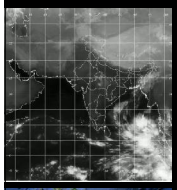
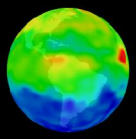
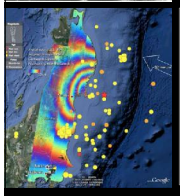
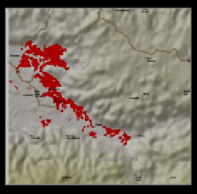
Agenda 3

Asia Pacific Plan of Action for Applications of Space Technology and GIS for DRR Development

- Some Thoughts

UN ESCAP High-level Decision Makers meeting (HLDM)

Bangkok
Nov 28, 2013

From Beijing to Delhi to.....

Directional Focus in AP Region

Global level: UNISPACE I & II GEOSS.....

... + Partnership

... Towards 3rd MinCon

• ICST Convergence
• Institutionalisation

Regional Level

... + Regional Cooperation

2nd MINCONF

Focus on Operationalisation
•Projectisation of RESAP (Minimum Common Program)

Capacity Building

1st MINCONF

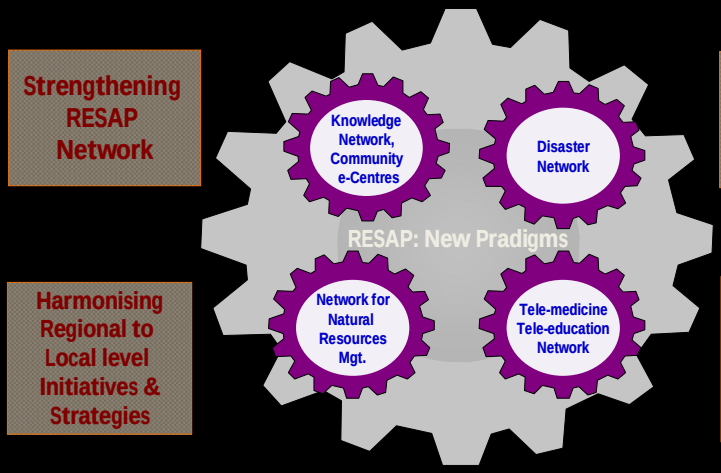
•Awareness Building
•Inception of RESAP

1994 1999 2007 2015

Take cognizance of Technology Advances

Some Thoughts on Refining RESAP

- In 2006



Thematic focus of RESAP could be towards
Disaster reduction; CeCs forTele-education; Tele-medicine; and Natural Resources Management

Climate Change Adaptation is the add-on now

ESCAP Meeting of Eminent Experts
Bangkok, Aug 3-4, 2006

GeoSpatial Today - Space Tech Advances

Satellite Remote Sensing

- Mapping the Earth's Surface: 100+ times more accurate
- Measuring of assets/ infrastructures: 1/100+ of a metre accuracy in surface subsidence
- Disaster warning: 100+ hours advance risk warning
- On-board imaging: 100+ new satellite sensors for sustainable development
- Formation flying; On-board autonomy; Event triggering mission; Constellation

Satellite Meteorology

- Improved computational capabilities
- Predicting El Nino: 100+ days early warning
- Advanced warning of T…adoes & flash floods

Event	20…	…n 2000	In 2005
Tornadoes	…	11 min.	15 min.
Flash flo…	…7 min.	15 min.	65 min.

- We… …ecast
  - T… 3 day at 93%; 7 day at 62%
  - …0 5 day >90%; 7-10 day at 75%

Source: NWS; NOAA; ESTO

Satellite Communication

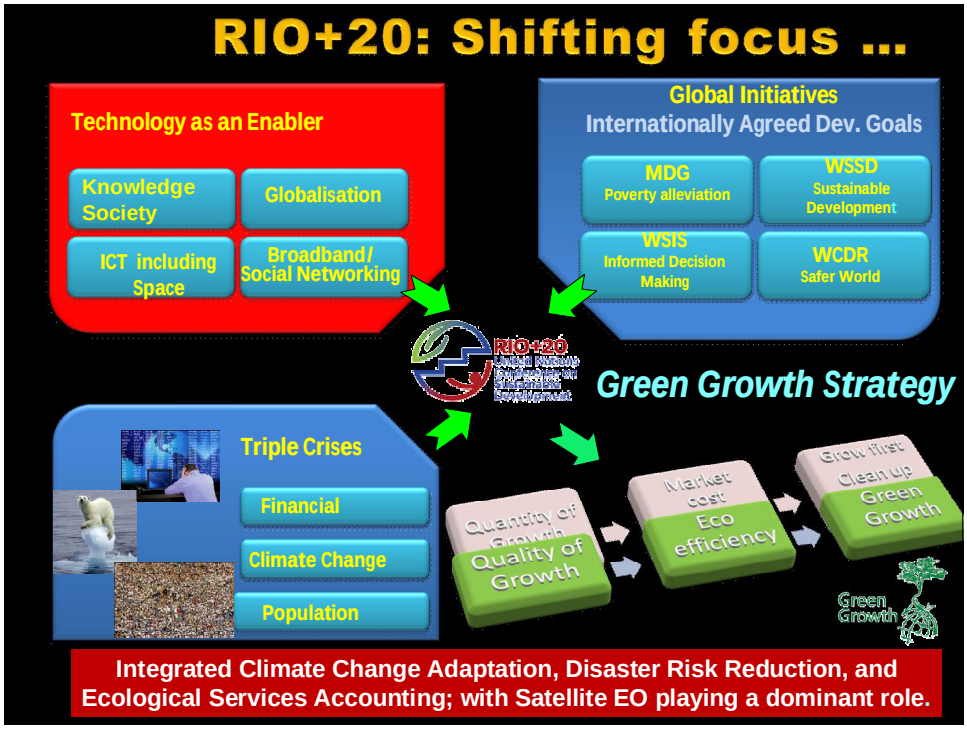
- Satcom capability >100+ new satellit… advent of Ku, Ka bands
- Convergence > 100 times mo…
- Networks > 100 times and …
- Emergency Communic… …0 times
- Emerging Killer Ap… …: DTH; DARS; HDTV; DMB
- Global Mobil… …al Communication System (C…
- Satellite bro… …band internet

Satellite Navigation

- Moved from warplanes to car navigation to gaming in <10 years
- American Wide Area Augmentation System (WAAS): 350 ft in 2003; 200 ft in 2006
- Commercial operators with WAAS gain access to Cat1 equivalent approach services with no ILS
- European EGNOS: Japanese MSAS; Indian GAGAN
- GPS, GLONASS, ….., IRNSS

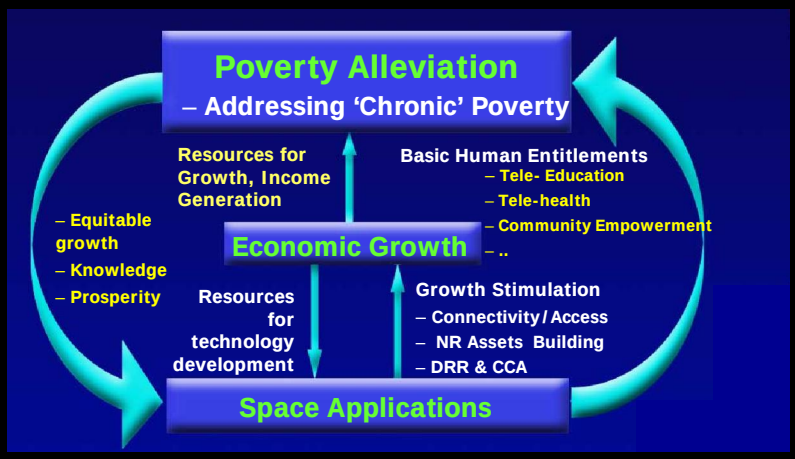
Last Mile to Last Foot Connectivity

RIO+20: Shifting focus ...



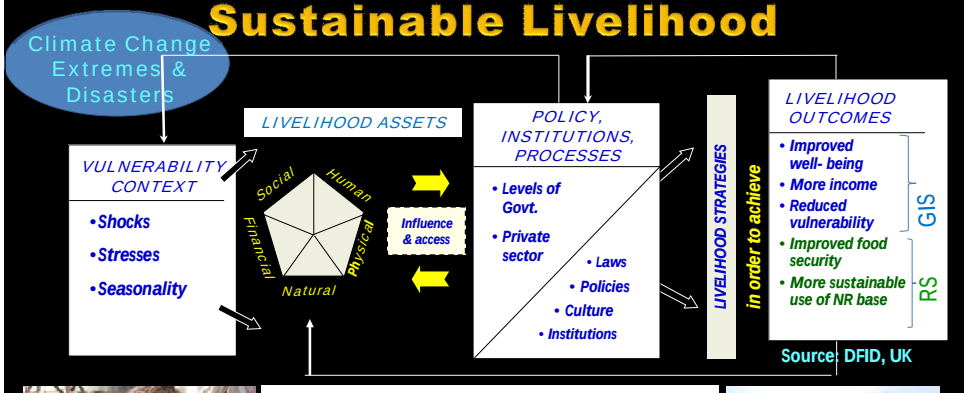
Integrated Climate Change Adaptation, Disaster Risk Reduction, and Ecological Services Accounting; with Satellite EO playing a dominant role.

Space Applications and IAGs



Unholy nexus between Poverty and Disasters; Poverty and Environmental Degradation; and Poverty and Digital Divide
Space Technology and GIS provide necessary intervention tools. It is a continuing Challenge

Empowering Community for Sustainable Livelihood



Source: DFID, UK

Poverty

Vulnerability to Shocks

Vulnerability to Climate Change

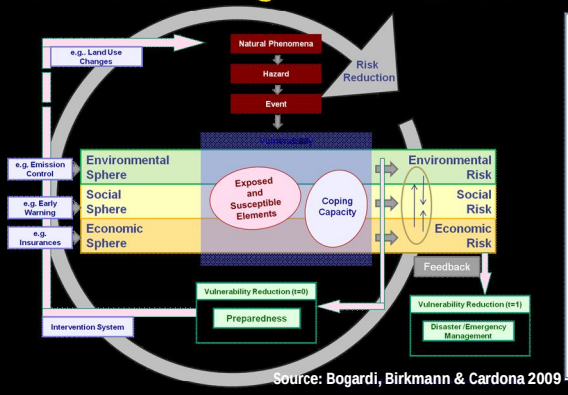
Sustainable Livelihoods

Resilience to shocks & Stress

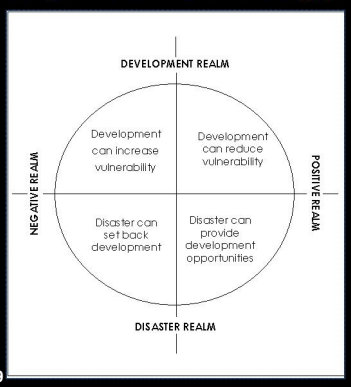
Adaptable to Climate Change

Space Tech. inputs provide support to effective functioning of the structures & processes that influence access to assets, and the livelihood strategies

Mainstreaming DRR into Development Strategy



Source: Bogardi, Birkmann & Cardona 2009



BBC Framework

Risk Knowledge **is a key element in building a Resilient Community**

HFA Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters

World Conference on Disaster Reduction ***(Kobe, Hyogo, Japan, 2005)***

" For Development to be Sustainable, Disaster Risk Reduction Must be Built Into The Planning Process"

RESAP and Thematic Pillars

RESAP redefined around the Thematic Pillars, and a Regional Cooperative Mechanism

From UNESCAP EEM, BKK 2006

Time ripe for setting up the Thematic Working Group on Disaster Risk Reduction as enumerated in the Action Plan

Disaster Risk Reduction
Global Response

WCDR, Kobe, 2005

Hyogo Framework for Action
- Indicators to assess possible impacts

ISDR, 2005

International Strategy for Disaster Reduction
- To develop robust, practical methods sound enough to withstand critical scientific scrutiny

International Charter

UN SPIDER

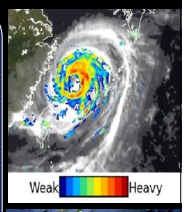
UNOOSA

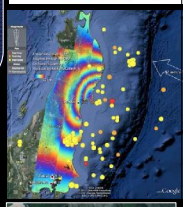
Sentinel Asia

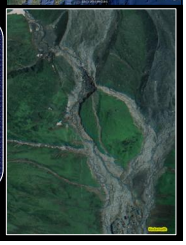
UNESCAP

APRSAF Community

JAXA ISRO GISTDA



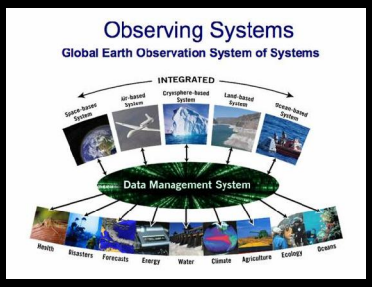




...plus GEOSS & CEOS initiatives

Global Earth Observation System of Systems (GEOSS)

Synergy & Simultaneity of Coordinated Measurements through International Co-operation



- **Disasters**: Risk reduction
- **Health**: Understand environmental factors
- **Energy**: Improve management of energy
- **Climate**: Understand, assess, predict, mitigate & adapt
- **Water**: Understand water cycle
- **Weather**: Improve forecasting & warning
- **Ecosystems**: Protect terrestrial, coastal & marine resources
- **Agriculture**: Sustainable agriculture & combating desertification
- **Biodiversity**: Understand, monitor & conserve

CEOS Virtual Constellation

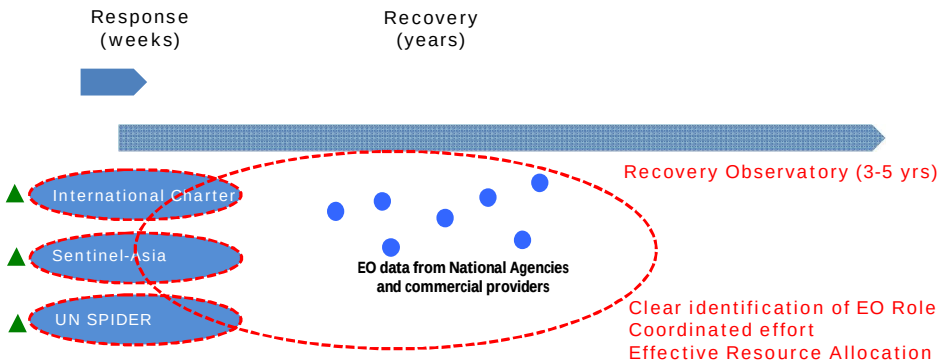
- Land Surface Imaging (LSI)
- Atmospheric Chemistry (AC)
- Global Precipitation Mission (GPM)
- Ocean Surface Topography (OST)
- Ocean Surface Wind
- Ocean Colour

GEOSS Data Sharing Principles

- Full and open exchange of data, metadata and products shared within GEOSS, with minimum time delay and at minimum cost recognizing relevant international instruments and national policies and legislation
- All shared data, metadata and products being free of charge or no more than cost of reproduction encouraged for research and education

CEOS is the Space arm of GEOSS working through Group on Earth Observations (GEO)

CEOS Recovery Observatory – the idea



Clear identification of EO Role
Coordinated effort
Effective Resource Allocation
Clear Institutional Links

Source: CEOS Plenary, Nov 2013

CEOS Launched the Working Group on Disasters recently, transitioning from the earlier ad-hoc WG

Space inputs for Mainstreaming DRR & CCA

ECVs , a GCOS & CEOS Initiative – An example for such efforts

Domain	Essential Climate Variables
Atmospheric (over land, sea and ice)	Precipitation, Earth radiation budget (including solar irradiance), Upper-air temperature, Wind speed and direction, Water vapour, Cloud properties, Carbon dioxide, Ozone, Aerosol properties
Oceanic	Sea-surface temperature, Sea level, Sea ice, Ocean colour (for biological activity), Sea state, Ocean salinity
Terrestrial	Lakes, Snow cover, Glaciers and ice caps, Albedo, Land cover (including vegetation type), Fraction of absorbed photosynthetically active radiation (fAPAR), Leaf area index (LAI), Biomass, Fire disturbance, Soil moisture

Climate signals are extremely small

- Temperature trends of only a few tenths of a degree C per decade
- Ozone changes as little as 1% per decade
- Variations in the Sun's output as tiny as 0.1% per decade or less

Reliable, consistent Fundamental Climate Data Records (FCDR) with accuracy & precision ;
with calibration, navigation and radiometric info needed with traceability records

Once identified CEOS agencies and others committed for data support through Virtual Constellation of Satellites

Identifying such indicators & drivers for SDG is the Challenge

Indicators & Drivers for SDG

No universally accepted sets of indicators, due to plurality of purpose in characterising and measuring Sustainable Development

Need for identifying and