Capacity Building Towards Space Based Disaster Risk Reduction in Asia Pacific:2006-2016

(*Affiliated to the United Nations*)

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ISRO's contribution to Sendai Framework for Disaster Risk Reduction

Communication

Satellite Data

Capacity Building

Capacity Building by Indian Space Research Organization

Indian Institute of Remote Sensing

Transfer of technology through Capacity Building & Research in RS & GIS technology and Application

Caters to ISRO's initiatives in

- *Natural Resource Survey*
- *Earth and Atmospheric Sciences*
- *Disaster Management*

National Needs

- Regular PG courses; Certificate courses; Decision makers courses and Tailor made courses
- International Programme (MEA – ITEC/SCAPP Sponsored Courses)

More than 500 participants from 79 countries

International perspective

- Hosting CSSTEAP Headquarters & supporting its activities
- Conducting RS & GIS Educational Programs *(PGD/M.Tech. & Short Courses)*
- Interface with other ISRO Centres, UN offices, etc. to conduct its academic programmes.

CSSTEAP Objectives and Goals

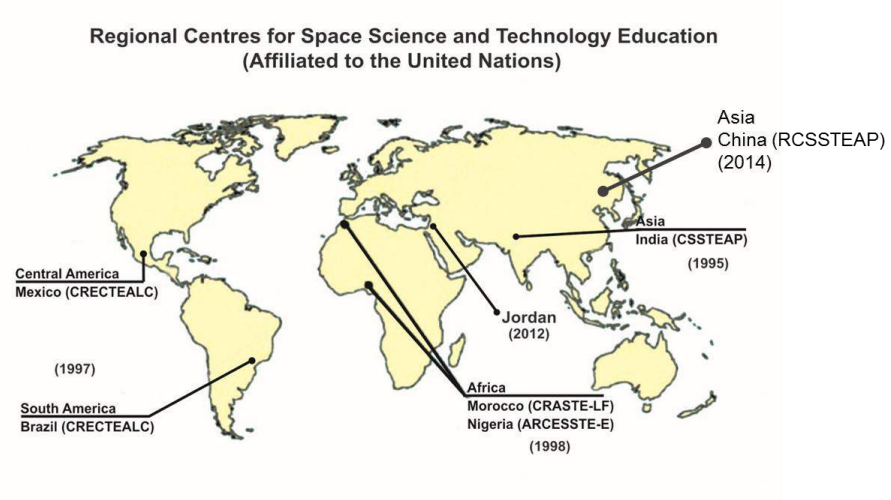
… objective is to strengthen the existing national / regional educational institutions in the developing countries in the field of space science and technology to enhance the societal benefits.

- Increasing knowledge and understanding in Space Science & Technology

  … developing skills and knowledge of university educators and research and application scientists through rigorous theory, applications, field exercises and pilot projects in those aspects of space science and technology…

- Building/Enhancing national and regional capacity

- Socio-economic development, regional cooperation, support to international programmes



- At the behest of UN General Assembly, UNOOSA and Government of India signed an agreement in 1995 to establish Regional Centre for Asia Pacific Region

- CSSTEAP became the First Regional Centre for Space Science and Technology Education in the World established in 1995 by UN-OOSA

CSSTEAP Headquarters and Host Institutes

CSSTEAP GB-2014
Meets once every Year

CSSTEAP
Hqrs.,Dehradun

CSSTEAP AC-2015
Meets once in three years

Centre Campuses, Host Institutes and Courses

Indian Institute of Remote Sensing, Dehradun

RS & GIS
Disaster Risk Reduction
Small Satellite Missions

Space Applications Centre, Ahmedabad

SATCOM, SATMET, GNSS & NAVSAT

Physical Research Laboratory, Ahmedabad

Space & Atmospheric Sciences

ISRO Satellite Centre, Bengaluru

Small Satellite Missions

Training Programmes

- Post Graduate Courses (9 months) – announced 4-5 months
- Short Courses (4 days to 1 month) – announced 2-3 months
- Masters Degree (9 month Post Graduate Course + One year research in home country)
- Ph. D. - facilitates advance research and analysis

Funding: Government of India support

- International and domestic to & fro travel for all courses.
- Fellowships to all the participants (long and short courses)
- Book and Project allowance to all the participants
- Health care, insurance, etc.

UNOOSA - international travel for RS&GIS Courses
UNESCAP, UNDP, ICIMOD, IWMI, SAARC, ITC, etc.

Training Programmes – Short Courses

RS&GIS Theme specific	Satellite Navigation & Positioning Systems	Small Satellite Missions	Open Source Geospatial Tools
4 weeks every year	4 weeks every year from 2012 and now every even year	15 days every year from 2012	4 days occasional
(IIRS, Dehradun)	(Space Application Center, Ahmedabad)	(ISRO Satellite Center, Bengaluru/ IIRS, Dehradun	(IIRS, Dehradun)
UNOOSA, UNSPIDER, UNDP & UNESCAP, IWMI, SAARC DMC			

4 days to 4 weeks duration

For middle level managers & professionals having 5-10 years experience in relevant field

Fully funded either by DOS/GoI, UN Agencies or SAARC

Core Faculty from ISRO/DOS from IIRS, SAC, PRL, ISAC and National and International subject experts

Research Facilities

Satellite Data Archives & Instrumentation Facility

- Map & Image Library (archives of Satellite Data, Topographical Maps, Aerial Photographs, Thematic maps, etc.)
- Ground-truth equipments (Spectroradiometer, Geodetic & hand-held GPS, Total Station, Photogrammetric Cameras, GPR, Soil, water & vegetation parameters measurement instruments)

In-house Labs

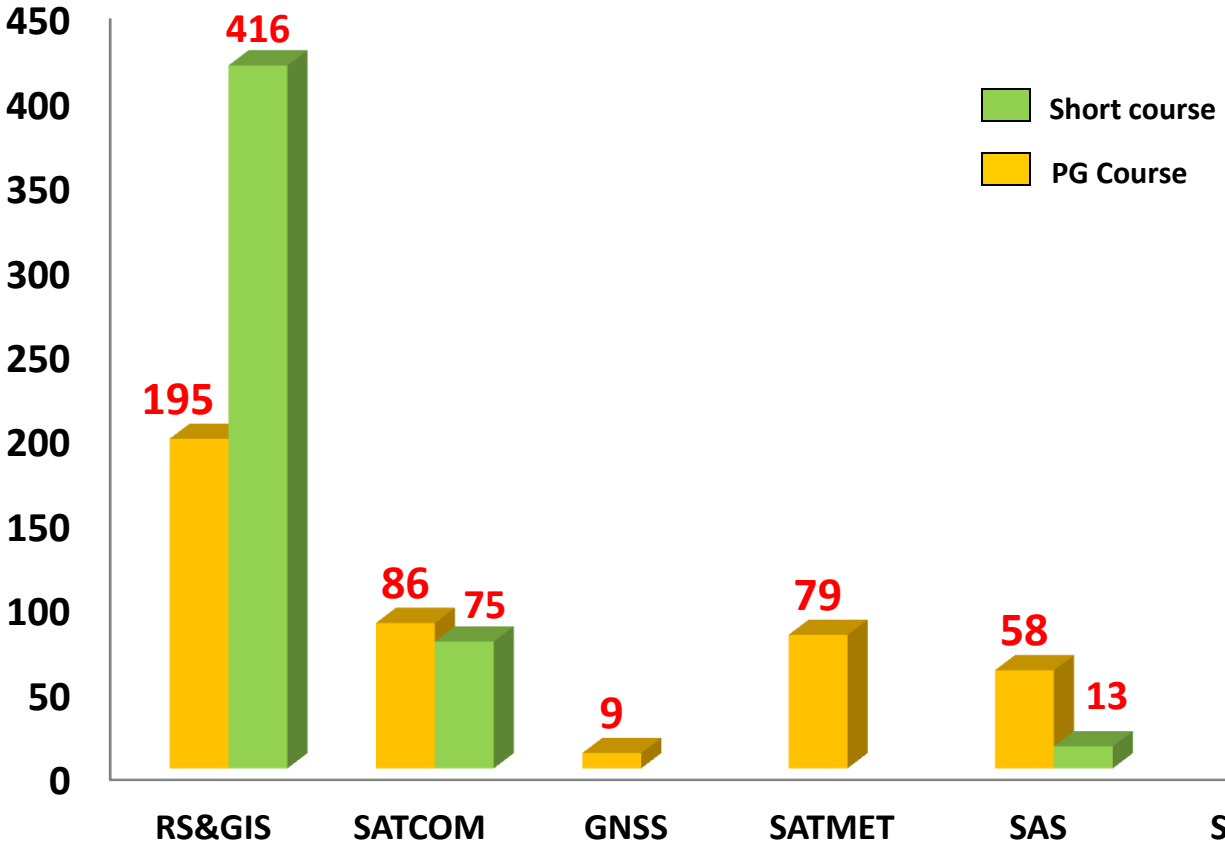
- DIP, Photogrammetry & GIS Labs
- Soil & Water Analysis Laboratory

Field facilities

Flux towers, AWS, Sensors for geophysical monitiring

Achievements (last 10 years)

Total: 992 (49 AP countries*)
- **427 from PG courses**
- **565 from short courses**



No. of PG Courses conducted:
RS & GIS – 10
SATCOM- 05 (OY)*
GNSS – 01 (OY)*
SATMET – 05 (EY)*
SAS- 05 (EY)*

No. of Short Courses conducted:
RS & GIS – 21
SATCOM- 01
NAVSAT- 03
SAS– 01
SSM- 04

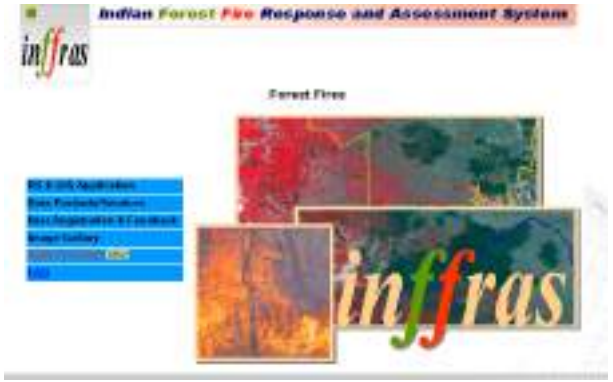
Special Short Courses on DRR

Special Programmes with UN Agencies

On Going…….

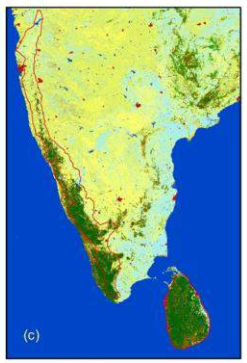
- **Disaster Damage and Loss Assessment in Natural Heritage and Cultural Sites using Geospatial Techniques: Sep 11 to Oct 02, 2016 jointly with UNESCO, C2C**

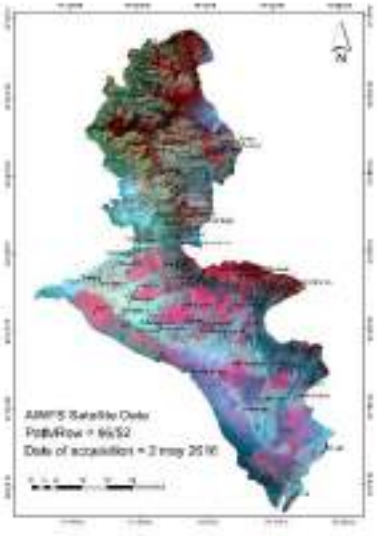
24 participants from 11 countries



Highlights:

- ❖ First of its kind course incorporating 2 different aspects.
- ❖ For the first time impact of disaster on natural and cultural heritage
- ❖ 5 internationally renowned guest faculty
- ❖ Educational visit as well as lectures in various natural and cultural heritage sites





Special Short Courses on DRR

Special Programmes with UN Agencies

Application of Space Technology for Disaster Risk Reduction April 9 – May 4, 2012

- 27 participants from 17 countries
- Funded by UNOOSA/UNSIPDER, UNESCAP

Flood Risk Mapping & Modeling and Assessment using Space Technology: July 22-26, 2013

- 19 participants from 11 countries
- Funded by UNOOSA/UNSIPDER, UNESCAP and IWMI

Sub-regional training on development of Geo-referenced Information Systems for Disaster Risk Management: 26-29, August 2013

- 16 participants from 9 countries
- Funded by UNESCAP

Short course on 'Earth Observation for Disaster Response, Recovery and Preparedness' for Bhutanese Officials: April 13-17, 2015

- 19 Participants from Bhutan
- Organized by CSSTEAP, UNDP and UNSPIDER at IIRS, ISRO, Dehradun
- Funded by UNDP Bhutan

Geospatial Technologies for Coastal & Marine Disaster Management & Climate Change: May 4-31, 2015

- Conducted jointly with UNESCAP
- 19 participants from 10 countries

Short Courses on Disaster Management / Risk Reduction

Conducted by CSSTEAP/IIRS for Asia Pacific region

- Application of Space Technology for Disaster Management Support with Emphasis on Flood Risk Management: 2007
  18 participants from 12 countries

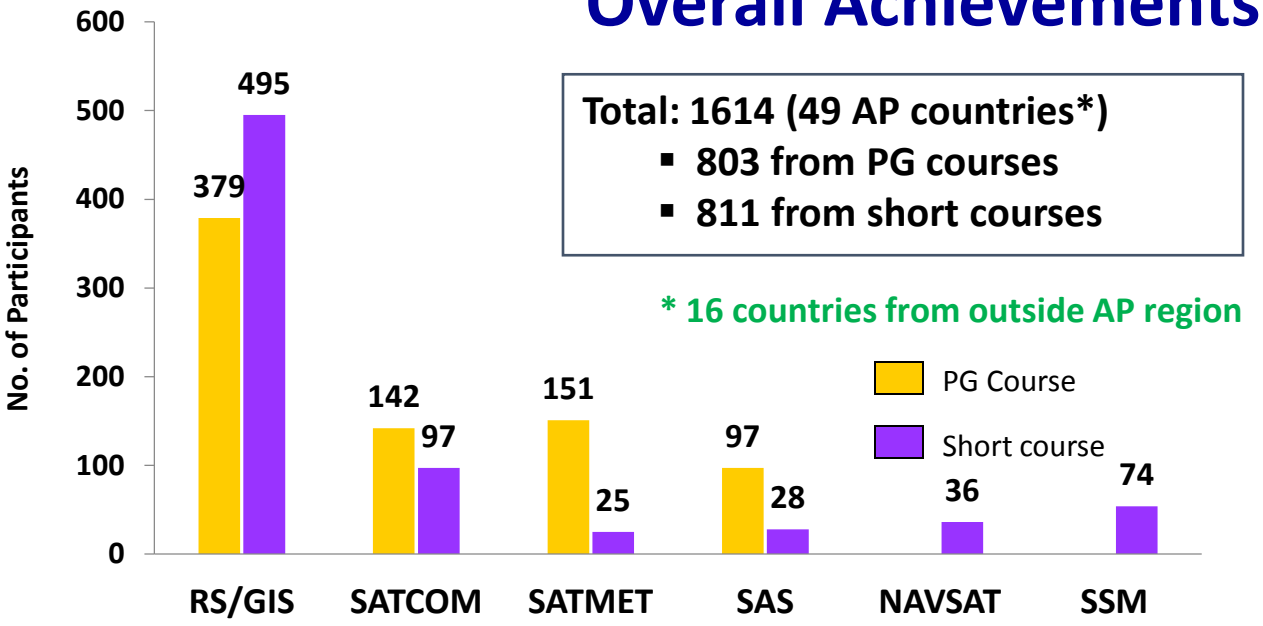
- Application of Space Technology for Disaster Management Support with Emphasis on Drought Monitoring, Desertification and Crop Yield Prediction: July 14– Aug 08, 2008
  16 participants from 09 countries

- High Resolution Aerospace Image Analysis for Geo-hazard Assessment: 2010
  18 participants from 6 countries

- Application of Space Technology for Disaster Management: 2010
  14 participants from 10 countries

- RS&GIS Applications for Coastal Hazards Mitigation & Sustainable Development for Pacific countries: 2011
  11 participants from 5 countries

Overall Achievements



Total: 1614 (49 AP countries*)

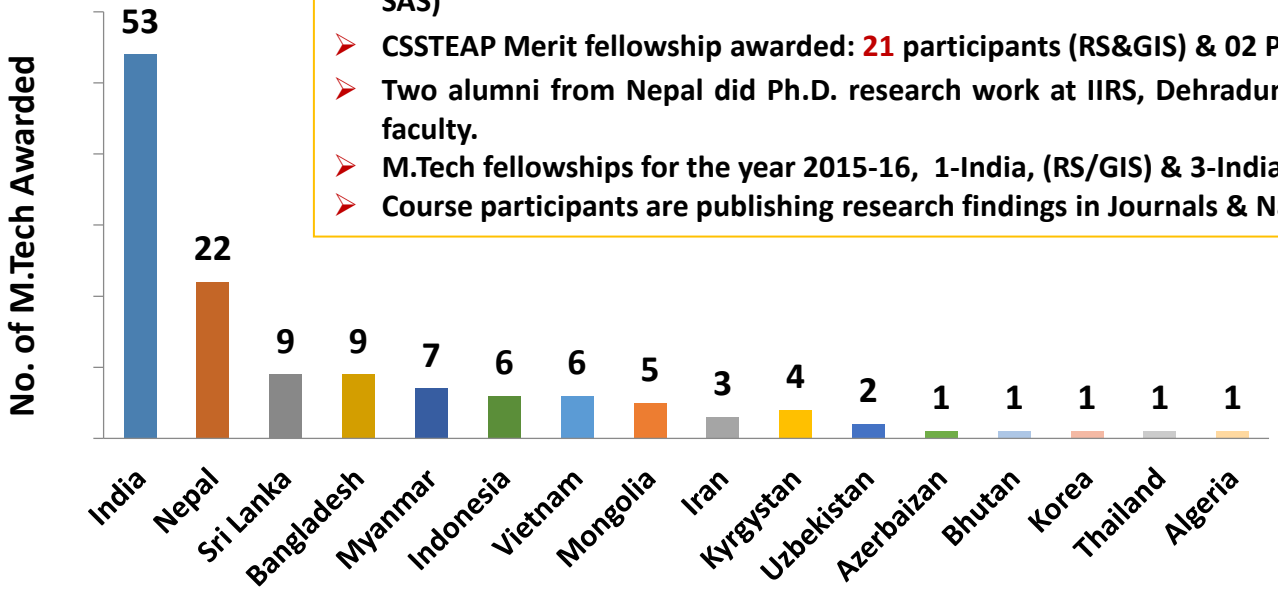
- **803 from PG courses**
- **811 from short courses**

*** 16 countries from outside AP region**

PG Courses conducted:
RS & GIS – 19 (Every year)
SATCOM – 09 (OY)
SATMET – 09 (EY)
SAS – 09 (EY)

Short Courses conducted:
RS & GIS – 26
SATCOM – 05
SATMET – 02
SAS – 01
NAVSAT – 03
SSM – 04

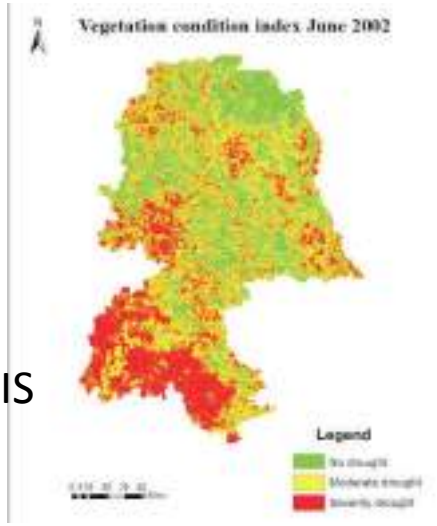
- **M.Tech. degree Awarded – 131 from 16 countries**
- **During the year 2014-15: 07 participants were awarded M.Tech degree f(3-RS&GIS, 2-SATCOM, 1-SATMET, 1-SAS)**
- **CSSTEAP Merit fellowship awarded: 21 participants (RS&GIS) & 02 Participants (SAS) since 2004.**
- **Two alumni from Nepal did Ph.D. research work at IIRS, Dehradun under guidance and supervision of IIRS faculty.**
- **M.Tech fellowships for the year 2015-16, 1-India, (RS/GIS) & 3-India (SAS) have been awarded.**
- **Course participants are publishing research findings in Journals & National/Intl. symposia.**



Course	M.Tech. Awarded
RS & GIS	64
SATCOM	34
SATMET	17
SAS	16

Student Projects in Disaster Detection and Risk Mitigation

2014 & 2015



Close range Photogrametry for urban Disaster Aplication

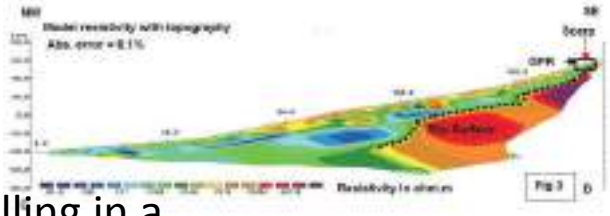
Marzhan Shaimerdenova, Kazakhastan

Agriculture drought risk assessment using Remote sensing and GIS

Altannavch Magsarjav Mongolia

Integration of Satellite Remote Sensing and Geophysical Methods for Landslide Characterization at Kalimath, Garhwal Himalaya, India

Dilhani Jayalath, Srilanka



Landslide Susceptibility Mapping and Debris Flow Modelling in a part of Tons Valley, Uttarakhand, India

Chathuri Nadeesha Subasinghe, Srilanka

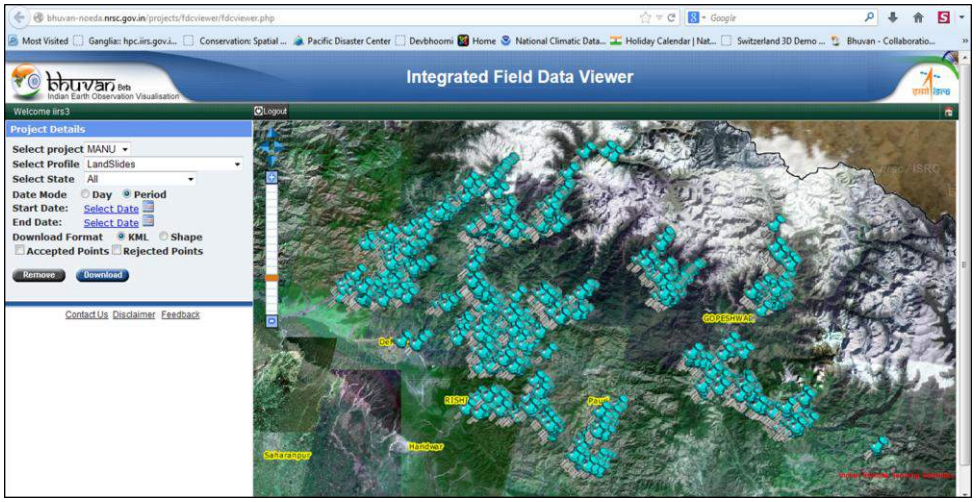
Structural and tectonic analysis for slope stability and landslide studies in Yamunotri region, India

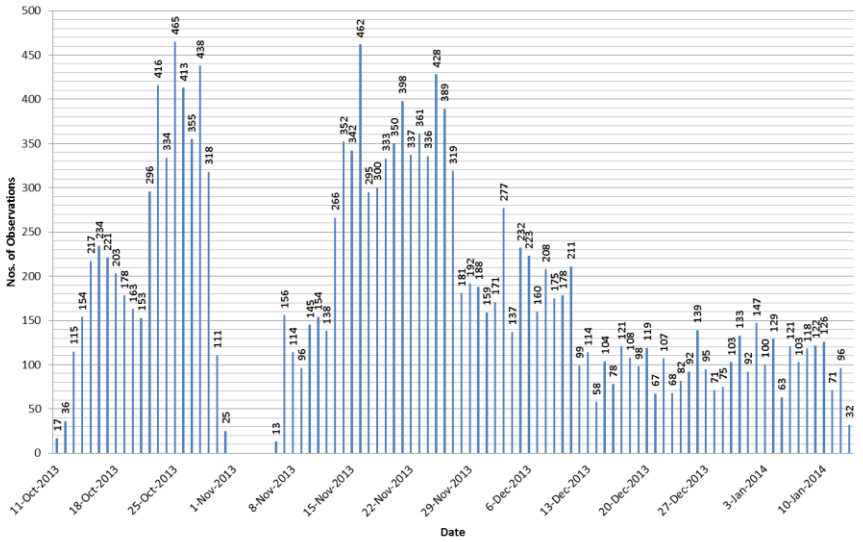
Manuchehr Baydulloev Otambekovich, Tazikistan

Future Directions

Crowd Sourcing

Damage Assessment During Kedarnath, Disaster, Uttarakhand, India - 2013



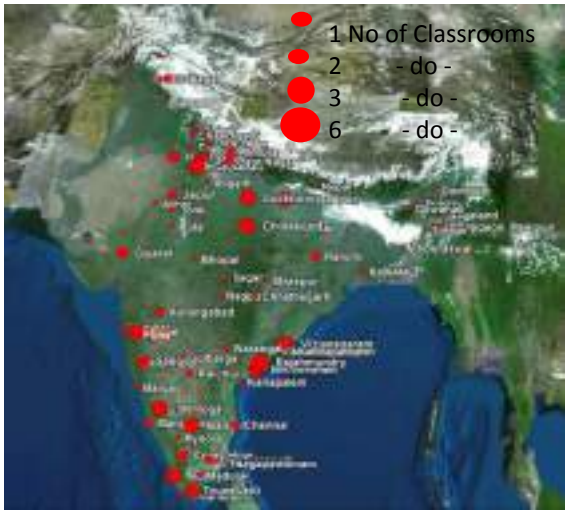


Damage Assessment During Nepal Earthquake - 2015

Requirements

- Need for rapid and large volume of data collection
- Geospatial platform for data repository and analysis (including QC)
- AI based algorithms for tagging disaster risk from random crowd sourced data

EDUSAT Based Outreach Programs



- IIRS has initiated its interactive distance education based capacity building under IIRS outreach programme in the year 2007, wherein over 35,000+ students and researchers from 470+ universities/institutes across the country have been trained in the field of geospatial technology.
- This was accomplished through ISRO's communication satellites, satellite interactive terminals and A-View software.

Courses Completed	
Basic Course on RS, GIS & GNSS (12 weeks)	Advance Courses (4 Weeks)
▪ Module 1: Remote Sensing and Digital Image Processing ▪ Module 2: Geographical Information System ▪ Module 3: Global Navigation Satellite System ▪ Module 4: Remote Sensing & Geographical Information System Applications	▪ Applications of RS&GIS for NRM ▪ Microwave (SAR) Remote Sensing for Natural Resources ▪ Geo-web Services – Technology & Applications (February-March, 2013) ▪ Hyper-spectral Remote Sensing (February-March, 2012) ▪ Open Source GIS (February-March, 2011)

IIRS launched e-learning based certificate courses Under Distance Learning Programme

Registrations are open from 15th August 2014 onward

http://elearning.iirs.gov.in

Following courses are available under IIRS e-learning programme through Internet using NKN connectivity.

Four (04) months duration:

- Comprehensive certificate course on Remote Sensing and Geo-information Science.

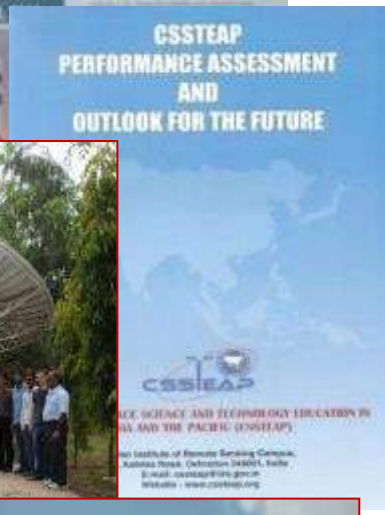
One (01) Month Duration certificate courses on :

- Fundamentals of Remote Sensing.
- Fundamentals of Photogrammetry and Cartography.
- Fundamentals of Geographical Information System and Global Navigation System.
- Fundamentals of Digital Image Processing.

Target Groups:

- State and Central Government Ministries and Departments.
- Geospatial Industries.
- PSU/entrepreneurs / NGO.
- Students and Researchers.

Passing Out



Alumini Meets

Nay Pyi Taw, Myanmar
March 22, 2012

Thimpu, Bhutan
November 15, 2011

Field Work and Facility visits

Cultural Exchange

Questions?

Acknowledgements: IIRS, SAC, ISAC, PRL Teams

Thank You for Your Kind Attention