-L1 (SR)	M1-L2 (ICD)	M1-L3 (SS)
10.04.2012	M1-L4 (SS)	M1-L5 (SS)	M1-L6 (SR)	M1-P1 (SR)
11.04.2012	M1-L7a (RS)	M1-L7b (RS)	M1-P2a (RS)	M1-P2b (RS)
12.04.2012	M1-P2c (RS)	M1-P2d (RS)	M1-P2e (RS)	M1-P2f (RS)
13.04.2012	M2-L1 (SA)	M2-L2 (MK)	M2-P1 (SKS/HS)	M2-P2 (MK/HP)
14.04.2012	SATURDAY - Visit to Delhi/Agra (SKS/PKG)			
15.04.2012	SUNDAY - Visit to Delhi/Agra (SKS/PKG)			
16.04.2012	M2-L3 (CS)	M2-P3 (MK/HP)	M2-P4 (CS)	
17.04.2012	M2-L4 (SS1)	M2-L5 (VS)	M2-P5 (SS1/PKG)	
18.04.2012	M3-L2 (GA)	M2-L7 (SS1)	M2-P6 (HS/VS)	M2-P7 (VS/HS)	M2-P8 (SS1)
19.04.2012	M3-L1 (SPA)	M2-L6 (AK)	M3-L3 (NRP)	M3-P1 (PKT/VG)	M3-P2 (NRP)
20.04.2012	M3-L4 (PKC)	M3-L5 (PK)	M3-P3 (PK)	M3-P4 (PKC)
21.04.2012	SATURDAY - Mobile Mapping and Ground Verification of Satellite Image Interpretation (BDB/SKS)			

22.04.2012	SUNDAY (Free Day)			
23.04.2012	M3-L6 (MK1)	M3-L7 (MK1)	M3-P5a (MK1)	M3-P5b (MK1)
24.04.2012	M3-L13 (SK)	M3-L9 (PKJ)	M3-L10 (GRS)	Discussion for Project Work
25.04.2012	M3-L11a (CJW)	M3-L11b (CJW)	M3-P6a (CJW)	M3-P6b (CJW)
26.04.2012	M3-L11c (CJW)	M3-P6c (CJW)	M3-P6d (CJW)	M3-P6e (CJW)
27.04.2012	M3-L11d (CJW)	M3-P6f (CJW)	M3-P6g (CJW)	M3-L12 (DM)
28.04.2012	SATURDAY - Field Excursion on Ground Instrumentation and Mountain Hazards (SKS/SK)			
29.04.2012	SUNDAY - Country Presentations by Participants			
30.04.2012	M4-L1 (PPM)	M3-L8 (CMK)	M5 - Group Project	
01.05.2012	M4-L2 (BD)	M4-P1 (BD)	M5 - Group Project	
02.05.2012	M4-L3 (AR)	M5 - Group Project		
03.05.2012	M4-L4 (SKS)	M5 - Group Project		
04.05.2012	M4-L5 (HK)	Presentation of Group Projects & Course Feedback		Valedictory Function

M - Module No., L - Lecture No., P - Practical No.

Tea/Coffee Break : 1100-1130 hrs and 1530-1600 hrs; Lunch Break : 1300-1400 hrs

C. Details of Theory and Practicals / Demonstrations / Field Excursions

Module 1: Overview of DRR

Theory

Module (M)-Lecture (L) No.	Topic	Faculty
M1-L1	Hyogo framework and disaster risk reduction - priorities and relevance of space based information	Shirish Ravan (SR) *(UN-SPIDER)*
M1-L2	Basic terminologies and concepts of DRR, hazard, vulnerability and risk assessment	IC Das (ICD) *(NRSC)*
M1-L3	Natural hazards and risks in the Asia-Pacific region and their trends	Sanjay Srivastava (SS) (UN-ESCAP)
M1-L4	International initiatives and their roles in disaster risk reduction	Sanjay Srivastava (SS) *(UN-ESCAP)*
M1-L5	Integrating disaster risk reduction in socio-economic development policies in Asia and the Pacific	--do--
M1-L6	Spatial Data to compliment the use of space-based information for disaster management	Shirish Ravan (SR) *(UN-SPIDER)*
M1-L7a-b	Establishing and institutionalizing disaster loss database for vulnerability and risk analysis	Rajesh Sharma (RS) *(UNDP)*

Practicals/ Demonstrations

Module (M)-Practical (P) No.	Topic	Faculty
M1-P1	Interactive discussion on disaster risk management in Asia-Pacific countries	Shirish Ravan (SR) *(UN-SPIDER)*
M1-P2a-f	Organisation and analysis of disaster loss databases for vulnerability and risk assessment using DesInventar software	Rajesh Sharma (RS) *(UNDP)*

Module 2: Overview of Space Technology in the Context of DRR

Theory

Module (M)-Lecture (L) No.	Topic	Faculty
M2-L1	Basics of remote sensing and characteristics of Earth observation systems	Shefali Agrawal (SA) *(IIRS)*
M2-L2	Image processing techniques, information extraction and change detection from Earth observation data	Minakshi Kumar (MK) *(IIRS)*
M2-L3	Linkage of climate change and natural hazards and fundamentals of satellite meteorology	Charu Singh (CS) *(IIRS)*
M2-L4	Basics of geographic information system (GIS) and geodatabase creation and organization	Sameer Saran (SS1) *(IIRS)*
M2-L5	Spatial analysis and geovisualization	Vandita Srivastava (VS) *(IIRS)*
M2-L6	Basics of global positioning system (GPS), location-based services and mobile mapping	Anil Kumar (AK) *(IIRS)*
M2-L7	Open source tools for spatial data processing, web-based data viewers and web portals in support of disaster risk management	Sameer Saran (SS1) *(IIRS)*

Practicals/ Demonstrations

Module (M)-Practical (P) No.	Topic	Faculty
M2-P1	Hands-on-experience with different types of Earth observation satellite data products and their analysis for identification of surface features	SK Srivastav (SKS)/ Hari Shankar (HS) *(IIRS)*
M2-P2	Digital image classification for information extraction	Minakshi Kumar (MK)/ Hina Pandey (HP) *(IIRS)*
M2-P3	Change detection mapping	--do--
M2-P4	Rainfall retrieval from satellite data	Charu Singh (CS) *(IIRS)*
M2-P5	Creation and organisation of geodatabase	Sameer Saran (SS1)/ Prasun K Gupta (PKG) *(IIRS)*
M2-P6	Vector based spatial analysis of geographic data	Hari Shankar (HS)/ Vandita Srivastava (VS) *(IIRS)*
M2-P7	Raster based spatial analysis of geographic data	Vandita Srivastava (VS)/ Hari Shankar (HS) *(IIRS)*
M2-P8	Demonstration and hands-on experience with Geoportals and WebGIS applications for disaster management support	Sameer Saran (SS1) *(IIRS)*

Module 3: Application of Space Technology in DRR-I

Theory

Module (M)-Lecture (L) No.	Topic	Faculty
M3-L1	Flood mapping, monitoring and risk assessment using Earth Observation data	SP Aggarwal (SPA) *(IIRS)*
M3-L2	Large-scale flood event: global and regional assessment	Giriraj Amarnath (GA) *(IWMI)*
M3-L3	Agriculture drought assessment and monitoring using Earth observation data	NR Patel (NRP) *(IIRS)*
M3-L4	Geological hazards (landslides and earthquake) assessment and monitoring using Earth observation data	PK Champati Ray (PKC) *(IIRS)*
M3-L5	Geospatial technologies for tsunami early warning system	Patanjali Kumar (PK) *(INCOIS)*
M3-L6	Utilization of space based technology in disaster risk reduction	Makoto Kawai (MK1) *(JAXA)*
M3-L7	Damage assessment in the Great East Japan earthquake and flood and landslide hazard mapping/warning using ALOS and GSMaP data	--do--
M3-L8	Weather forecasting: track prediction of cyclones and early warning for hydro-meteorological hazards	CM Kishtawal (CMK) *(SAC)*
M3-L9	Satellite communication system for early warning, search & rescue and emergency response	PK Jain *(ISRO HQ.)*
M3-L10	Real-time mapping and monitoring of forest fires using Earth observation data	G. Rajashekar (GRS) *(NRSC)*
M3-L11a-d	Remote sensing and GIS for natural hazard assessment and disaster risk management - An overview, - Identification, mapping and assessment of elements-at-risk, hazards, vulnerabilities and risks using EO data and GIS, - Hazard and risk modeling using EO systems and GIS for common natural hazards, - Multi-hazard risk assessment in urban areas and damage assessment using Earth observation data	Cees Van Westen (CJW) *(UNU-DRM Centre, ITC/ University of Twente)*
M3-L12	Application of geospatial technologies in coastal hazards	D Mitra (DM) *(IIRS)*
M3-L13	Land degradation and decertification : concept, status and geospatial approach for assessment	Suresh Kumar (SK) *(IIRS)*

Practicals/ Demonstrations

Module (M)-Practical (P) No.	Topic	Faculty
M3-P1	Mapping flood inundation areas	PK Thakur (PKT)/ Vaibhav Garg (VG) *(IIRS)*
M3-P2	Agriculture drought assessment and monitoring	NR Patel (NRP) *(IIRS)*
M3-P3	Demonstration on tsunami early warning system in Indian ocean	Patanjali Kumar (PK) *(INCOIS)*
M3-P4	Landslide hazard modeling	PK Champati Ray (PKC) *(IIRS)*
M3-P5a-b	Damage assessment using ALOS data	Makoto Kawai (MK1) *(JAXA)*
M3-P6a-g	- Mapping elements-at-risk - Assessment/ modeling of hazards, vulnerabilities and risks - Multi-hazard risk assessment in urban areas - Damage assessment	Cees Van Westen (CJW) *(ITC/ University of Twente)*

Module 4: Application of Space Technology in DRR-II

Theory

Module (M)-Lecture (L) No.	Topic	Faculty
M4-L1	Hydro-meteorological impacts of climate change	PP Mujumdar (PPM) *(IISc)*
M4-L2	Crowdsourcing/ VGI technology and application in disaster management for creation and dissemination of geographic information in near-real-time for emergency management	Bikash Dangol (BD) *(ICIMOD)*
M4-L3	Space based environmental services and role of EIA in disaster risk reduction	Asha Rajvanshi (AR) *(WII)*
M4-L4	Concept of sustainable development, spatial planning and national databases for disaster risk reduction	Sushil K Srivastav (SKS) *(IIRS)*
M4-L5	Concept and application of web GIS and decision support tools in disaster management	Harish Karnatak (HK) *(NRSC)*

Practicals/ Demonstrations

Module (M)-Practical (P) No.	Topic	Faculty
M4-P1	Crowdsource application for emergency management	Bikash Dangol (BD) (ICIMOD)

Module 5: Group Projects

Group	Participants	Project Topic	Supervisor
1	Dr. Janak Bahadur Chand Ms. Luiza Bikeeva Ms. Nurzat Zhunushalieva Ms. Alina Gasanova	Landslide hazard zonation in Giri Valley, Uttarakhand (India)	Dr. P. K. Champati Ray (Geosciences & Geohazards Deparment, IIRS)
2	Mr. Napadol Sudsom Ms. Marodbekova Alima Mr. Virasith Phomsouvanh Dr. Md. Rejaur Rahman Mr. Mohammad Abdul Quader Ms. Mudalinayakage Rajitha Lakmini Ms. Ganbat Munkhzul	Flood mapping and monitoring using satellite imagery in part of Orissa (India)	Dr. Praveen Thakur & Dr. Vaibhav Garg (Water Resources Deparment, IIRS)
3	Mr. Sherzod Zaitov Ms. Le Van Anh Ms. Asset Yegizbayeva Ms. Nurgul Aitekeyeva Mr. Aldwin Torres Almo Mr. Justine Jose Polotan de la Cruz Ms. Rushanka Pramod Amrutkar Mr. Walpitage Harsha Ravindra Mr. K. A. D. P. K. Kodippili	Modeling dispersion pattern of oil spill and its effect on land use/ land cover along Indian coast	Dr. A. K. Mishra & Mr. P. P. Mandal (Marine & Atmospheric Sciences Deparment, IIRS)
4	Mr. Hamid Jamshid Samadi Mr. Davlatov Davlatbek Ms. Thiri Maung Ms. Meelina T Ailesi	Creation of GIS database for disaster management	Ms. Vandita Srivastava (Geoinformatics Deparment, IIRS)
5	Mr. Jonathan Matamaru Tafiariki Mr. Le Mai Son Mr. Vinod Kumar Sharma	Web application development using Google APIs for disaster management	Dr. Sameer Saran (Geoinformatics Deparment, IIRS)

Field Excursions/ Visits

Educational-cum-cultural visit to Delhi/Agra *(Sushil K Srivastav / Prasun K Gupta, IIRS)*		14 - 15 April, 2012
Field excursion	- Mobile Mapping and Ground Verification of Satellite Image Interpretation *(BD Bharath / Sushil K Srivastav, IIRS)*	21 April, 2012
Field excursion	- Ground Instrumentation and Mountain Hazards *(Suresh Kumar / Sushil K Srivastav, IIRS)*	28 April, 2012

Course Participants

S. No.	Name / Designation / Address	Country	Photograph
1.	**Mr. Hameed Jamshid** *GIS Specialist* Afghanistan Information Management Services (AIMS) , House 1070, Street 15, Wazir Akbar Khan, Kabul, Afghanistan Ph: +93-794904388, 700221043 E-mail: hamid.jamshid@aims.org.af	Afghanistan	
2.	**Mr. Md. Abdul Quader** *Assistant Programmer* Disaster Management & Relief Division Ministry of Food & Disaster Management Dhaka - 1000, Bangladesh Ph: +880-1740555698 Fax: +880-2-7165405 E-mail: quader75@gmail.com, ap@dmrd.gov.bd	Bangladesh	
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5.	**Mr. Vinod Kumar Sharma** *Scientist/ Engineer 'SD'* Disaster Management Support Group (RS Area) National Remote Sensing Centre Balanagar, Hyderabad 500 037, India Ph: +91-40-23884533 Fax: +91-40-23870445 E-mail: vinod_sharma@nrsc.gov.in	India	
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Summary of Course Feedback

Annexure-IV

Name of the Participant (Country)	Overall Rating of the Course	Objectives Achieved	Programme Design (Subject coverage/ Time distribution/ Sequencing of Topics	Teaching Methods (Lectures/ Practical)	Duration of the Course [Assesed on a scale of 1 (Enough) to 5 (Short)]	Reading Material Usefulness/ Adequacy	Relevance/ Quality of Contents/ Presentations/ Time for each Topic	Logistics & Administrative Arrangements/ Lodging/ Boarding/ Physical environment	Suggestions for improvements/ Remarks
Mr. Hameed Jamshid (Afghanistan)	--	B	B, C, B	C, C	Short (4)	B, B	B, C, A, B	A, B, B, B	Advance course on DRR required in future; more detailed training material needed
Dr. Md. Rejaur Rahman (Bangladesh)	A	A	A, B, A	A, B	Enough (2)	A, A	A, A, A, B	A, A, A, A	Little more time for practicals
Ms. Rushanka P. Amrutkar (India)	A	A	A, B, B	A, C	Enough (1)	A, B	A, B, B, A	A, A, A, A	Hands-on training to be increased
Mr. Vinod Kumar Sharma (India)	A	A	A, A, A	A, B	Enough (1)	A, A	A, A, A, A	A, A, A, A	--
Ms. Asset Yegizbayeva (Kazakhstan)	A	A	A, A, A	A, A	Short (3)	A, A	A, A, A, A	A, A, A, A	--
Ms. Alina Gasanova (Kyrgyzstan)	B	B	C, B, A	A, B	Enough (1)	A, A	A, A, A, A	B, A, A, A	Central Asian case studies to be included
Ms. Nurzat Zhunushalieva (Kyrgyzstan)	A	A	B, A, A	A, A	Enough (4)	B, A	B, A, A, A	A, A, A, A	--
Mr. Virasith Phomsouvanh (Lao PDR)	B	A	A, C, B	A, D	Short (5)	A, D	-, A, A, B	A, A, A, A	Tutorials for each process/analysis required; Practicals to be in more detail
Ms. Ganbat Munkhzul (Mongolia)	A	A	A, A, B	B, A	Short (4)	A, A	C, C, C, B	A, A, A, A	--
Ms. Thiri Maung (Myanmar)	A	B	B, C, C	B, D	Short (3)	A, B	B, B, B, C	B, B, B, B	Practical time to be increased
Mr. Janak Bahadur Chand (Nepal)	A	A	A, A, A	A, A	Short (4)	A, A	A, A, A, A	A, A, A, A	Duration to be of 2 months; more emphasis on practicals required
Mr. Aldwin Torres Almo (Philippines)	A	A	A, B, A	A, A	Short (3)	A, A	A, A, A, B	A, A, A, A	Limited time; additional topics and tutorials on use of microwave & Lidar data to be included

Mr. Justine J. Polotan De la Cruz (Philippines)	--	A	A, A, C	B, A	Short (4)	A, A	A, B, C, B	A, A, A, A	More examples outside SAARC countries to be included
Mr. Jonathan Matamaru Tafiariki (Solomon Islands)	A	A	A, A, B	B, A	Short (3)	A, C	A, A, A, B	B, B, B, A	Practicals needs to be in more detail
Mr. Harsha R. Walpita (Sri Lanka)	A	B	A, B, A	A, C	Short (4)	A, B	A, A, A, C	A, A, A, A	Required more practicals hours
Mr. K. A. D. P. K. Kodippili (Sri Lanka)	A	B	A, B, B	A, A	Short (4)	A, B	A, B, B, C	A, A, A, A	Increase the course durtion with more practicals
Ms. Mudalinayakage R. Lakmini (Sri Lanka)	A	A	A, A, A	A, C	Short (5)	A, A	A, B, B, A	A, A, A, B	--
Mr. Davlatov Davlatbek (Tajikistan)	A	A	B, B, A	A, B	Short (5)	A, A	B, B, A, B	A, A, A, A	Lectures may be more interactive; want to join RS & GIS course
Ms. M.A. Marodbekovna (Tajikistan)	A	A	A, A, A	A, A	Short (5)	A, A	A, A, A, A	B,B,A,A	--
Mr. Napadol Sudsom (Thailand)	B	A	B, B, B	B, C	Short (4)	A, B	B, B, B, B	B, B, B, B	--
Ms. Meelina T Ailesi (Tuvalu)	A	A	A, A, A	A, A	Enough (1)	A, A	A, A, A, A	A, A, A, A	CSSTEAP to work closer with the DRR officials in Asia Pacific countries in imparting this important training; follow-up on use of this training by participants in their respective countries required
Ms. Luiza Bikeeva (Uzbekistan)	--	A	A, B, A	A, B	Short (4)	A, A	A, A, -, B	A, A, A, A	Time for practicals to be increased
Mr. Zaitov Sherzod Shukratovich (Uzbekistan)	B	B	B, C, B	C, B	Short (5)	B, B	B, B, C, E	B, B, B, B	Time very short; field studies/ experiences to be included
Ms. Anh Van Le (Vietnam)	B	C	C, C, B	C, B	Short (4)	B, B	C, B, B, B	A, B, B, A	Contents on disaster statistics may be reduced
Mr. Le Mai Son (Vietnam)	B	B	B, C, B	B, B	Short (4)	C, B	B, B, B,C	A, B, B, B	--

Note: Feedback on above items were taken on a relative scale of 1 to 5; 1 being *Poor/Least Useful/ Inadequate/ Not Relevant/ Not Enough* and 5 being *Excellent/ Useful/ Adequate/ Relevant/ Enough* depending on the context.

A Excellent, B Good, C Average, D Below Average, E - Poor

Photo Gallery

Course inauguation by the Chief Guest, Dr. Nagesh Kumar, Chief Economist UN-ESCAP and Director of its Sub-regional Office for South and South-West Asia, New Delhi

Release of lecture notes volume during the inaugural function of the course

Inaugural address by the Chief Guest, Dr. Nagesh Kumar

Course participants discussing with faculty during the practical session

Course participants presenting their views during group discussion

Course participants during the field excursion

Course participants during the group project

Dr. D.P. Rao, former Director, NRSC (ISRO) Hyderabad and Chief Guest during the valedictory function, giving away the certificate to one of the course participants

Dr. D.P. Rao, former Director, NRSC (ISRO) Hyderabad and Chief Guest delivering valedictory address (left) and Mr. Youshik Kim, Expert, UN-ESCAP, Bangkok addressing the participants and audience during the valedictory function (right)

Course participants with the dignitaries on the dais (Dr. D.P. Rao, Chief Guest, sitting in the centre) during the valedictory function

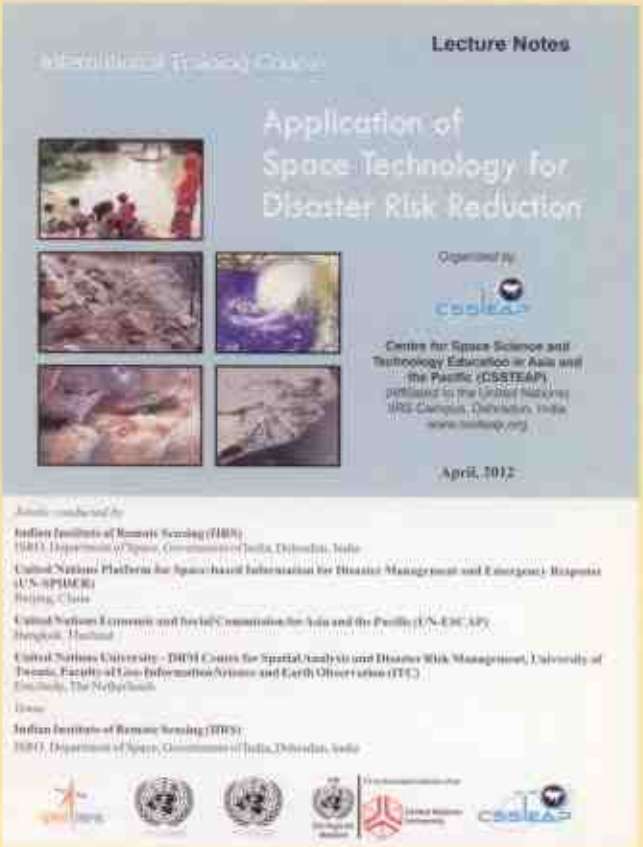
Course participants at Taj Mahal, Agra

Course participants at India Gate, Delhi

Course participants at Qutub Minar, Delhi

Course participants at Lotus Temple, Delhi

Course participants at Kempty Fall, Mussoorie



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