

United Nations International Conference on Space-based Technologies for Disaster Management “Understanding Disaster Risk”

Overview of ESCAP

ICT and Disaster Risk Reduction Division (IDD)



19-21 September
Beijing, China

6th UN-SPIDER Conference

Outline

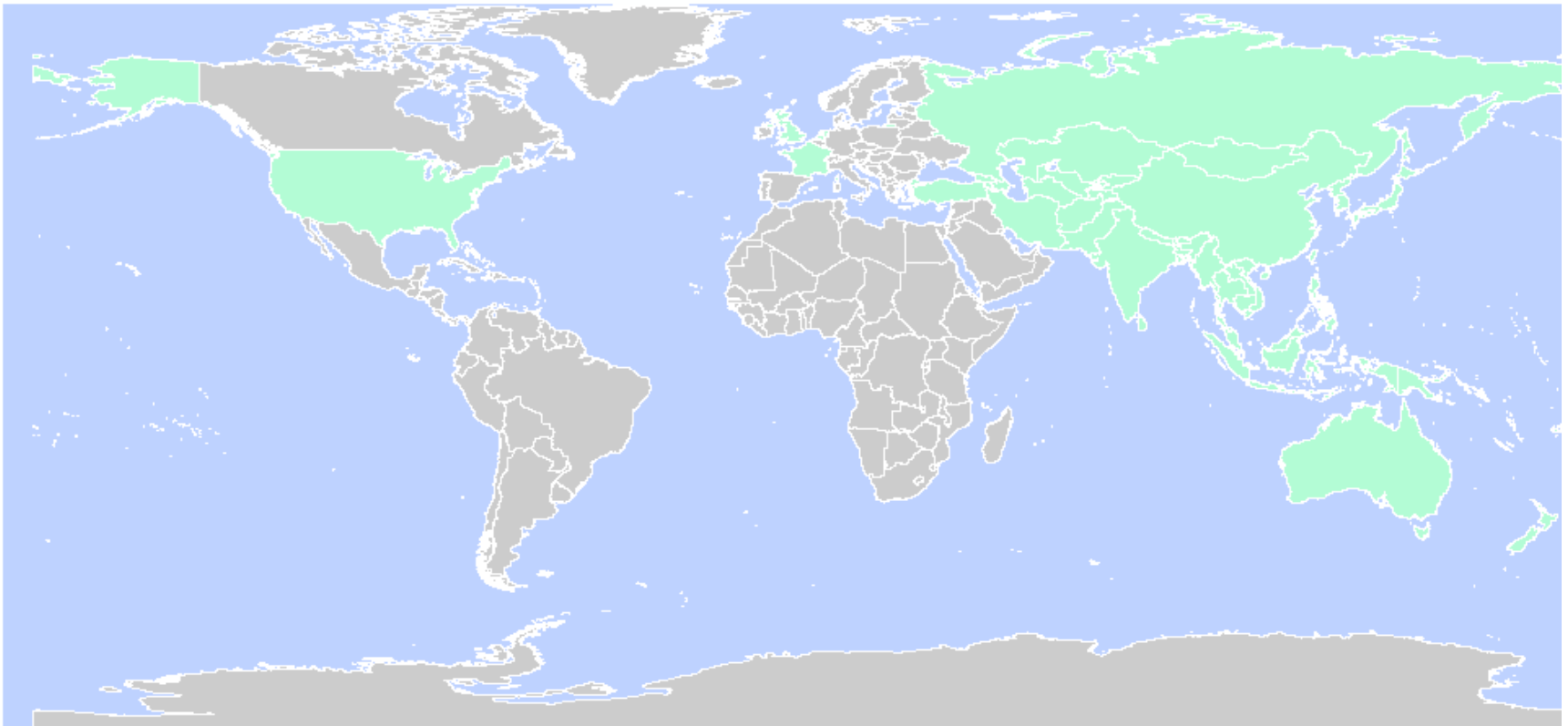
1. About ESCAP
2. Addressing disasters in Asia-Pacific
3. Space Applications Section within IDD
4. Information sharing framework - Overview of the Procedural Guidelines for sharing Space-based information during Emergency Response

About ESCAP

- **Regional development arm** of the United Nations for the Asia-Pacific region
- One of the five UN regional commissions
 - (Santiago, Chile – Addis Ababa, Ethiopia – Beirut, Lebanon – Geneva, Switzerland)
- Home to 4.1 billion people (or two thirds of the world's population) making ESCAP the most comprehensive of the five UN regional commissions
- The largest UN body serving the Asia-Pacific region with over 600 staff

About ESCAP

- Made up of **53 Member States** and 9 Associate Members
 - geographical scope that stretches from Turkey in the west to the Pacific island nation of Kiribati in the east, and from the Russian Federation in the north to New Zealand in the south



About ESCAP

- ESCAP works to overcome some of the region's greatest challenges in the **following areas**:
 - Macroeconomic Policy, Poverty Reduction and Financing for Development
 - Trade and Investment
 - Transport
 - Environment and Development
 - **Information and Communications Technology and Disaster Risk Reduction**
 - Social Development
 - Statistics
 - Subregional activities for development
 - Energy

About ESCAP

- Established in 1947 with its headquarters in Bangkok, Thailand, ESCAP has **four sub-regional offices** in:
 - Incheon, Republic of Korea - East and North-East Asia
 - Almaty, Kazakhstan - North and Central Asia
 - Suva, Fiji - The Pacific
 - New Delhi, India - South and South-West Asia

About ESCAP

- And **six regional (technical) institutions** in:
 - Asian and Pacific Centre for Transfer of Technology (New Delhi, India)
 - Asian and Pacific Training Centre for Information and Communication Technology for Development (Incheon City, Korea)
 - Centre for the Alleviation of Poverty through Sustainable Agriculture (Bogor, Indonesia)
 - Statistical Institute for Asia and the Pacific (Makuhari, Chiba Prefecture, Japan)
 - Centre for Sustainable Agricultural Mechanization (Beijing, China).
 - **Asian and Pacific Centre for the Development of Disaster Information Management (Tehran, Islamic Republic of Iran)**

Addressing disasters in Asia-Pacific

- From our **2015 Year in Review**

2015 Fact Snapshot: Natural Disasters in Asia and the Pacific



US\$ 45.1 billion
total cost of economic damage



Earthquakes
had the highest number of fatalities;
with 8,790 killed in the Nepal earthquake



59.3 million
affected by disasters



Floods
were the most frequent disaster; and
floods and storms were the costliest
in terms of economic damage



160 disasters
were recorded in the Asia-Pacific
region



South and South-West Asia
was the most affected subregion



16,046 deaths
due to natural disasters

- These numbers are gross underestimates as there is no systematic assessment of the cost of all disasters that struck the region
- Especially slow-onset disasters such as droughts, heat waves, forest fires and haze

Addressing disasters in Asia-Pacific

- From our **2015 Year in Review**

Main Trends



Urban areas are being severely impacted by natural disasters, particularly floods



The 2015-2016 El Niño continues to severely impact the region



Post-disaster response from neighbouring countries is increasing



Extreme weather conditions are causing a great number of fatalities



Higher incidence of disasters with transboundary origins and cascading effects



Innovative disaster assessment techniques and data gathering tools are increasingly being used

Addressing disasters in Asia-Pacific

- Sendai Framework for DRR 2015-2030 also **calls for regional solutions:**
 - for sharing policy lessons and good practices; monitoring and early warning systems; sharing scientific knowledge and technology
- Mandates given to ESCAP by member States:
 - Resolution 69/11: **Implementation of the Asia-Pacific Plan of Action** for Applications of Space Technology and Geographic Information Systems for Disaster Risk Reduction and Sustainable Development, 2012-2017.
 - Resolution 71/12: Strengthening **regional mechanisms** for the **implementation of the Sendai Framework** 2015-2030

Space Applications Section

Within the ICT for Disaster Risk Reduction Division

Focus on four main areas of work under the **Regional Space Applications Programme for Sustainable Development (RESAP)**:

1. Timely provision of near real-time satellite imagery to disaster-affected countries
2. Operationalization of the Regional Cooperative Mechanism for Drought Monitoring and Early Warning
3. Skills and capacity to address existing gaps and emerging challenges
4. Institutional development through applications of emerging technology, knowledge products, standards and procedures

Provision of near real-time satellite imagery

- ESCAP provides **approximately 150-200 satellite images** and damage maps to disaster-affected countries each year
- Space-based data, products and services, equivalent to **approximately \$320,000** (data and product) and \$175,000 (services) respectively
- **Provided free of charge** by the member States in the region through the regional cooperation mechanism network and partnerships with other UN agencies and international and regional initiatives

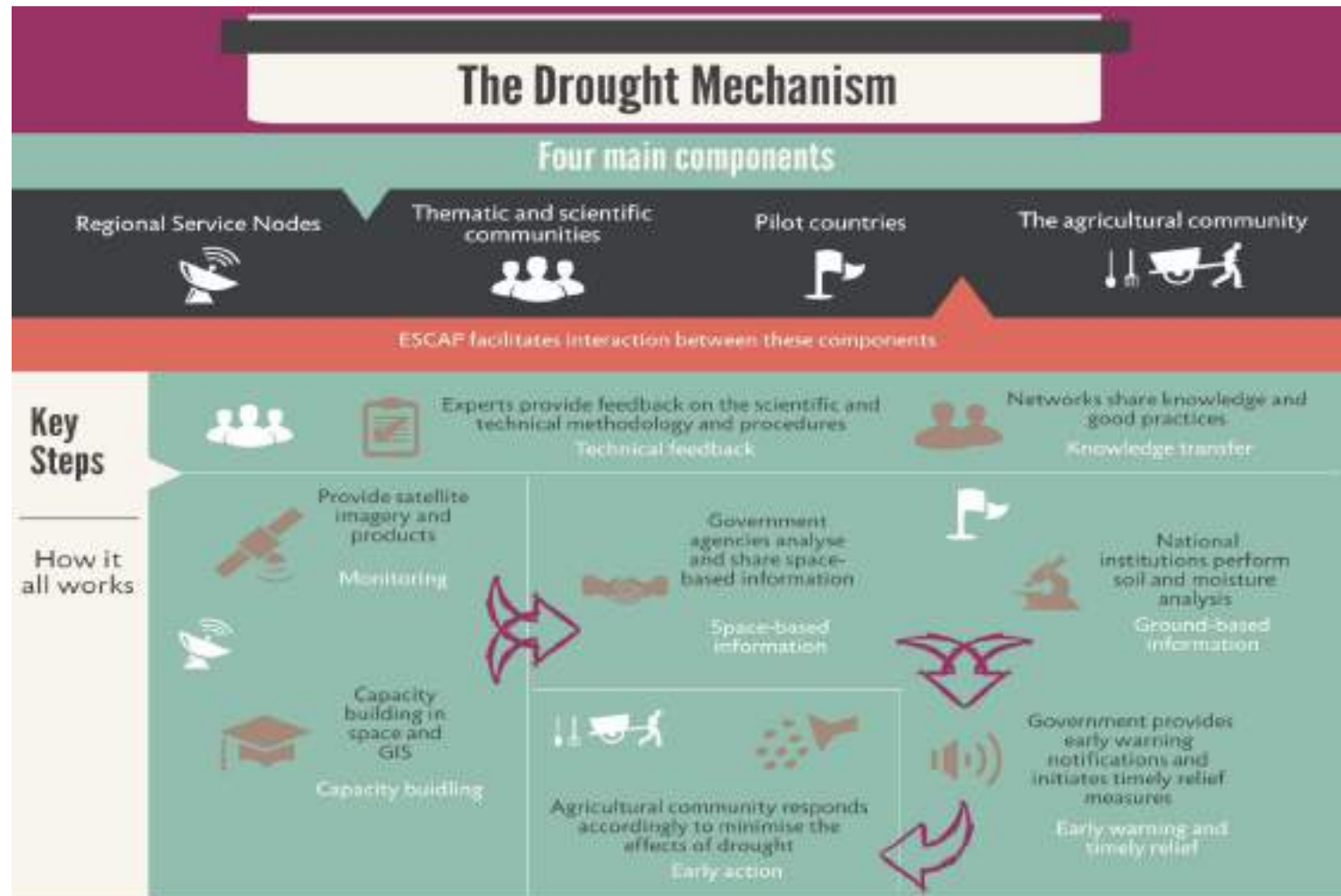
Regional Drought Mechanism

Objectives:

- Strengthen the capacity of drought-prone member to access and effectively utilize space applications and GIS for drought monitoring and early warning
- Build regional cooperation platforms for capacity building on drought management
- Complement drought monitoring capacity with seasonal forecasting for effective planning
- Build greater capacity of drought-prone member States to develop a long-term planning, climate adaptation and drought management approach through climate risk analysis
- 8 pilot countries - Afghanistan, Bangladesh, Cambodia, Kyrgyzstan, Mongolia, Myanmar, Nepal, Sri Lanka.

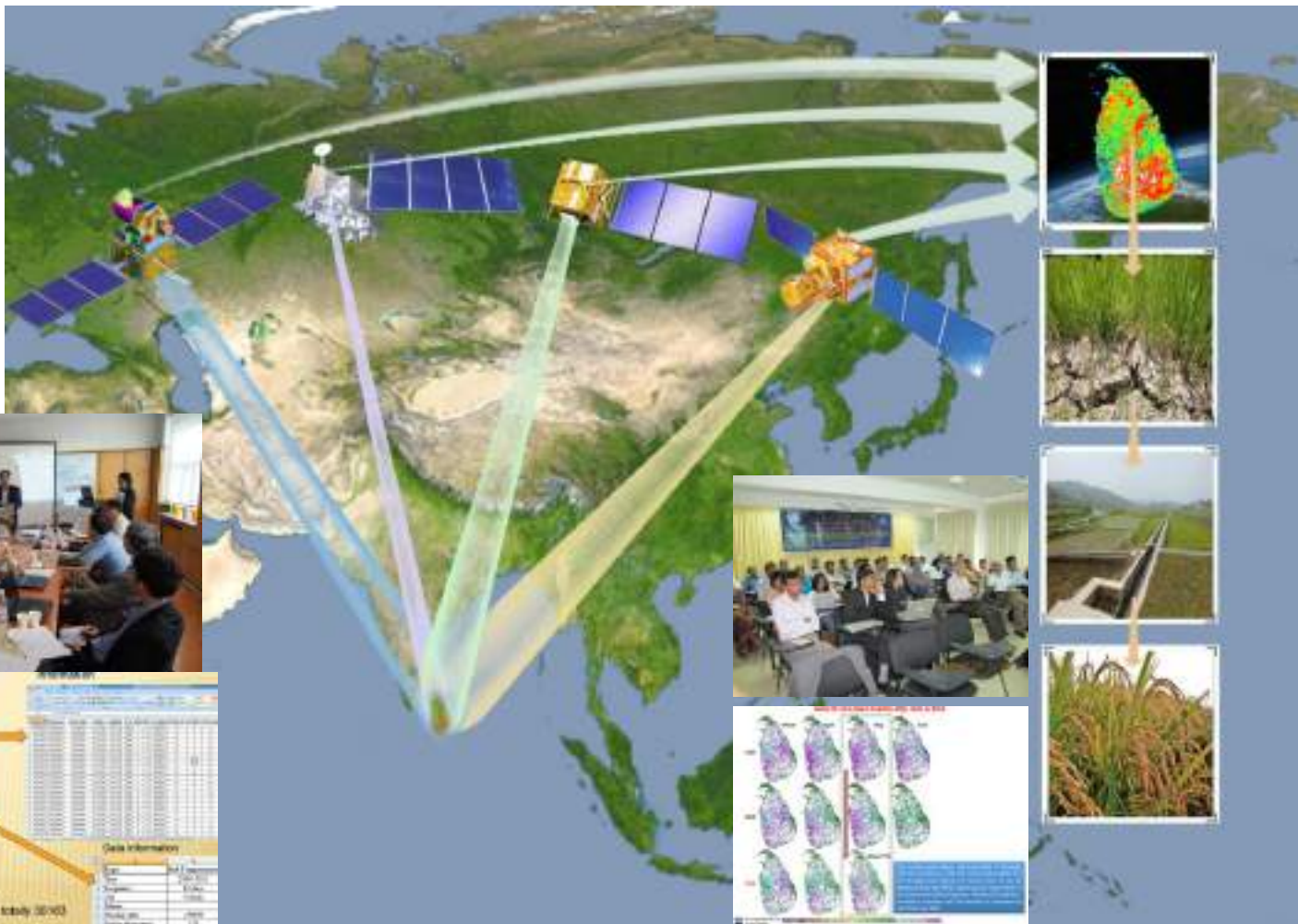
Regional Drought Mechanism

- How does it work?



Regional Drought Mechanism

- Example of the Sri Lanka pilot project



Regional Drought Mechanism

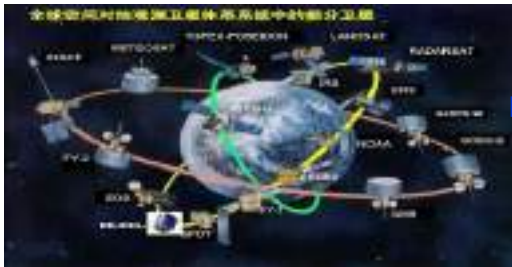
Need assessment

Specialized training

Country Profile

Regional Service Nodes

Regional Service Nodes



Field observation



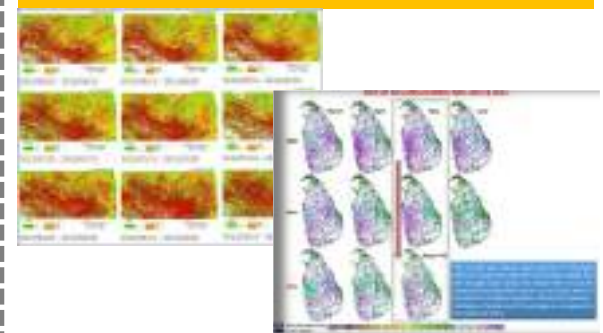
Meteorological data



Data processing
Drought Index calculating



Drought monitoring results



Capacity development

- Capacity development for member States through a series of **specialized programmes**
- Based on the **needs identified** through **surveys and the regional inventory** on space applications and GIS
- The focus areas include:
 - mainstreaming space applications into disaster risk management;
 - use of space and GIS in flood-risk mapping, drought monitoring and early warning;
 - facilitate the establishment and use of the geo-referenced information systems for disaster risk management (Geo-DRM) in CSNs
 - and technical advisory service in effective use of space and GIS for disaster management.

Capacity development

- ESCAP's Disaster Risk Management **e-learning platform**
 - <http://drmlearning.unescap.org>

The screenshot shows the ESCAP Disaster Risk Management E-Learning Platform homepage. At the top, there is a header with the ESCAP logo and the text "UNITED NATIONS ESCAP Disaster Risk Management E-Learning Platform". Below the header is a search bar and a navigation menu. The main content area features a large image of a city skyline with a disaster preparedness banner that reads "Preparing for the disaster" and "Being prepared saves lives and livelihoods". Below the main image is a section titled "Available Courses" with a grid of course thumbnails. The thumbnails include "INTRO TO RS&GIS USING QGIS", "FLOOD MODELLING", "SPATIAL DATABASES", and "QGIS FOR DISASTER MGMT".

INTRO TO RS&GIS USING QGIS

Course for those new to GIS and remote sensing and who want to use GIS in their work.

PRESS TO ENTER

FLOOD MODELLING

A brief introduction on the use of ITC's GeoRAS 10.1 with ArcGIS 10.1 and ITC's RAS 4.1.1E.

PRESS TO ENTER

CONFIGURING GEODRM

Course on installing, configuring and population data on Geospatial and GeoWorkbench.

PRESS TO ENTER

QGIS FOR DISASTER MGMT

A QGIS tutorial with a focus on natural disaster mitigation, management and rehabilitation.

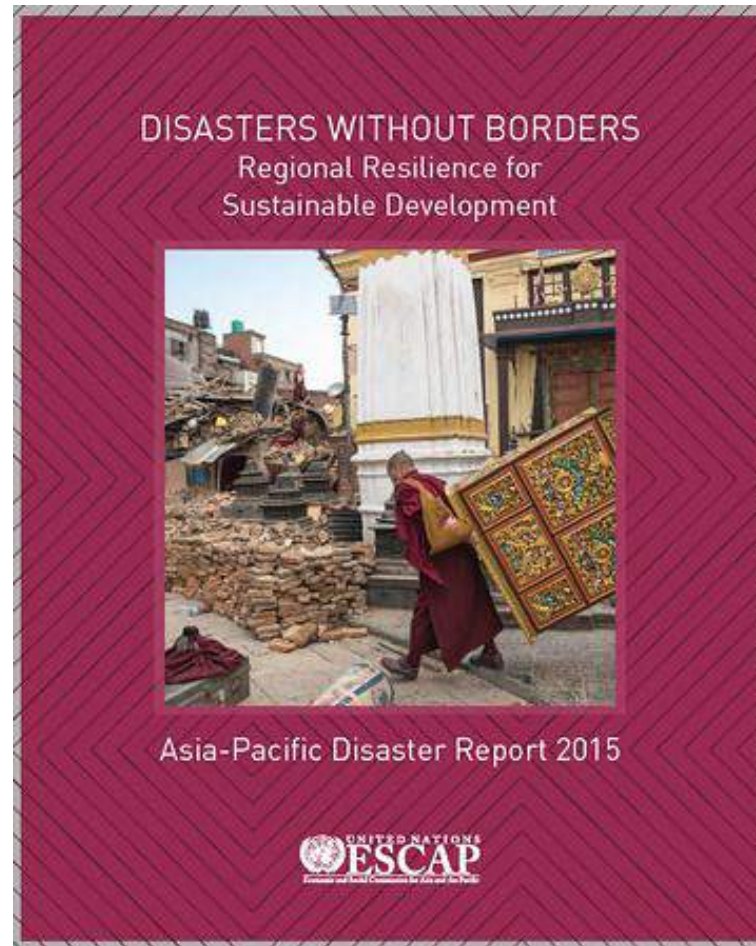
PRESS TO ENTER

Capacity development

- Projects include:
 - Strengthening Multi-Hazard Risk Assessment and Early Warning Systems with Applications of Space and Geographic Information Systems in **Pacific Island Countries**
 - 9 Month course in **CSSTEAP** Dehradun for **Central Asian Countries**
 - Enhance the institutional capacity on remote sensing and GIS applications for disaster early warning and management for officials from national disaster management agencies in **developing countries in Asia and the Pacific**
 - **Scholarship fund** with the Chinese University of Hong Kong (CUHK) for **MSc Earth System Science** at the Institute of Space and Earth Information Science (ISEIS)

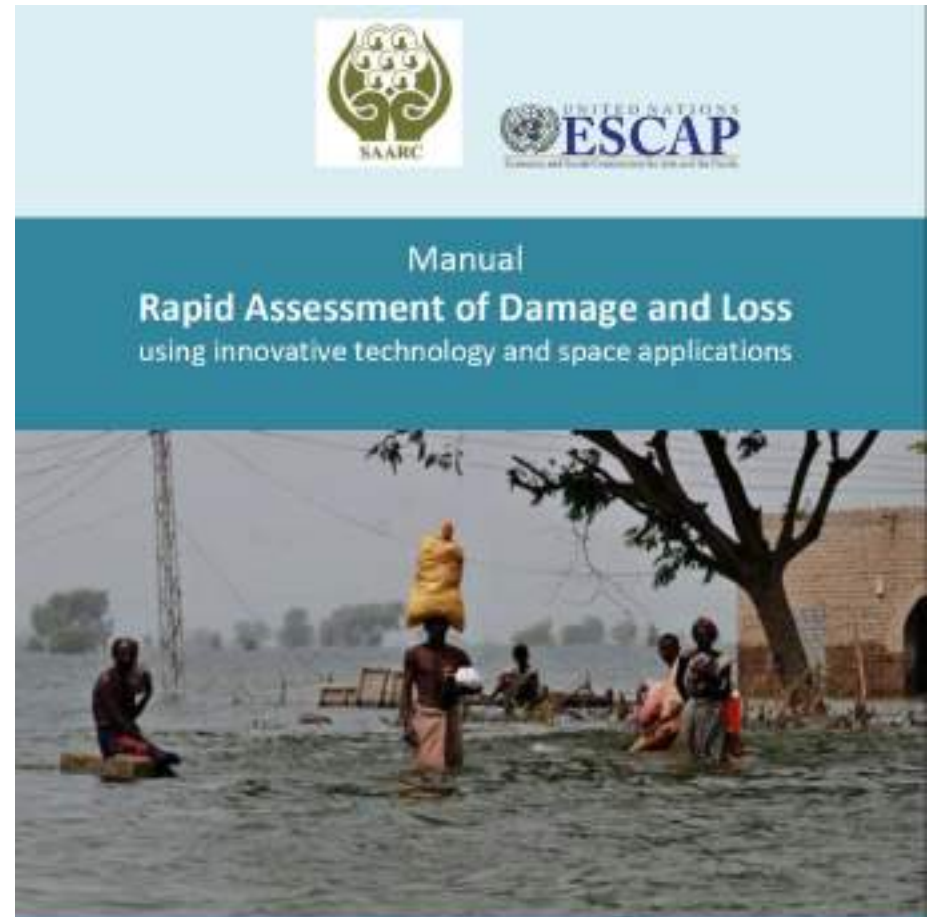
Knowledge products, standards and procedures

- **Asia-Pacific Disaster Report 2015: Disasters without Borders**
 - Chapter on right information, right people, right time



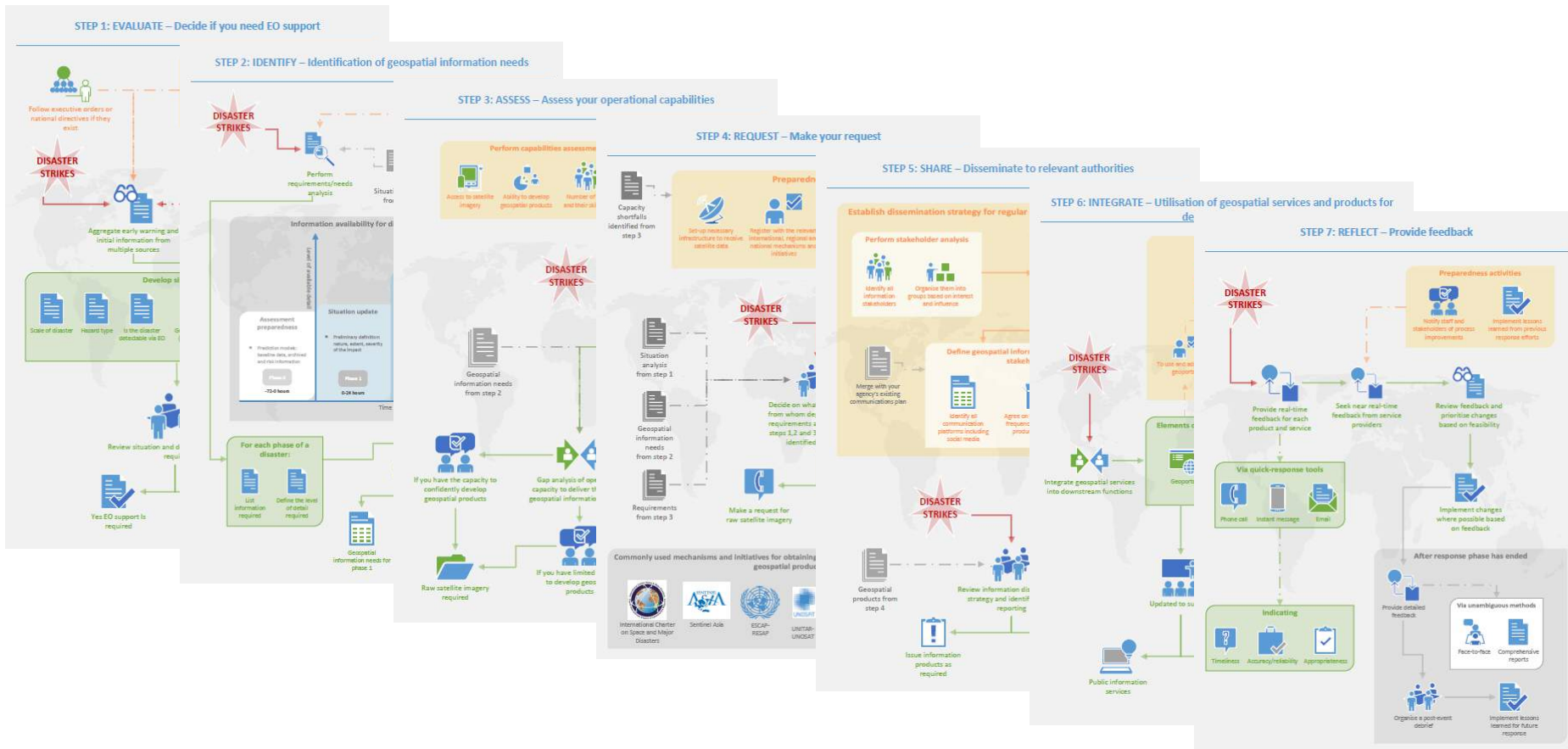
Knowledge products, standards and procedures

- **Rapid Assessment for Resilient Recovery (SAARC)**
 - Now being developed for ASEAN region
- Provides a framework for sector based rapid assessment that complements the PDNA process



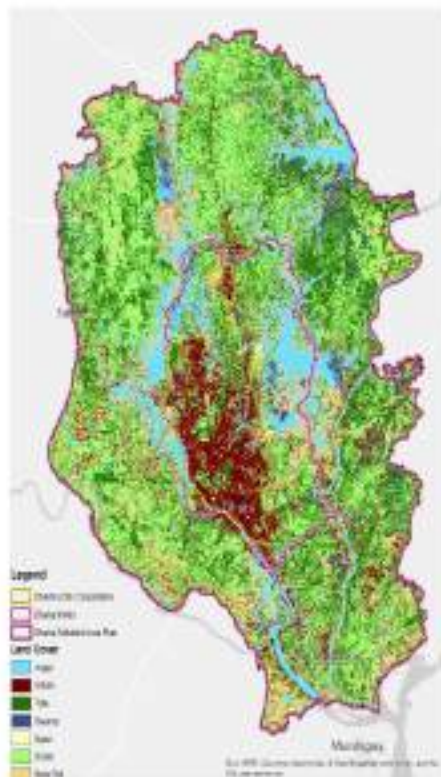
Knowledge products, standards and procedures

- **Procedural Guidelines** for sharing Space-based information during Emergency Response in ASEAN
 - Now developing hazard specific guidelines as requested by member States

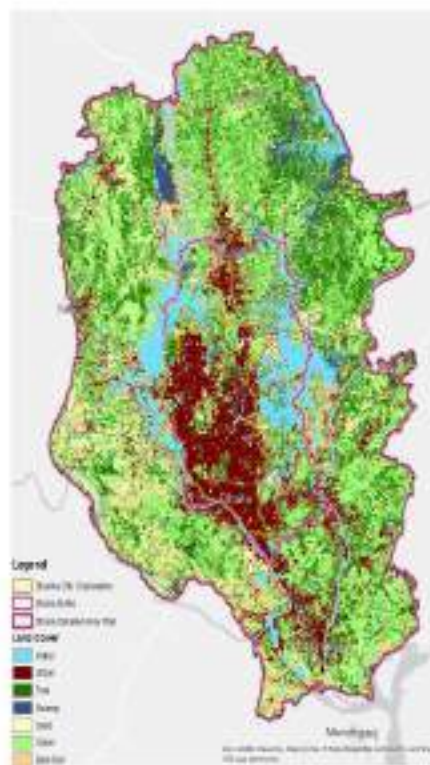


Knowledge products, standards and procedures

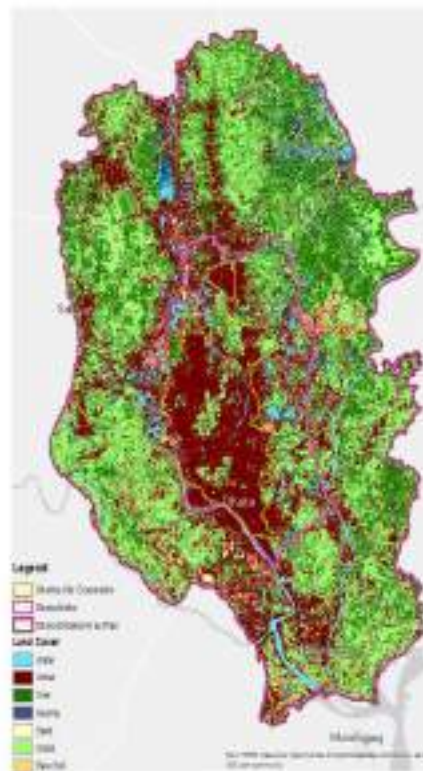
- Regional **landcover mapping** example
 - Change detection for pilot countries
 - Land use and land classification mapping etc...



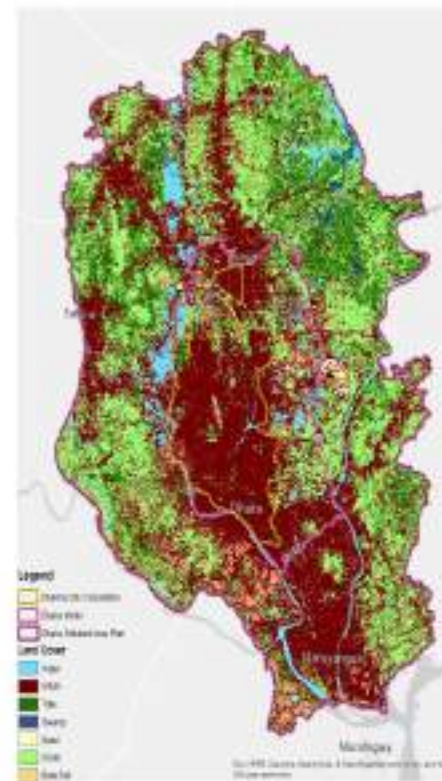
2000



2005



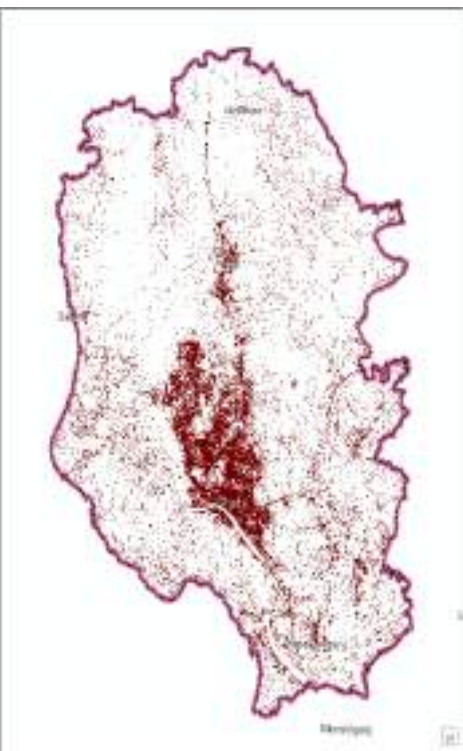
2009



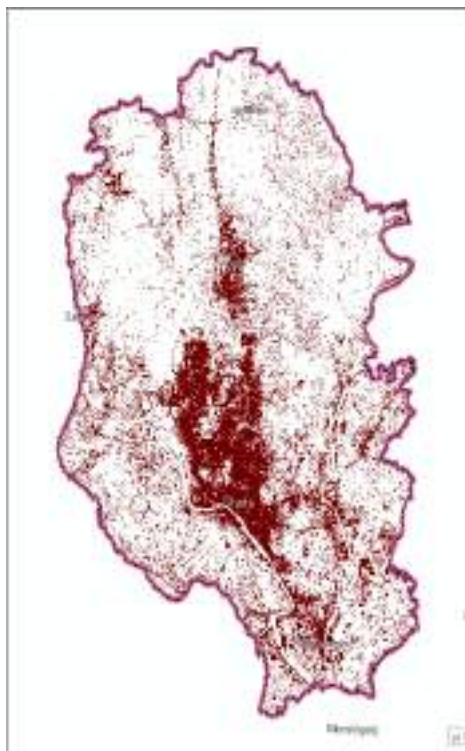
2014

Knowledge products, standards and procedures

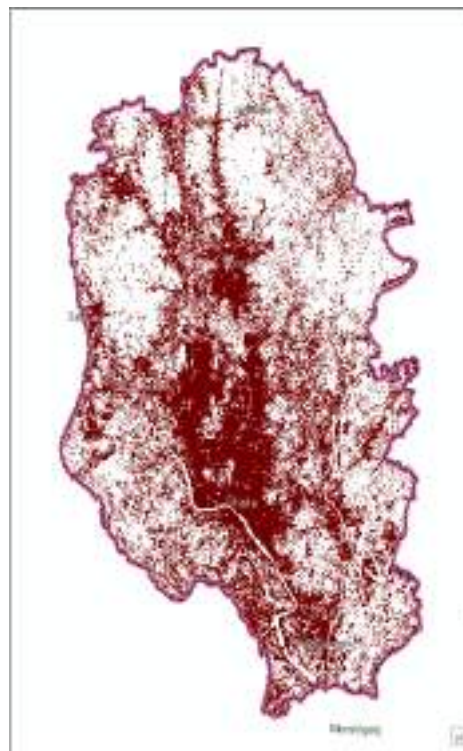
- Regional **landcover mapping** example
 - Urbanisation of Dhaka, Bangladesh



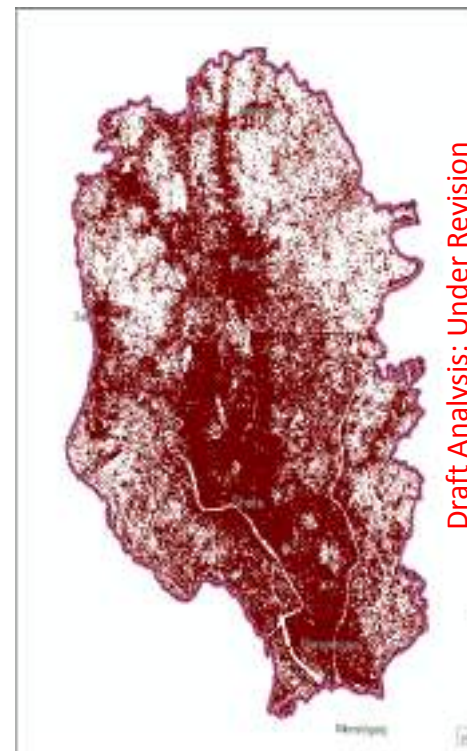
2000



2005



2014

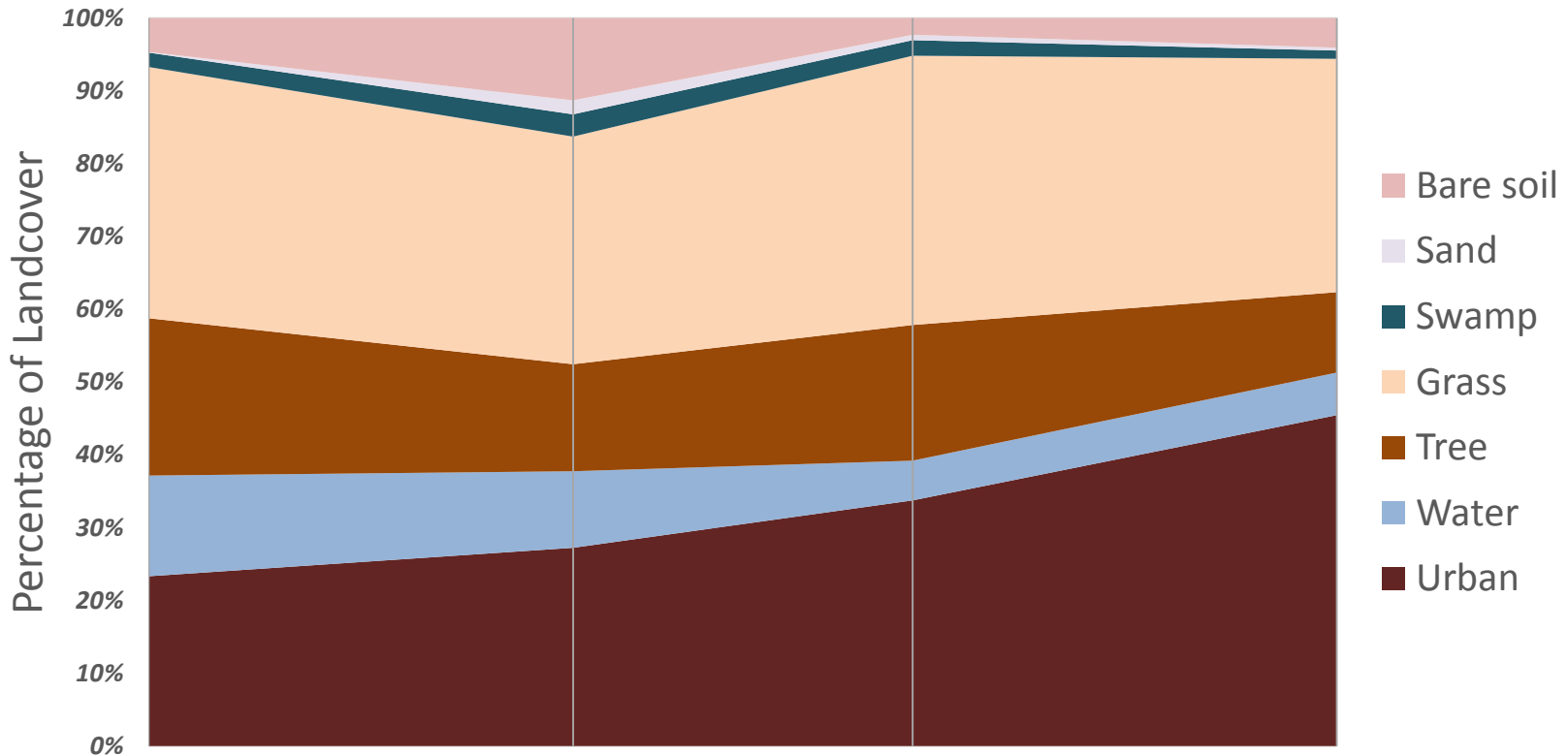


2009

Knowledge products, standards and procedures

- Regional **landcover mapping** example

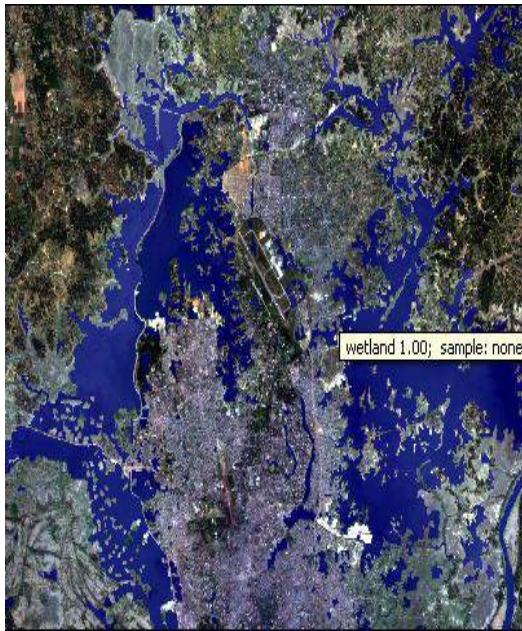
Landcover Change of Dhaka City
from 2000 - 2014



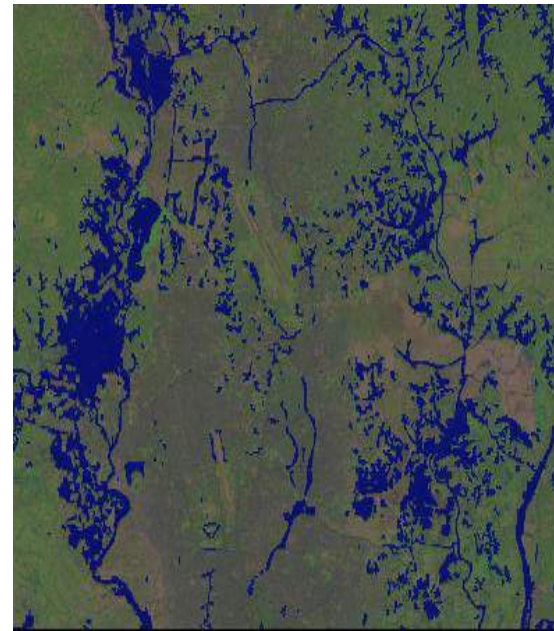
Draft Analysis: Under Revision

Knowledge products, standards and procedures

- Regional **landcover mapping** example
 - Shrinking buffer (water) in Dhaka, Bangladesh



Buffer area in 1999

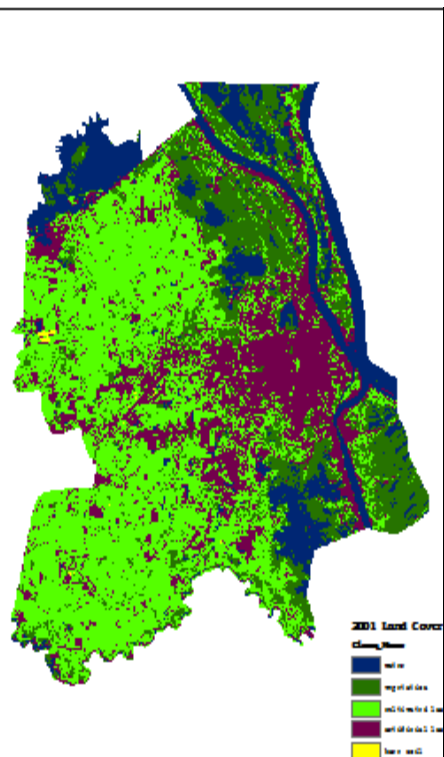


Buffer area in 2014

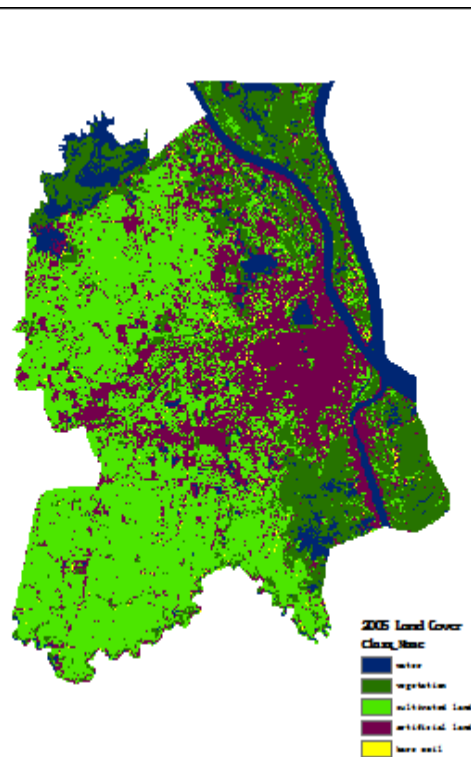
The buffer area in 2014 shrank by about 59% from 1999. Among the decreased area:
-23% is contributed by urbanization;
-27% is bare land in 2014;
-9% is vegetation.

Knowledge products, standards and procedures

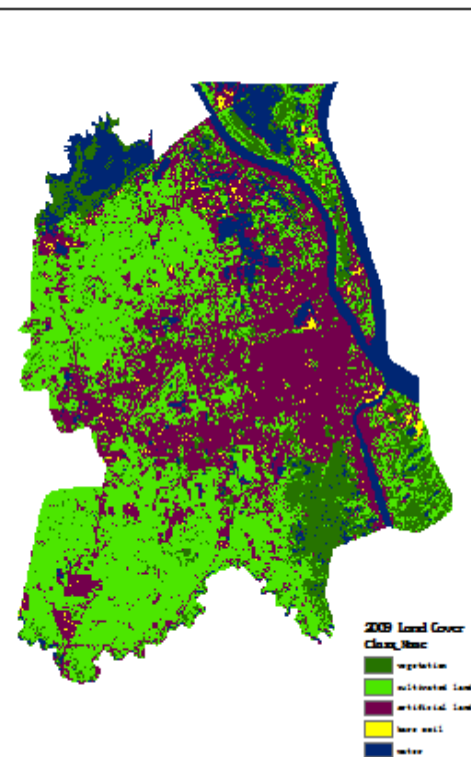
- Regional **landcover mapping** example
 - Urbanisation of Phnom Penh, Cambodia



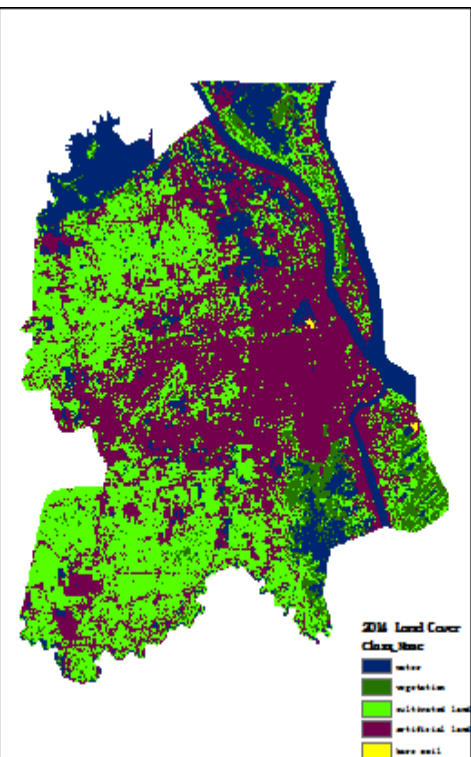
2001



2005



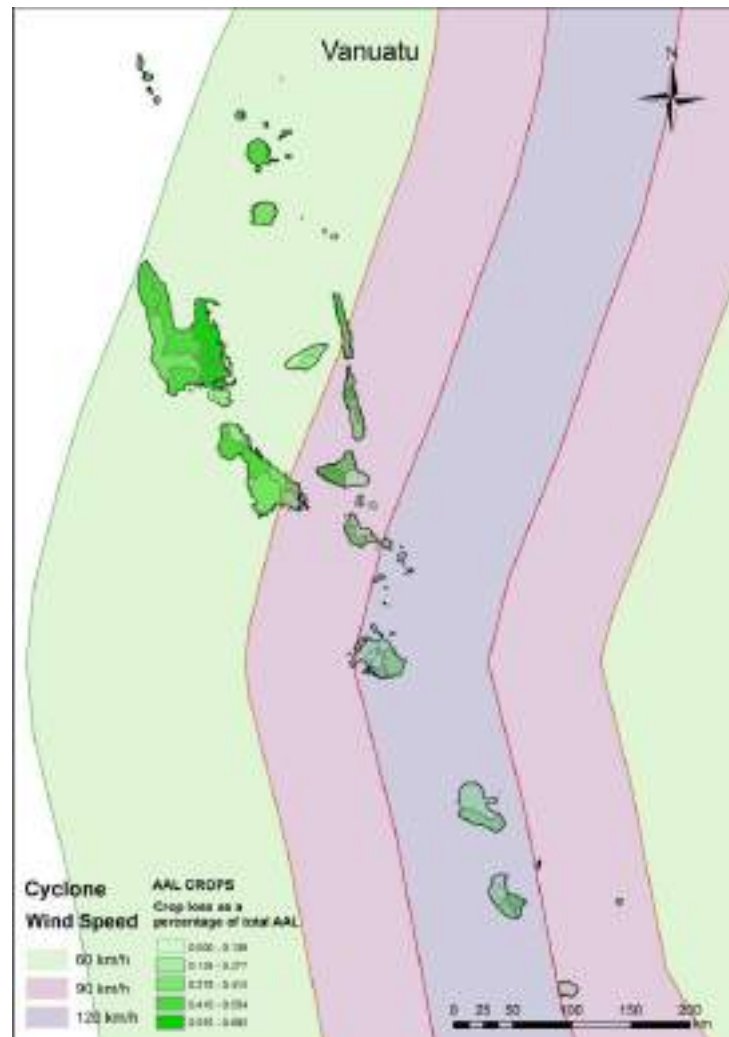
2009



2014

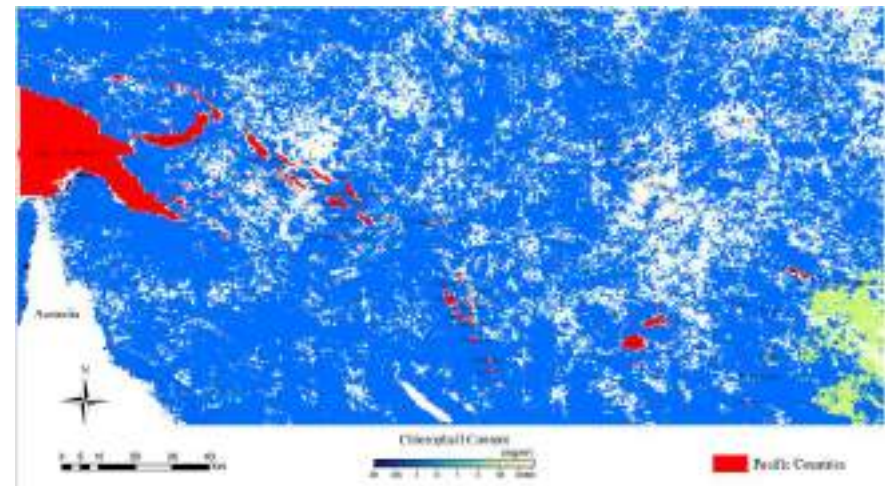
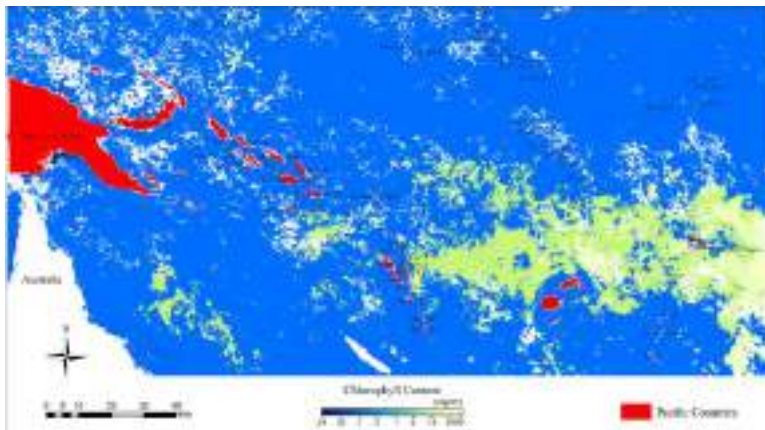
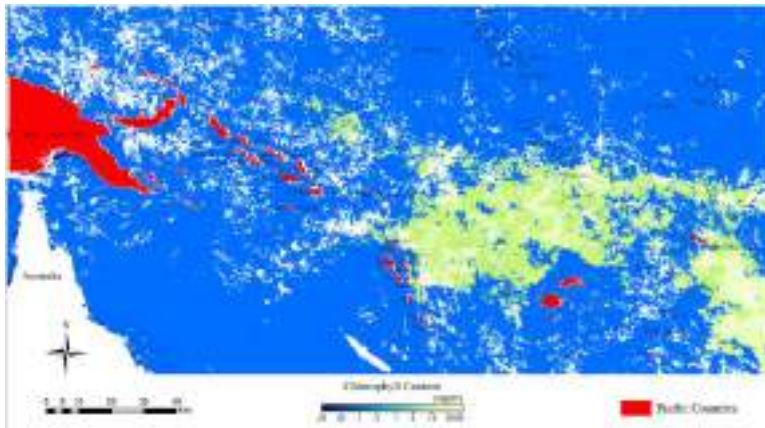
Knowledge products, standards and procedures

- Calculating **Average Annual Losses** (AAL)
- Example from Vanuatu
 - Crop loss as a percentage of AAL
 - **Cyclone Pam** wind speed from March 2015
 - **Highlights discrepancy** in calculations from 2013
 - Potential **impact on the agricultural sector** and crop loss insurance schemes



Knowledge products, standards and procedures

- Analysis of **Chlorophyll and Plankton bloom** in the Pacific
 - significant drop in Chlorophyll during El-Nino year
 - Chlorophyll can be seen as green during normal years



Significant reduction in Chlorophyll over the same areas

Addressing SDGs in Asia-Pacific

- Under the **Sustainable Development Goals**, Space Applications Section is working on the following:
 - Goal 1: No poverty
 - Goal 2: Zero hunger
 - Goal 4: Quality Education
 - Goal 11: Sustainable cities and communities
 - Goal 13: Climate action
 - Goal 14: life below water
 - Goal 15: life on land
 - Goal 17: Partnerships for the goals
- To promote the use of EO data and geospatial information products

Future direction and strategy

Space Leaders' Forum to be held on 2 November 2016 in New Delhi India, as a pre-conference event to:

- The Asian Ministerial Conference on Disaster Risk Reduction (AMCDRR), New Delhi, India, 2-5 November 2016
 - To directly link the priorities of RESAP and ESCAP's work in the area of space applications to the Sustainable Development Goals, Sendai Framework for DRR and Paris Climate Agreement



- New Asia Pacific **Plan of Action 2018-2030**

Procedural Guidelines

As an information sharing framework

- For sharing Space-based information during Emergency Response in ASEAN
- Evolved over the course of the:
 - 1st Workshop: 15-16 April, Yogyakarta, Indonesia
 - 2nd Workshop: 4-5 June 2015, Hangzhou, China
 - 3rd Workshop: 16-18 December 2015, Sriracha, Thailand
 - 4th Workshop: 19-21 April 2016, Bogor, Indonesia

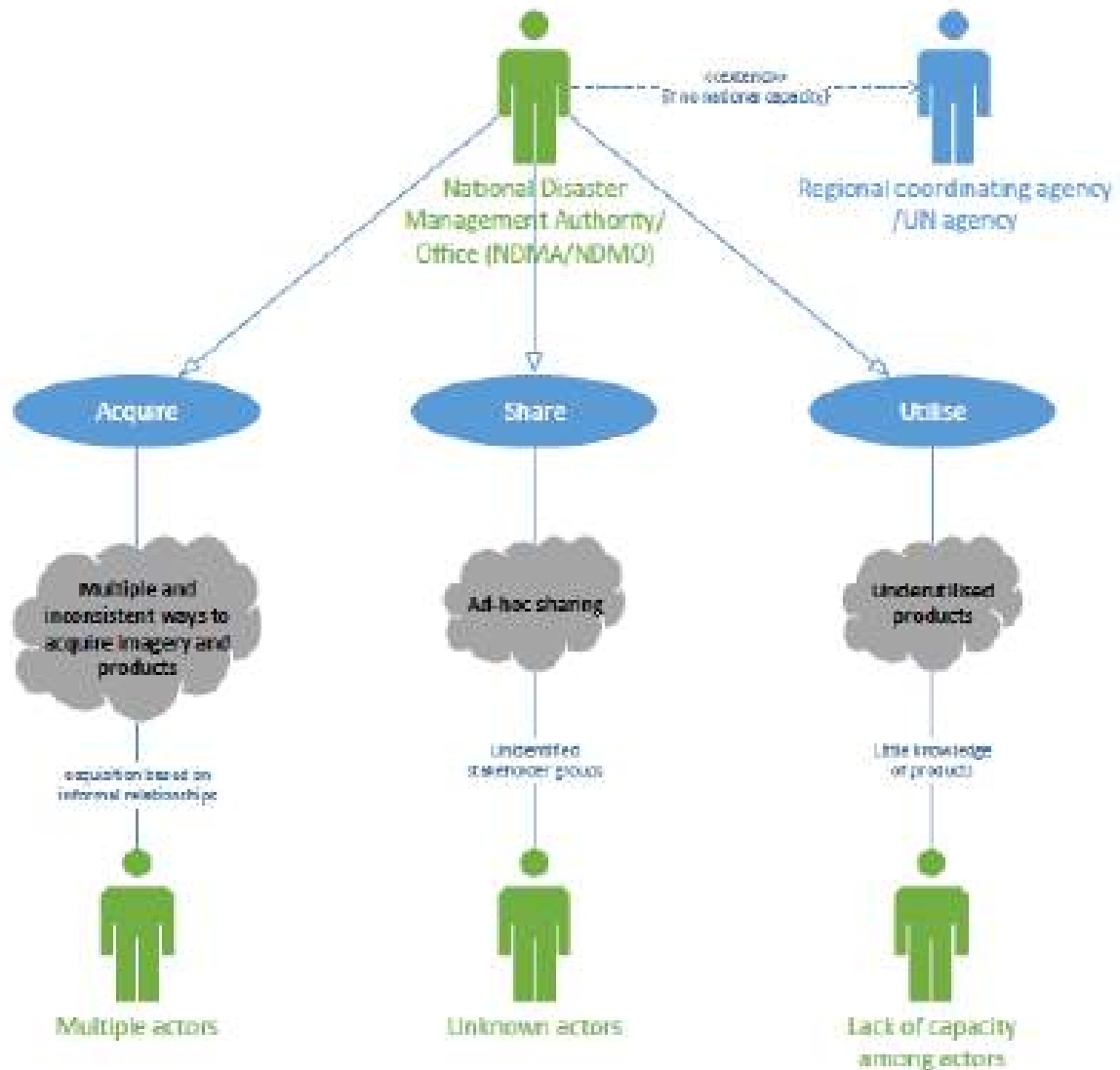
Challenges

Identified during the meetings:

- NDMAs often face difficulties with regard to acquiring, sharing and utilising geospatial information and other space-based products
- There are often no set procedures in place and potential overlap or disconnect with existing national and international mechanisms.

Challenges

In visual form:



Challenges

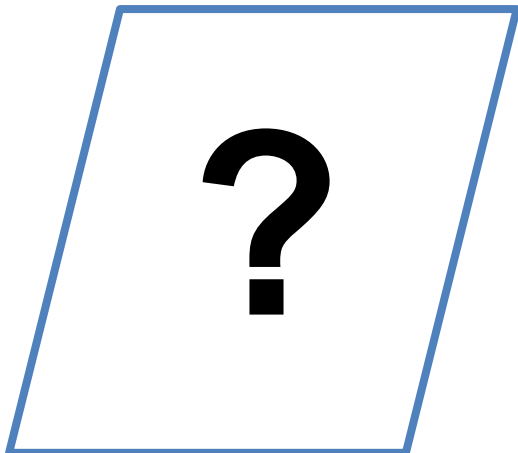
- A **decision-making framework doesn't exist** for **evaluating initial needs** based on disaster scenarios.
- There are a **variety of satellite-derived products** based on the timeframe and applicability which **end-users may not be aware of**.
- There is **varying capacity** for processing raw satellite images to derive meaningful information. In cases where there is capacity, there **may be no operational experience** to deliver such products under pressure and to a tight deadline.
- The **process for requesting space-based information is different** for different providers and mechanisms and there are **no consolidated instructions**.
- There are **multiple actors** at the national, regional and international levels, and platforms for sharing information, that **can create confusion** and potentially lead to duplication of efforts.
- **Capacity may not exist for effectively utilising satellite-derived products**, for example maps and other geospatial information.
- **Feedback lacks intensity and enthusiasm** as it is often not integrated into normal operating workflows.

Solution

To make it as easy to digest as possible:

- Similar to the instructions you get with a new phone or electronic device
- Cross cultural and unambiguous
- Easy to translate into other languages
- Visually appealing

Quick Guide

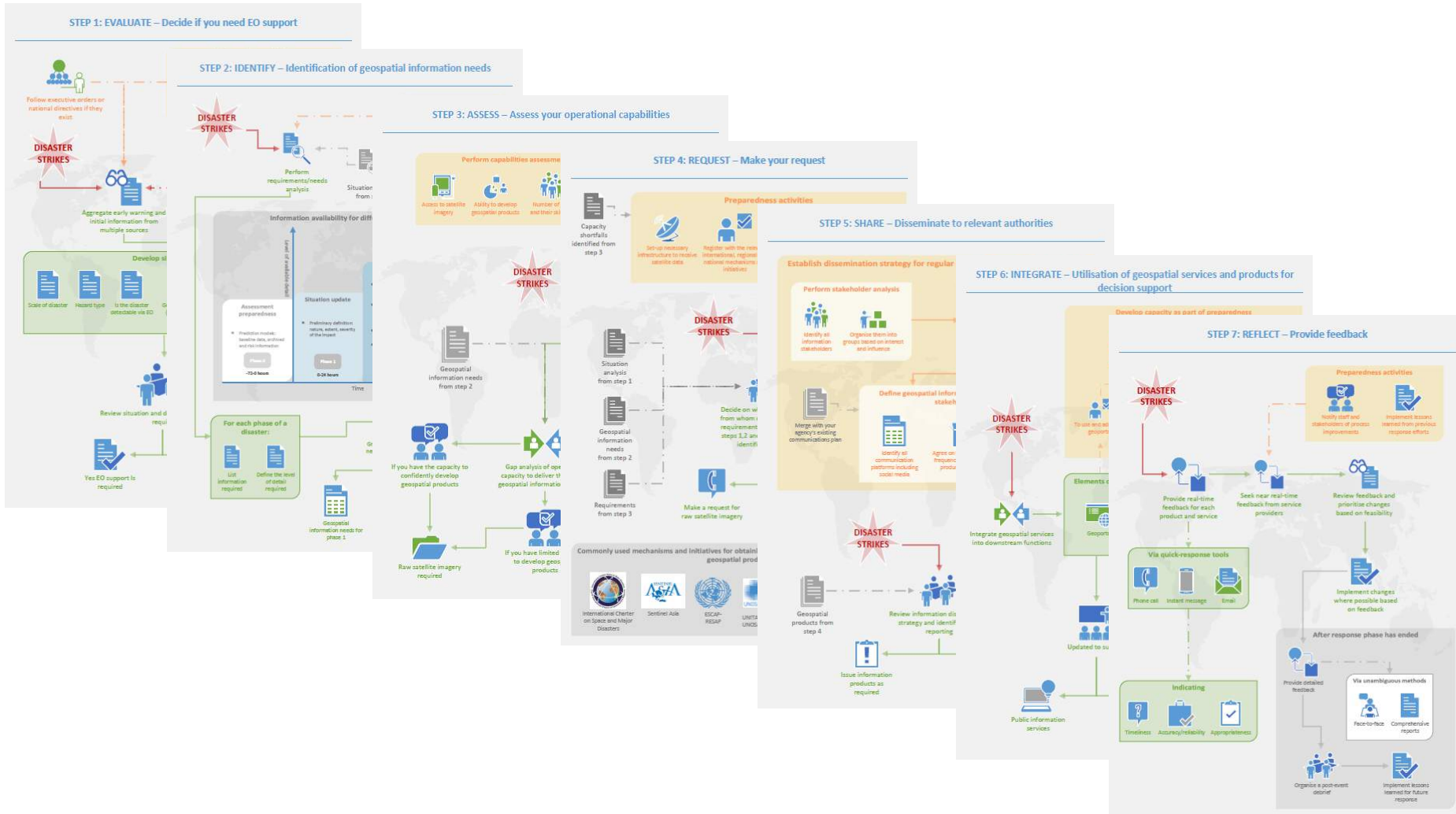


Reference Manual



Procedural Guidelines

- 7-Step Quick Guide



Partners

In collaboration with:



Supported by:



Partners

In consultation with ASEAN disaster management agencies and space agencies:

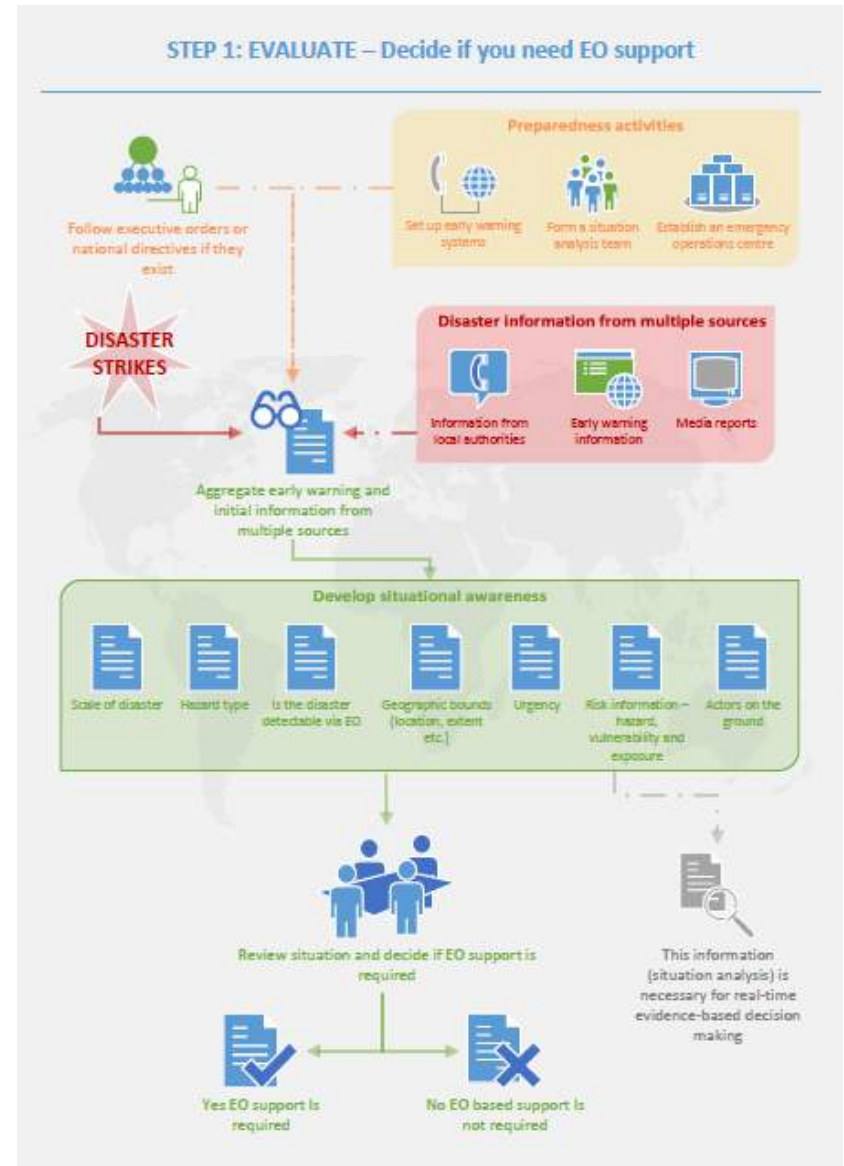
	Cambodia	 National Committee for Disaster Management (NCDM)
 National Institute of Aeronautics and Space (LAPAN)	Indonesia	 National Disaster Management Authority
 Ministry of Science and Technology	Lao People's Democratic Republic	 Ministry of National Resources and Environment (MONRE)
		 National Disaster Management Office
 National Space Agency (ANGKASA)	Malaysia	 National Disaster Management Agency

 Department of Meteorology and Hydrology (DMH)	Myanmar	 Relief and Resettlement Department
 Philippine Council for Industry Energy and Emerging Technology Research and Development (PCIEERD)	The Philippines	 National Disaster Risk Reduction and Management Council
 National University of Singapore Centre for Remote Imaging, Sensing and Processing (CRISP)	Singapore	 Civil Defence Force
 Geo-Informatics and Space Technology Development Agency (GISTDA)	Thailand	 Department of Disaster Prevention and Mitigation
 Space Technology Institute (STI). Vietnam Academy of Science and Technology (VAST)	Viet Nam	 Department of Natural Disaster Prevention and Control (DNDPC)
		 Disaster Management Centre, Directorate of water resources, Ministry of agriculture and rural development

STEP 1: EVALUATE

Decide if you need EO support

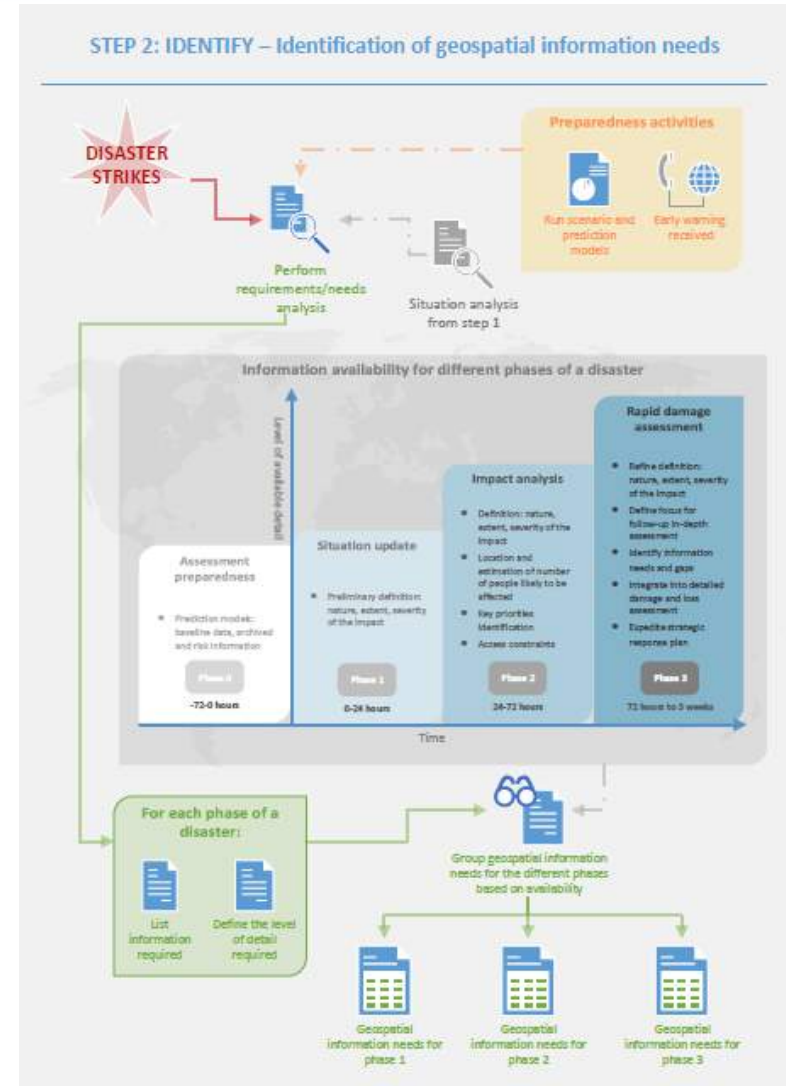
- Aggregate all available information in order to:
 1. Develop situational awareness
 2. Decide if EO support is required



STEP 2: IDENTIFY

Identification of geospatial information needs

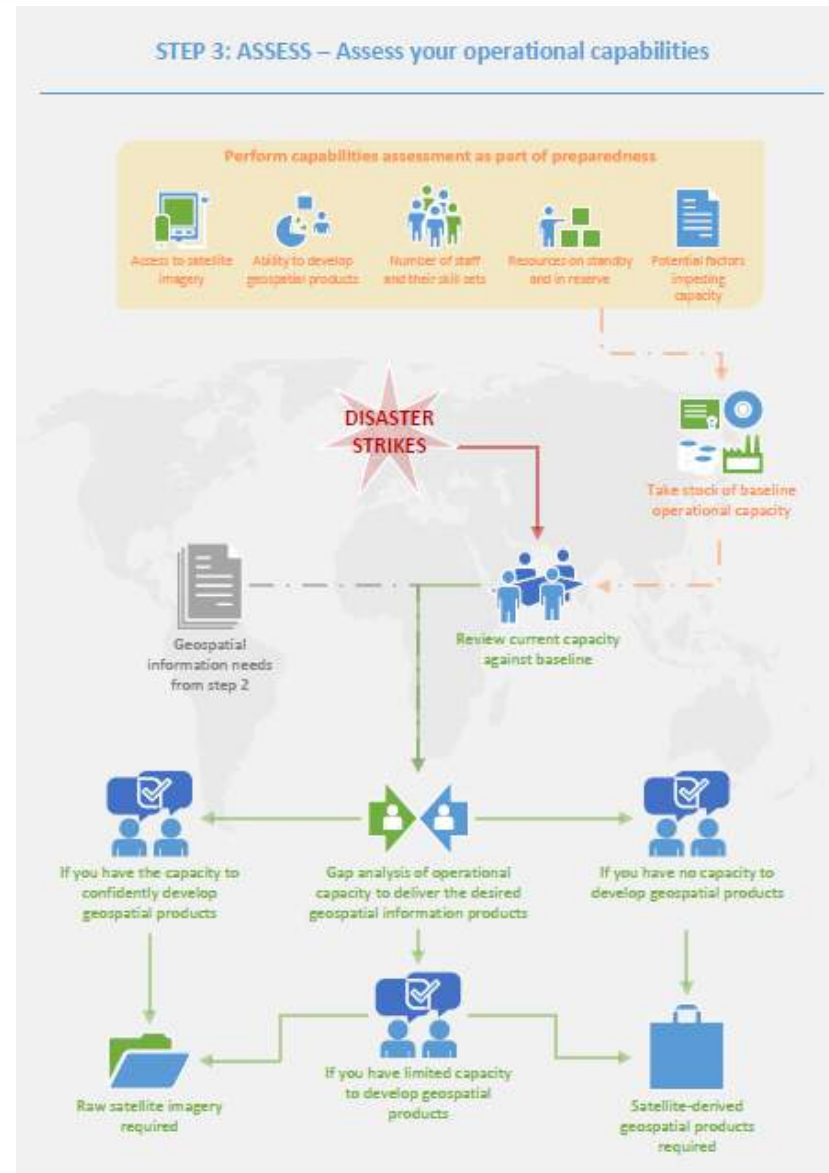
- Perform requirements/needs analysis for:
 1. Each phase of the disaster
 2. Based on the information available for that period



STEP 3: ASSESS

Assess your operational capabilities

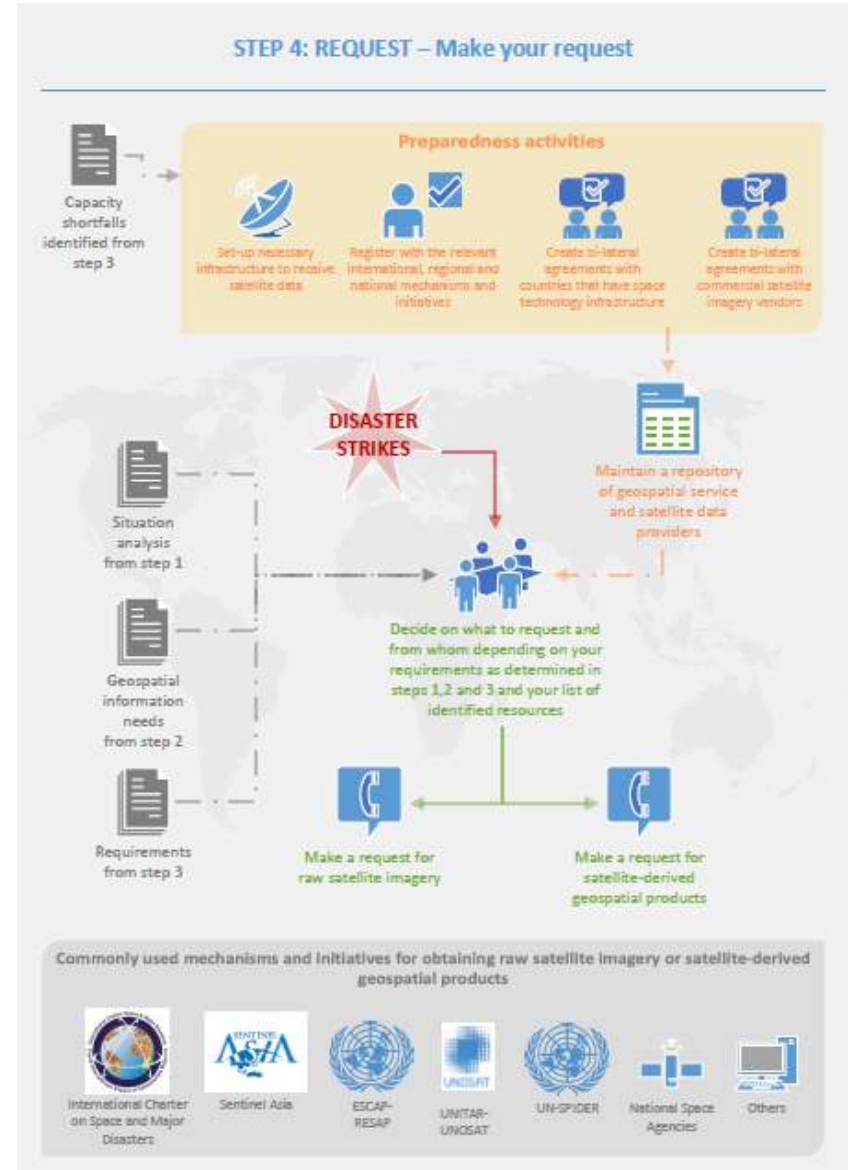
- Which type of support is required based on:
 1. Your baseline capacity before disaster
 2. Your existing capacity after disaster
 3. Gap analysis of what you require



STEP 4: REQUEST

Make your request

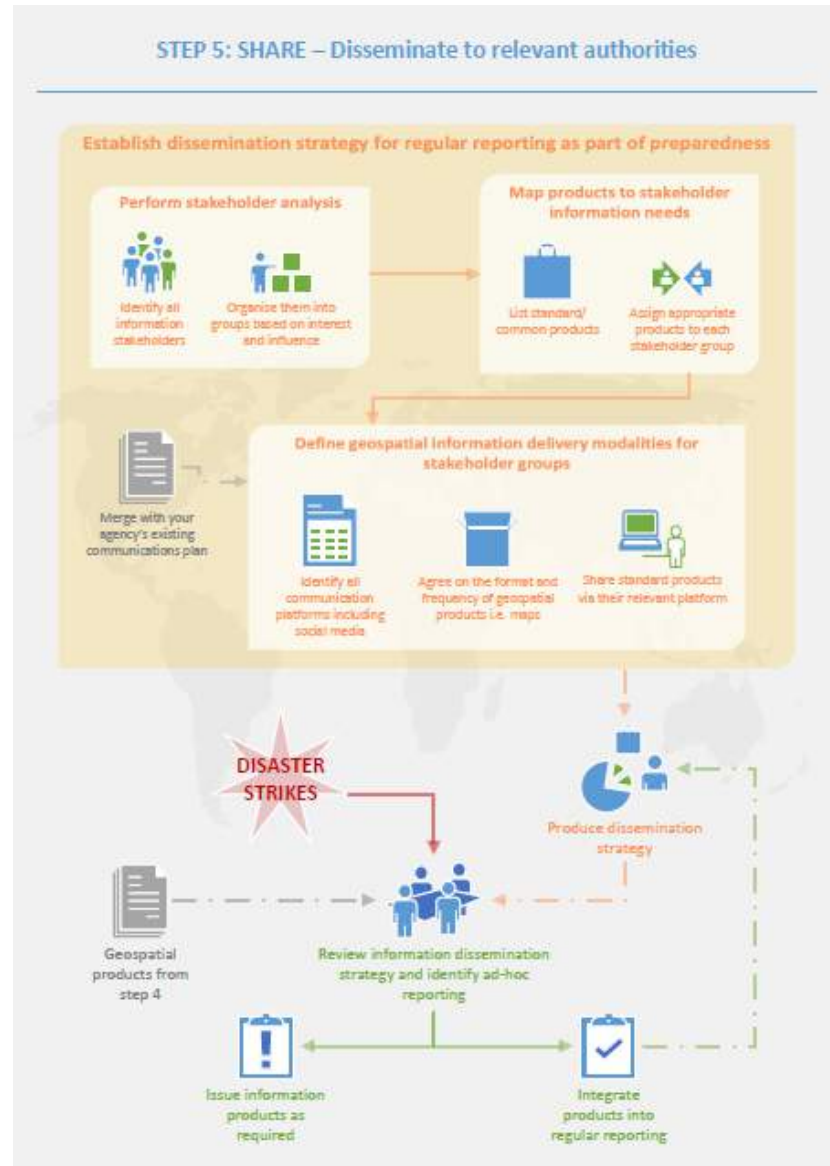
- Physically making a request:
 1. Raw satellite imagery or data
 2. Satellite-derived geospatial products
 3. Both



STEP 5: SHARE

Disseminate to relevant authorities

- Produce a dissemination strategy including
 1. Ad-hoc reporting
 2. Regular reporting

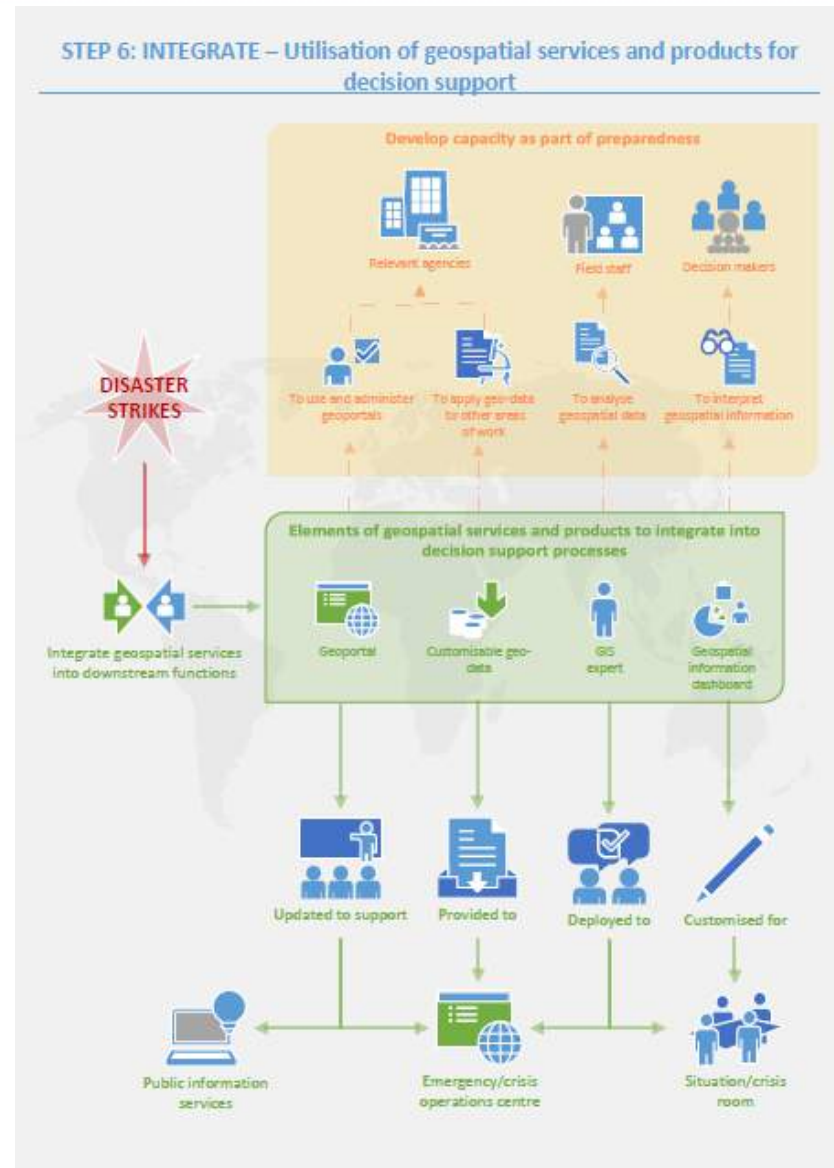


STEP 6: INTEGRATE

Utilisation of geospatial services and products for decision support

- Integrating geospatial services and products into decision support processes including:

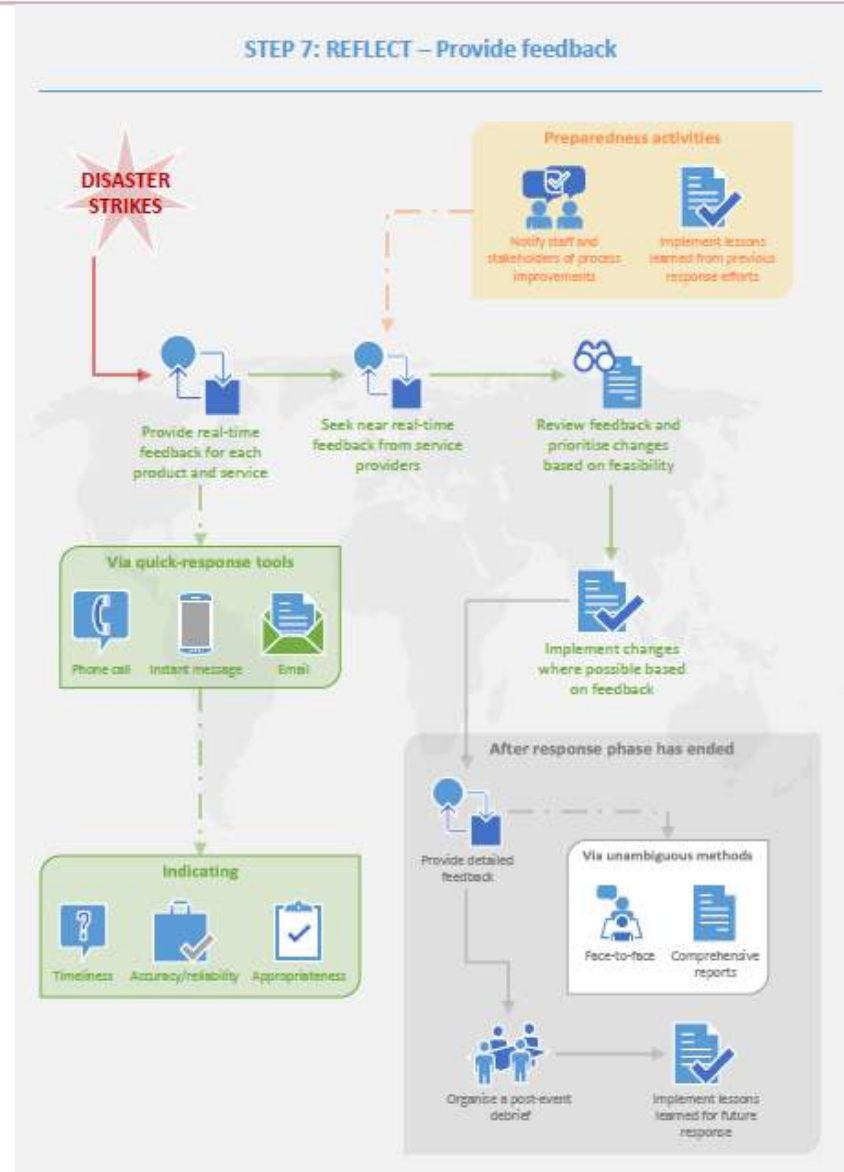
1. Geoportals
2. Customisable geo-data
3. GIS experts
4. Geospatial information dashboards



STEP 7: REFLECT

Provide feedback

- Two-way feedback:
 1. Quickly for each product and service
 2. More detailed once the response phase has ended



Thank you

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