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United Nations Platform for Space-based Information for
Disaster Management and Emergency Response

Climate Change and Disaster Risk Reduction : Space Technology Relevance

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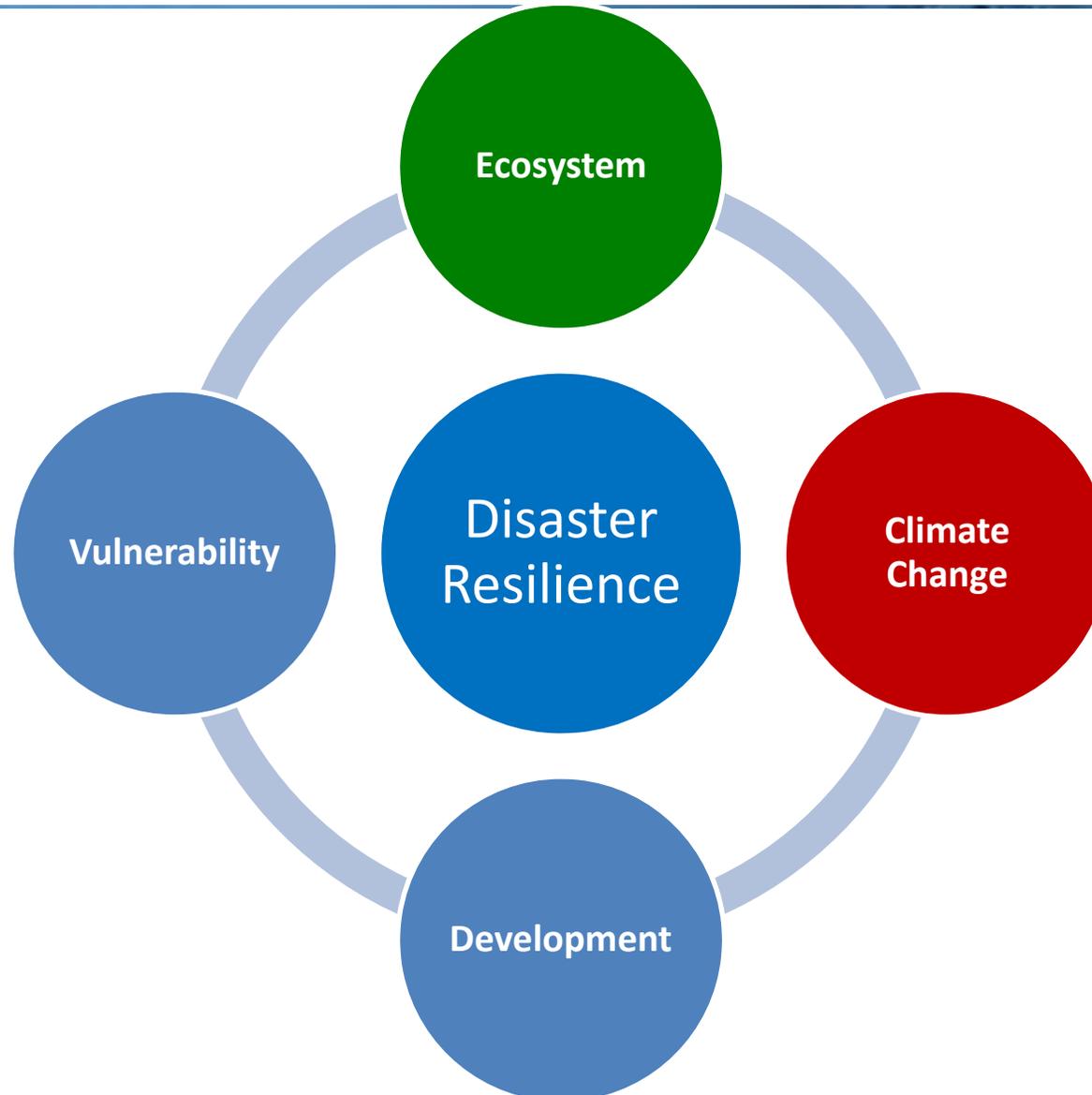
United Nations Platform for Space Based Information for Disaster Management
and Emergency Response (UN-SPIDER)

United Nations Office for Outer Space Affairs (UNOOSA)





Climate Change in DRR





Climate change induced disasters

**Climate
Change**

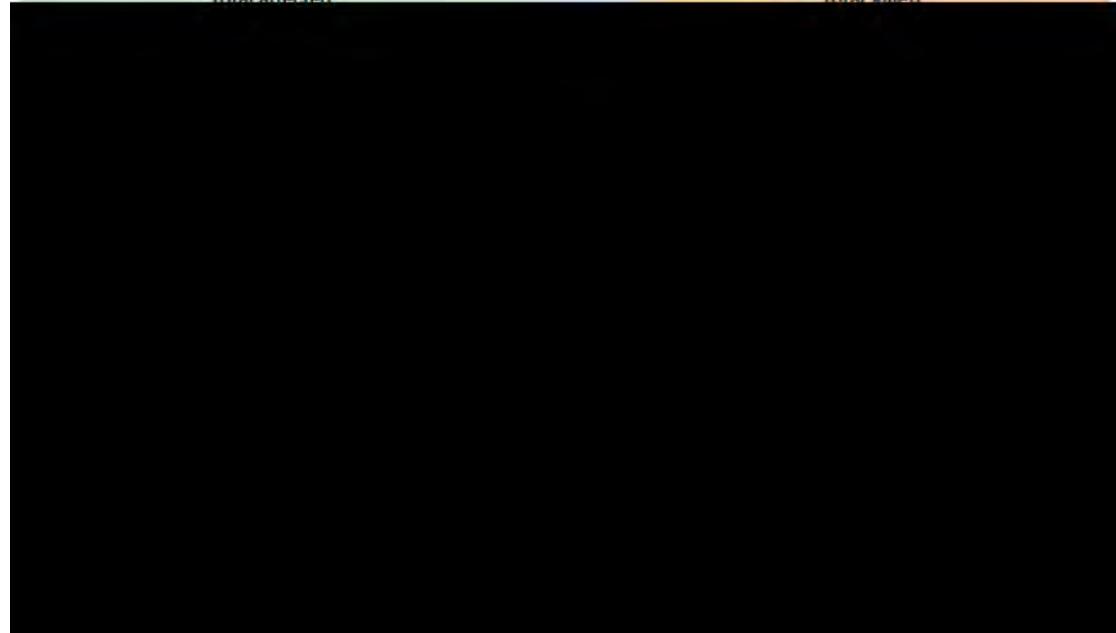
Floods, Droughts & Storms are closely linked to climate stimuli (temperature and precipitation)

Human impact by disaster types

Average 2000-2008 2009

Total affected

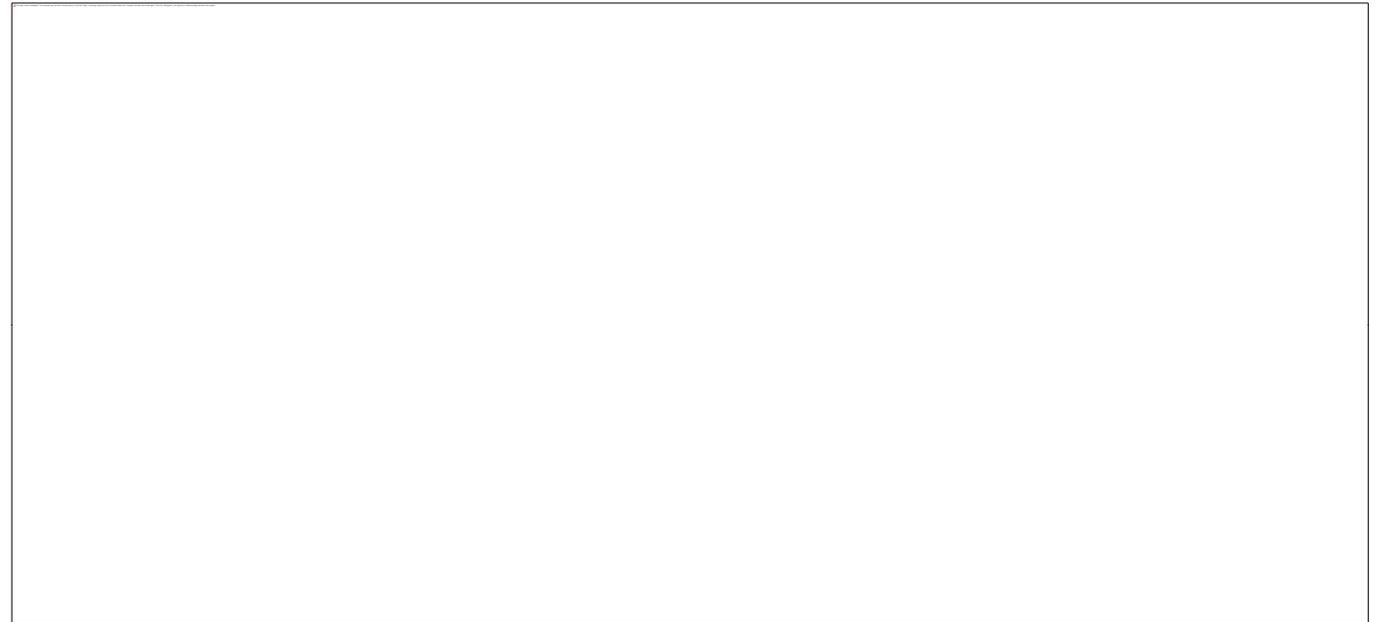
Total killed



Credits: ISDR



Asia- the most affected

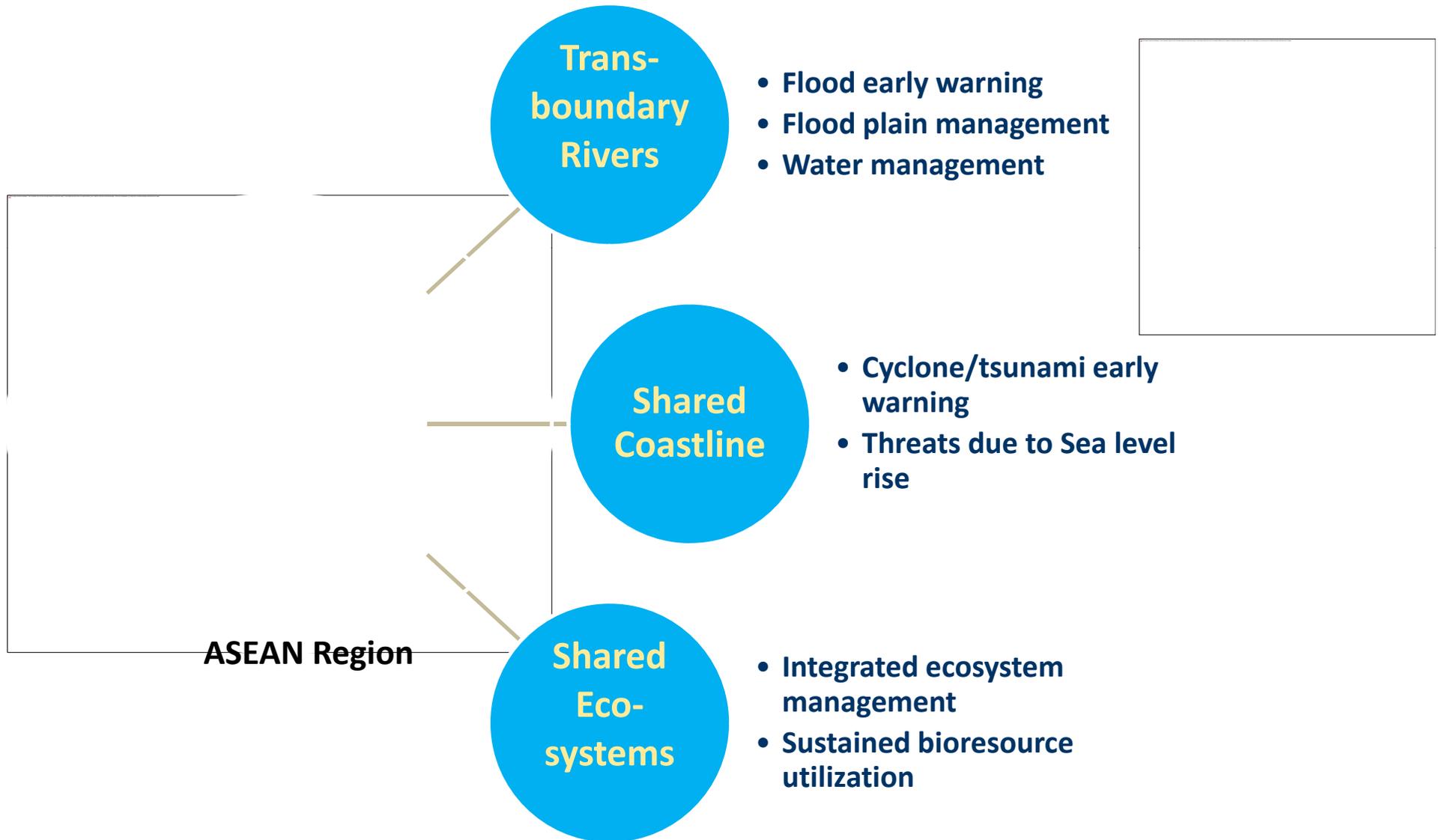


Source: Asia Pacific Disaster Report 2012

We make ourselves vulnerable



Climate change related DRR— Regional /Global Issue



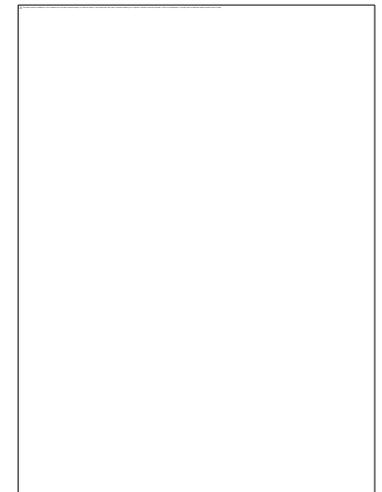


Post 2015 Framework for DRR

Post 2015 Framework for DRR refers to

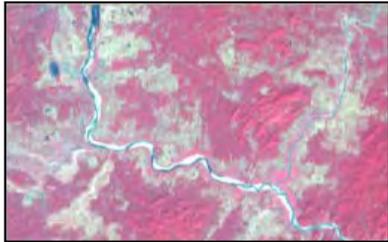
- Climate Change Adaptation
- Sustainable Development

A dollar invested in disaster risk reduction can save over 4 dollars in relief and rehabilitation costs in future *(World Food Programme)*

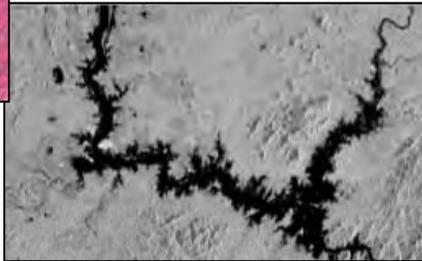




Space technologies interventions



Pre-Flood



During-Flood



Images from earth observing satellites help assess the damage caused by disasters and assess vulnerability to hazards.

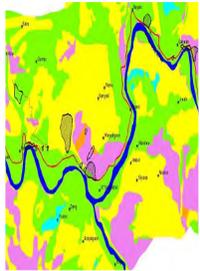
Satellite Meteorology help obtain precise weather forecast, thus provides early warning on floods, cyclones, droughts etc.

Satellite communications help warn people who are at risk, especially in remote areas. They help connect a disaster zone to the outside world

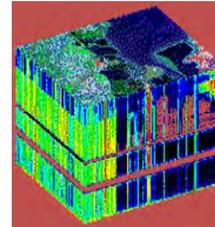
Global navigation satellite systems enable us to obtain positional information on events that have to be mapped



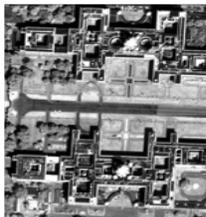
Earth Observation from Space



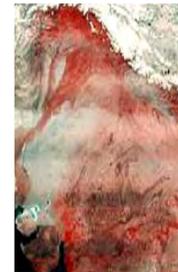
Spatially extensive mapping



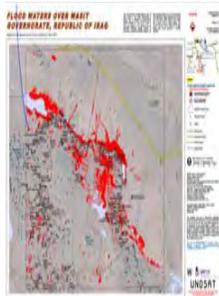
Beyond 'human eye' capability



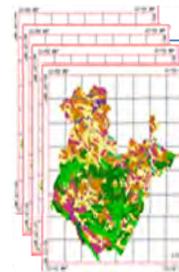
Localised event detection



Access difficult or dangerous sites



Near real time response



Geo-referenced and calibrated

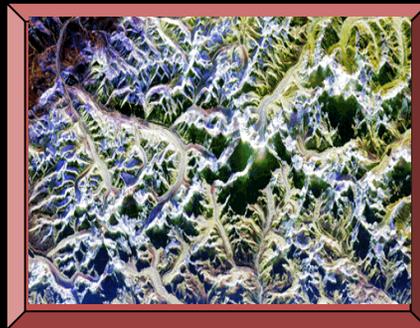
More than 40 nations with imaging satellites -160 sensors



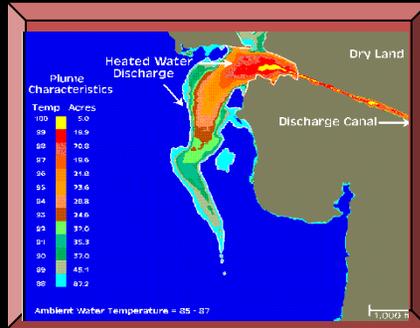
Sensor Systems



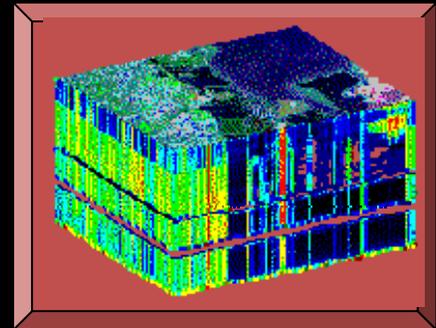
Multispectral



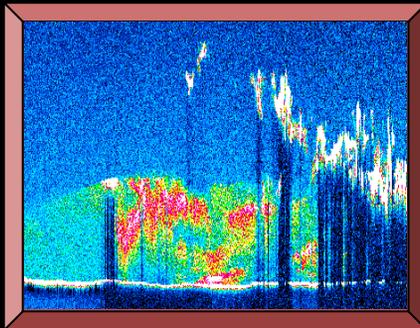
Radar/ SAR



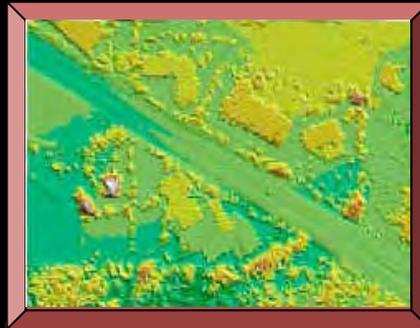
Thermal



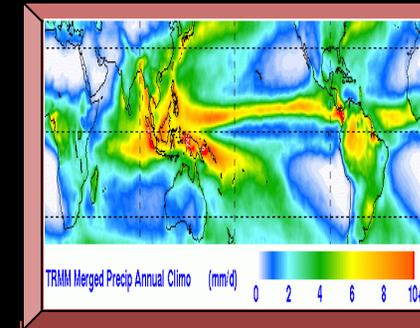
Hyperspectral



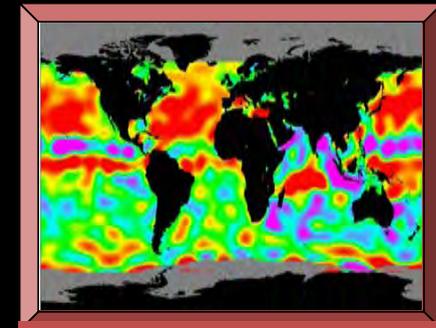
Atmospheric LIDAR



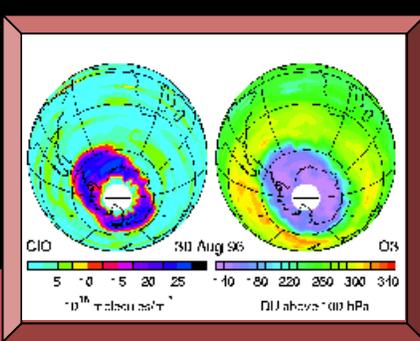
Surface LIDAR



Passive Microwave



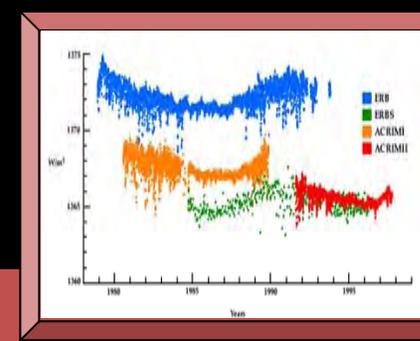
RADAR Altimetry



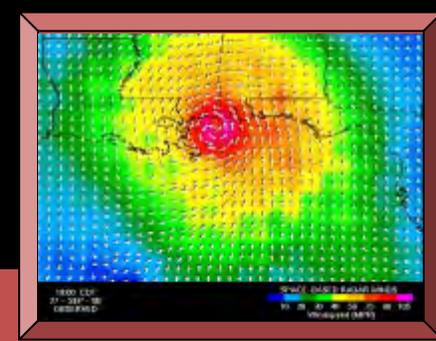
Limb Sounding



Gravitational Fields



Irradiance/Photometry



Scatterometry



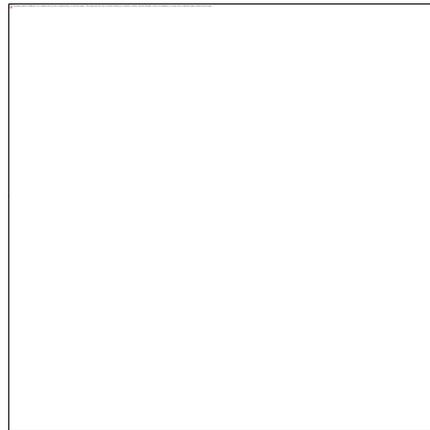
'Space' in Disaster Risk Management



Global scale



Local scale



Mitigation & Preparedness Planning

- Vulnerability and risk assessment
- Modelling impact
- Early warning

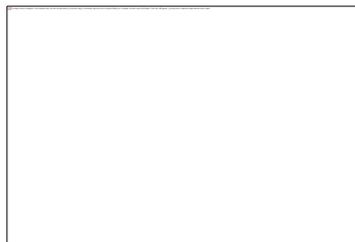
Emergency Response

- Specific event
- Rapid provision
- Map information
- Support crisis management

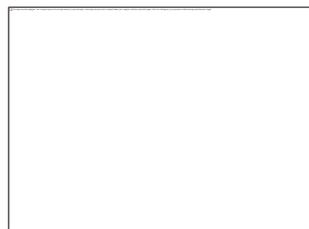
Recovery & Rehabilitation

- Situation maps
- Time series
- Monitoring

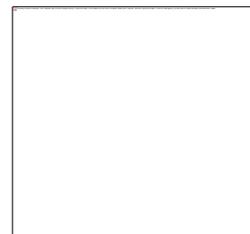
Life Saving Products



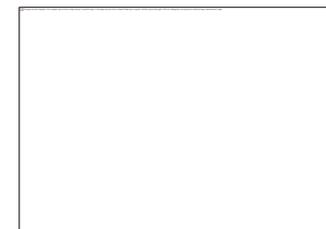
Hazard maps



Vulnerability maps



Risk maps



Response maps

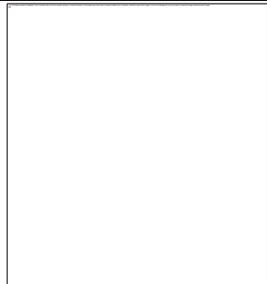
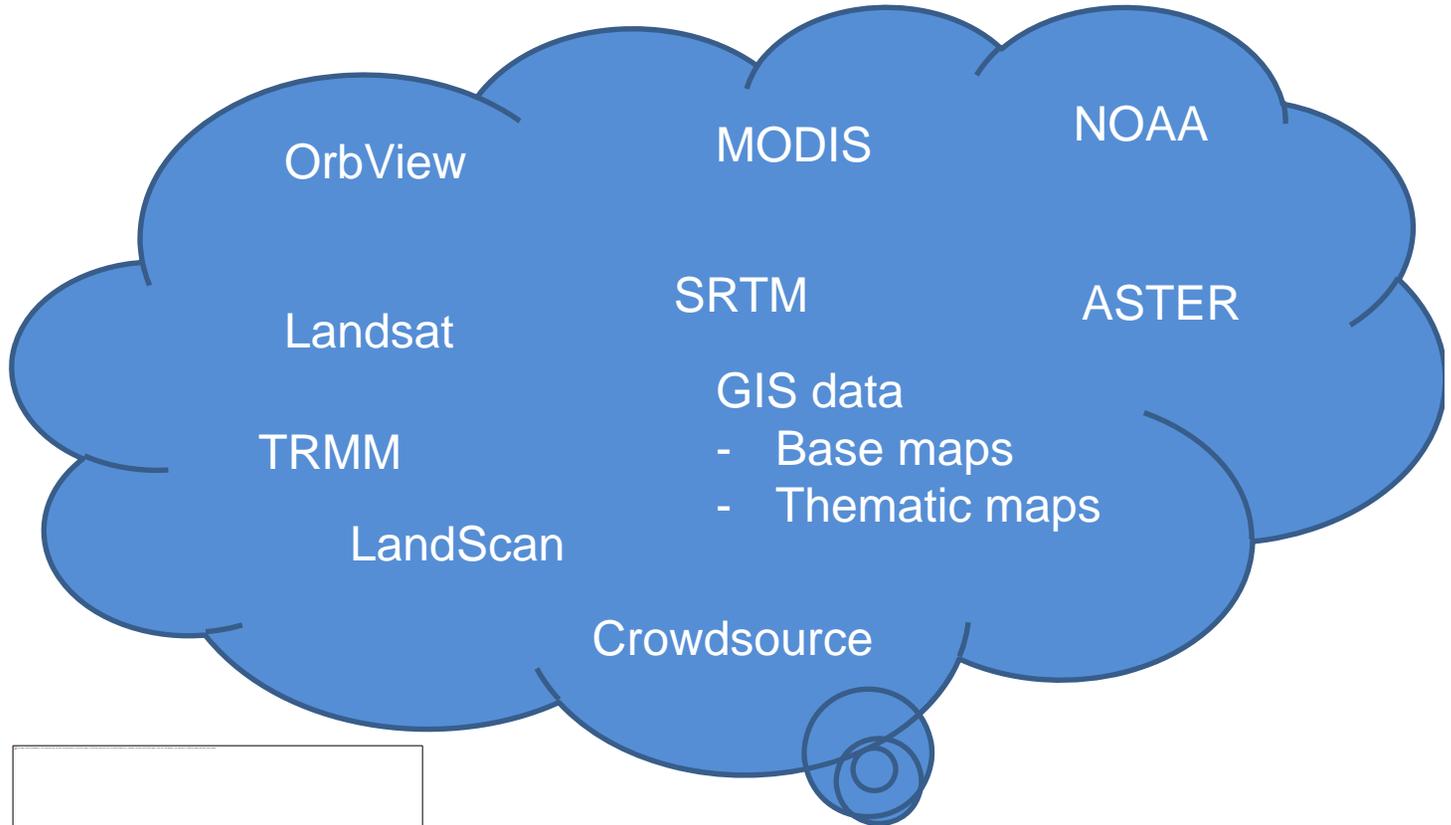
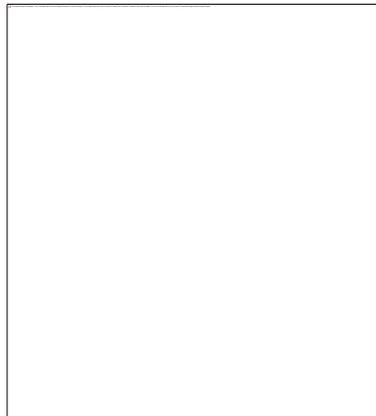


Earth Observation satellites and products – Changing Dynamics

GLCF



NOAA



- **Predictions of weather extremes**
- **Early warning**
- **Monitoring of disasters and risks**



Advanced/future space platforms



Credit: NASA

Global Precipitation Measurement (GPM)

- Quantify when, where, and how much it rains or snows around the world.

TanDEM-X

- A New High Resolution Interferometric SAR Mission
- New high quality digital elevation model

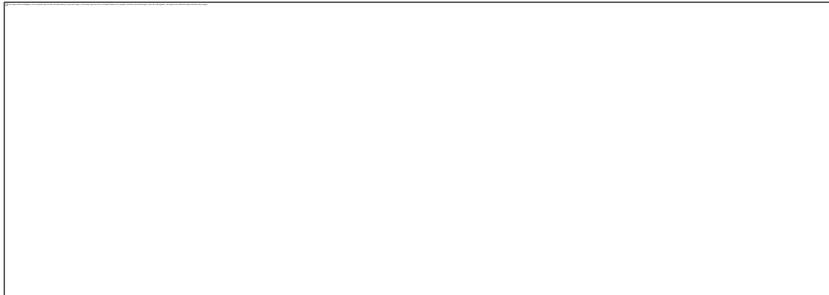
GRACE Mission

- Accurately mapping variations in Earth's gravity field.
- Contributes to global climate change studies



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Advanced Earth
Observation
systems provide
accurate
'Information'

Accurate
information
leads to better
understanding
of the *'Facts'*

Strategies based
on *'Facts'* lead
to precise
action plan



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Example – A country with own space infrastructure

Source: Dr Alex Held, CSIRO

Operational
(Weather and Comms.)

FY-3A MTSAT GOES

Operational
(GPS Navigation)

Operational
(Weather, Oceans
Land-mapping)

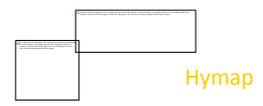
Ikonos QuickBird Landsat Radarsat SeaWIFS NOAA SPOT

ERS CBERS IRS

Proba-2
BIRD
DMC

Australia- One of the largest users of foreign satellite information

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Current Multiplicity of Civilian Satellite & Airborne Measurements

Australia is one of the largest users of foreign satellite information; roughly close to around 20 TB of satellite and airborne data per month, across various agencies and the commercial sector



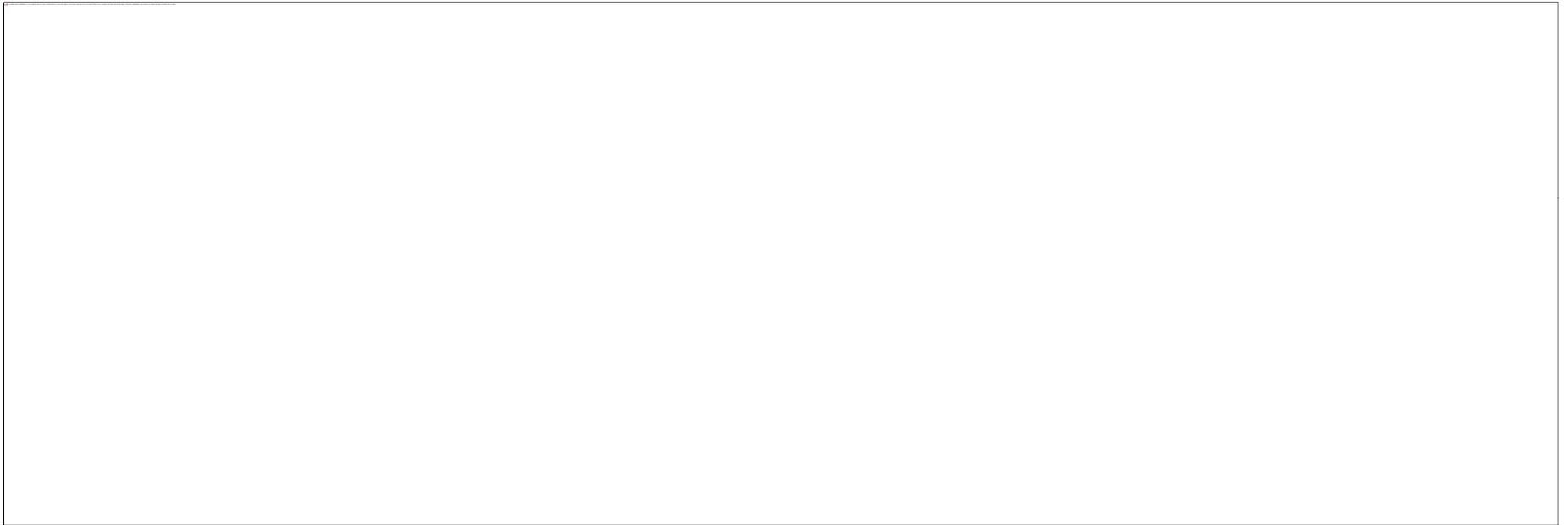
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**To be a user of space-based
information, one need not
necessarily possess satellites**



Ecosystems in DRR and Climate Change



**Balanced ecosystems are
needed to prevent disasters and
reduce its impact**

www.pedrr.net

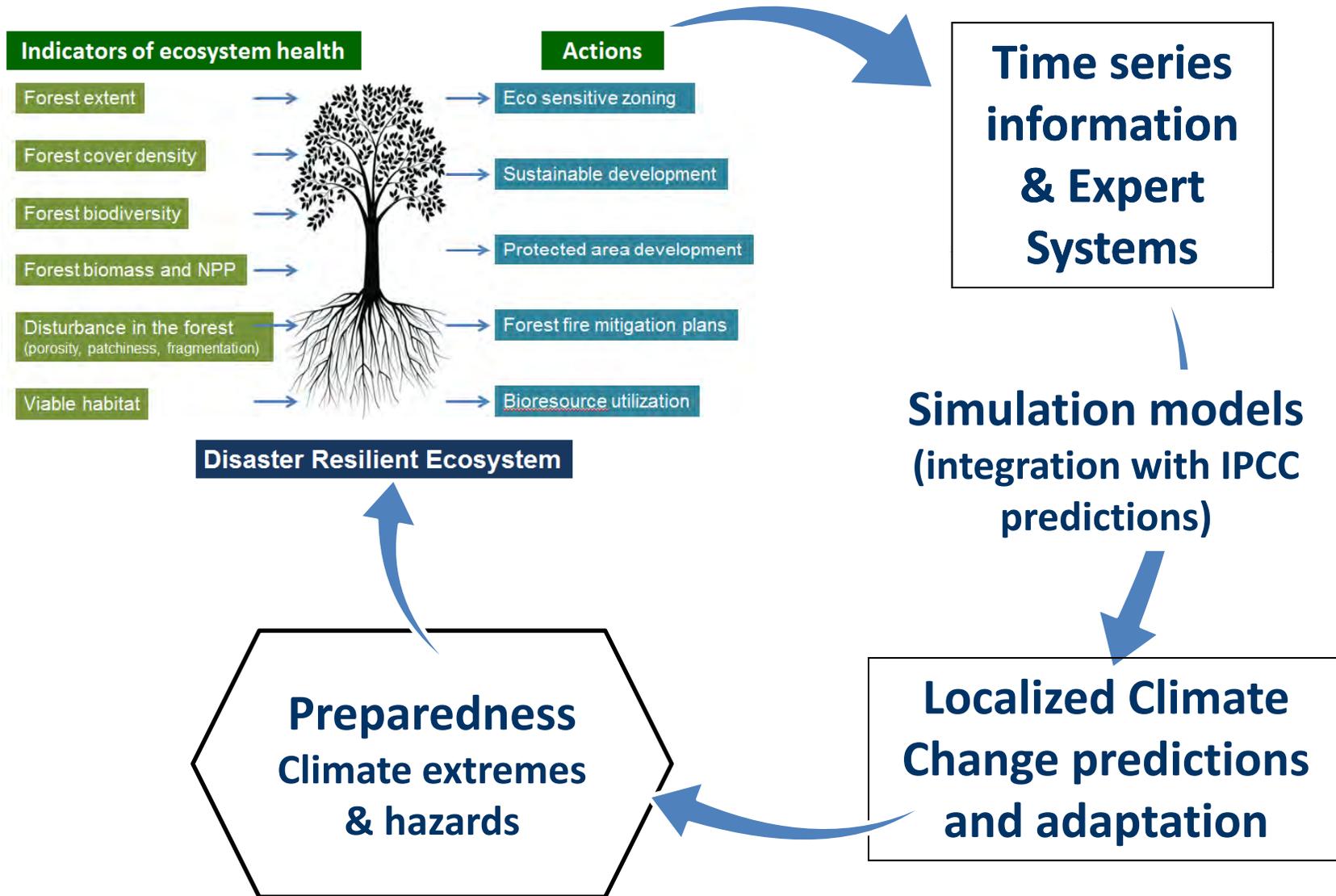


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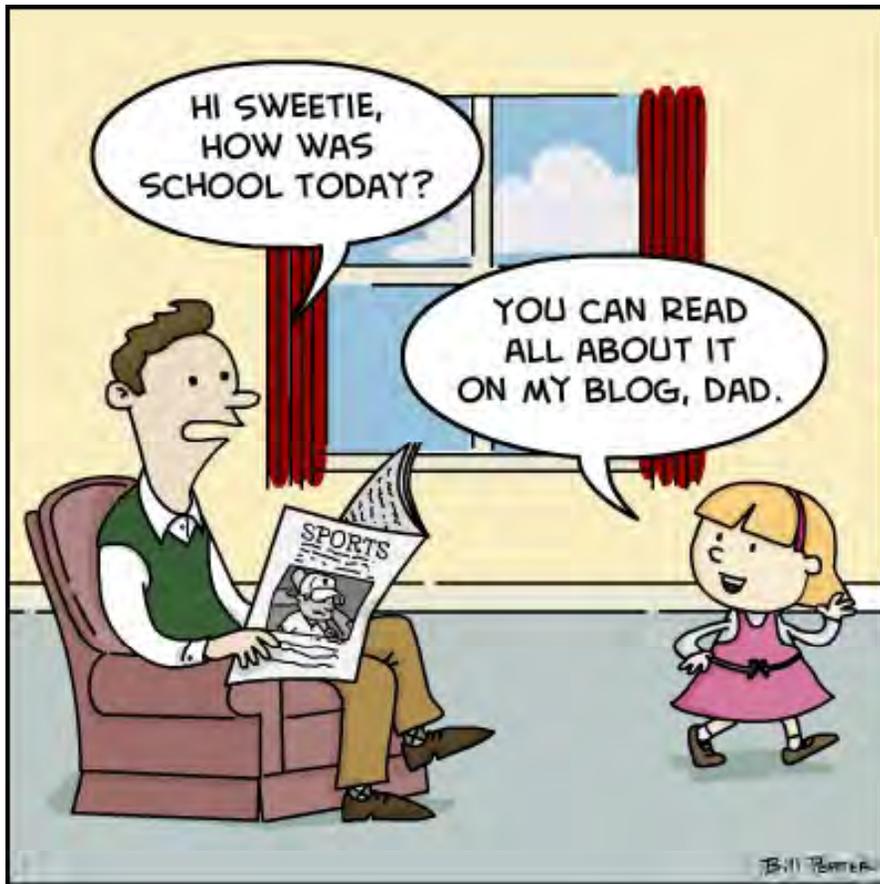


Ecosystem, DRR and Climate Change





Bridging the Gap



Decision makers / End Users



Missing link

Providers of geo-information



Challenges observed through UN-SPIDER Technical Advisory Missions

UN-SPIDER TECHNICAL ADVISORY MISSION TO VIETNAM
Bringing the Benefits of Space to Humanity



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- State of geospatial information (baseline, thematic and operational datasets)
- Access to high resolution and all weather data
- Lack of policies and mechanisms for data sharing
- Capacity to use space based information in relevant agencies
- Lack of information preparedness for effective response



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(UN-SPIDER)



Report of the
Technical Advisory Mission
to
Bangladesh

19 – 23 June 2010

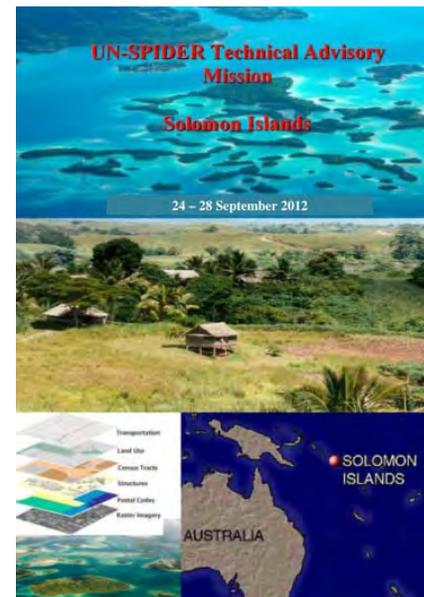


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Report of the
Technical Advisory Mission
to
Myanmar

19 – 23 March 2012



UN-SPIDER Technical Advisory Mission, Sri Lanka



17 – 21 October 2011



Bridging the Gap



**Policy
to
Action**





Key messages

- Investing in space-based information is 'no regret' investment
- Post 2015 DRR framework attached great importance to CCA – it needs to be translated into action
- Space and geospatial information plays critical role
- Changing technology dynamics offers better data and access that leads to improved knowledge of facts





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Announcement



United Nations International Conference on Space-based Technologies for Disaster Management - "Disaster risk identification, assessment and monitoring" in Beijing.

Conference dates: 23-25 October 2013

Training dates: 27-31 October 2013

<http://www.un-spider.org/risk-identification-assessment-monitoring-beijing>



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Bringing benefits of the space to humanity

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