# Use of Earth Observation to Strengthen Disaster Risk Management for Sustainable Development in Asia and the Pacific

**Mr. Hamid Mehmood**
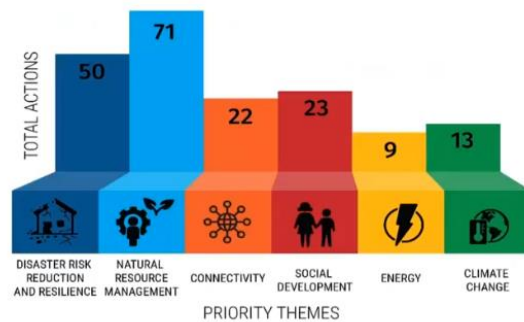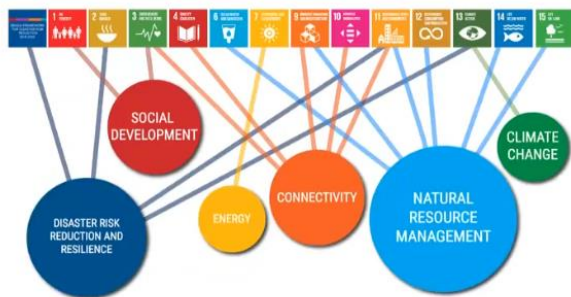
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ESCAP

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## 01

ESCAP

### Asia-Pacific Plan of Action on Space Applications for Sustainable Development (2018–2030)

## Outcome of the 4th Ministerial Conference on Space Applications

**SPACE+ FOR OUR EARTH AND FUTURE**

- Leveraging innovative digital applications
- Engaging end users in multiple sectors
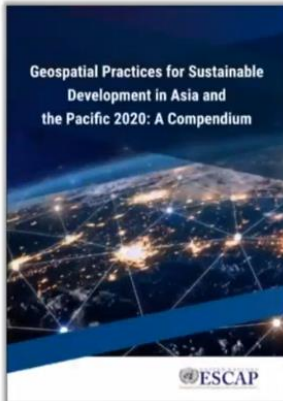- Managing data and information more effectively
- Enhancing partnerships

Space+ for our Earth and Future

ESCAP 75

THE 4TH MINISTERIAL CONFERENCE ON SPACE APPLICATIONS FOR SUSTAINABLE DEVELOPMENT IN ASIA AND THE PACIFIC

Wednesday, 26 October 2022

Wednesday, 26 October, 2022

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# Geospatial good practices database and dashboard

## Action Area

**Action Area:** All

**Number of Actions Implemented:** 179 (0 – 188)

**Number of Times an Action Has Been Implemented**
- More than 5
- Between 2 and 5
- Below 2

37 (20.79%)
80 (44.94%)
61 (34.27%)

**Action Implementation by Country and Action Area**
Action Area: Capacity-building and technical support... ● Intergovernmental discussion... ● Research and knowled...

**Top Contributing Sub Themes**
Action Area: ● Capacity-buildin... ● Intergovernme... ● Research and ...

Sub Theme:
- Mitigation and adaptat...
- Risk Reduction
- Disaster Assessment
- Food production
- Agroecosystem resilie...
- Forests
- Innovation
- Urban planning
- Modern and sustainabl...
- Water resource manag...

Number of Actions: 0 – 100 – 200

**Action Implementation by Thematic Area**
Thematic Area
- Disaster risk reduc...
- Management of N...
- Climate Change (C...
- Social Developme...
- Connectivity (CO)
- Energy (EN)

48 (3.87%)
96 (7.74%)
157 (12...)
511 (41.21%)
350 (28.23%)

**Timeline of Action Implementation**
Action Area: ● Capacity-building an... ● Intergovernment... ● Research and k...

539
253
183
24
2014  2016  2018  2020  2022

Geospatial Good Practices Dashboard Version 1.4    9/21/2023 3:06:29 AM

Data Source: ESCAP Geospatial Good Practices Database

# Innovative geospatial information applications for disaster resilience and sustainable development

## Compendium series: sharing knowledge and experience

Geospatial Practices for Sustainable Development in Asia and the Pacific 2020: A Compendium

Geospatial Practices for Sustainable Development in South-East Asia 2022: A Compendium

**Geospatial Practices for Sustainable Development in East and North-East Asia 2024: A Compendium**

*Chapter 1. The context of space applications for sustainable development in East and North-East Asia*

*Chapter 2. Good practices for using geospatial information*

*Chapter 3. Special topic: Leveraging digital innovations to promote geospatial information*

*Chapter 4. Trends and evolving subregional needs*

*Chapter 5. Policy recommendations*

# Timely provision of satellite imagery for disaster management

- On average, the secretariat provides over 40 reports and 150 gigabytes of satellite imagery and products to member States for early warning, response and damage assessment relating to various climate hazards, through the RESAP network and collaboration with the UNITAR/UNOSAT, UN-SPIDER and APRSAF.
- Member States shared space-based data, products and services free of charge through partnerships with other UN agencies and international/regional initiatives.
- ESCAP will collaborate with UNITAR/UNOSAT in AI for flood early warning and management.
- ESCAP will also work with UNU on flood and drought mapping through the use of integrated geospatial information.
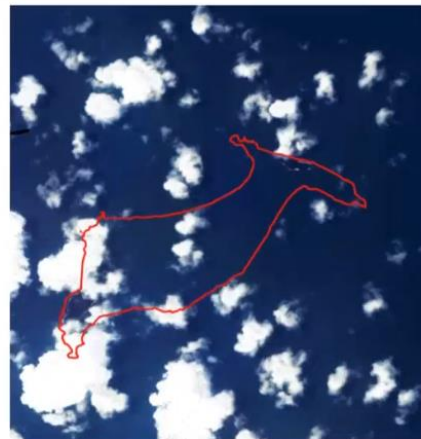
# Virtual Satellite Constellation for Disaster Risk Management (VSC)



**The VSC will develop a mechanism for sharing satellite imagery within Asia and the Pacific to build resilience in disaster risk hotspots**

**Develop a satellite imagery sharing mechanism** for enhanced pre-disaster monitoring of risk in high disaster - low risk countries

**Improve the capacity** of local governments and disaster management-related agencies to be prepared and manage disasters over their entire cycle

**Provide inputs** to the spacefaring nations on the design of future satellites and sensors which address national and regional data needs

❶ **Set up an informal working group** to work out the operational details and conduct a study to map free and commercial remote sensing data providers and share the catalogue with all member States.

❷ **Invite spacefaring countries** to set aside a percentage of their satellite operational time or data archive for use by high disaster-risk and low-capacity countries.

❸ **Invite target countries** to identify disaster risk hotspots for satellite imaging.

❹ **Match support and demand** for satellite data by the secretariat using the VSC Catalog and form a working group to facilitate data transfer.

❺ **Provide technical assistance** to the target countries in hosting, storing, processing and analysing the satellite data.

❻ **Share the data requests** with all the spacefaring nations to ensure that the regional needs are addressed in future satellite and sensor design.

❼ Contribute to the Asia-Pacific Plan of Action on Space Applications for Sustainable Development (2018–2030) in the areas of:

**Disaster Risk Reduction and Resilience**

**Social Development**

**Management of Natural Resources**

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## 03

**Leverage digital innovations to accelerate implementing the regional space Plan of Action**

### Disaster Risk Hotspot Mapping

Use Big Earth Data, Cloud Computing and AI to decrease the cost and time to generate disaster risk hotspots in Asia and the Pacific.

We are working with countries and cooperation partners to build an ARRAY of tools and apps to address the data and information needs in Asia and the Pacific

**2023**

Flood Hotspot Mapping     Wildfire Hotspot Mapping

**2026**

**Flood Mapping Tool** (floodmapping.inweh.unu.edu)

- Listed in 2022 UN Climate Change Innovations Compendium
- Won the 2021 Popular Science Best of Whats New Award

# Massive Open Online Courses (wlc.un.edu)



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### Active and Passive Satellite Data Analysis Using Cloud Computing for Surface Water/Flood Mapping

This online course introduces the participants to Earth Engine Code Editor platform and implementation of surface water detection algorithm using passive and active remote sensing.

**Enroll Now**

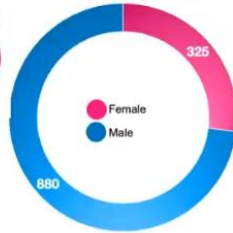**Total number of participants** 1205

Reporting date: 21 April 2023
Course launch date: 28 December 2022

**Completion rate 23%**

- Female 325
- Male 880

### Spatiotemporal Drought Assessment by Leveraging Google Earth Engine Platform

This online course introduces the participants to Earth Engine Code Editor platform and the implementation of drought detection and monitoring algorithm using passive and active remote sensing.

**Enroll Now**

**Total number of participants** 513

Reporting date: 21 April 2023
Course launch date: 28 December 2022

**Completion rate 19%**

- Female 138
- Male 375
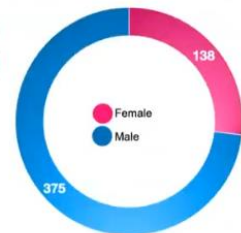
**Participants are from universities, research institutes, and government agencies.**

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# Leverage the power of Large Language Models (LLMs) to develop an open-access platform to better monitor and manage disaster risks_SatGPT

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**Label images:** LLMs will be used to label images with relevant information, such as the type of disaster, the extent of the damage, and the number of people affected.

**Classify data:** LLMs will be used to classify remote sensing data, such as distinguishing between different types of disasters or different levels of damage.

**Generate reports:** LLMs will be used to generate reports that summarize the findings of remote sensing data analysis and integrate sectoral data to aid decision-making and policy formulation.

**Extract features:** LLMs will be used to extract features from remote sensing data, such as the location of a disaster, the severity of the damage, and the risk of future disasters.

## These functionalities will help generate the following information in a disaster management cycle.

- Identify and track natural hazards in real-time.
- Assess the risk of disasters.
- Warn people about impending disasters.
- Help people to prepare for and respond to disasters.
- Assess the damage caused by disasters.
- Identify the needs of affected communities.
- Prioritize resources for disaster recovery.
- Monitor the progress of recovery efforts.

## The potential users include:
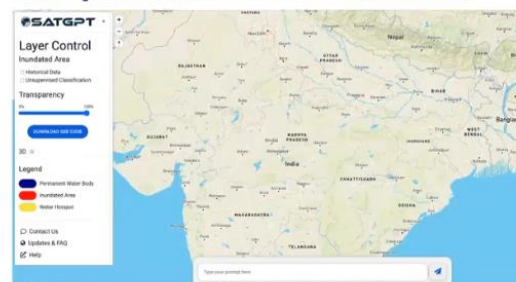


- Disaster Management Agencies
- Government Departments and Ministries
- Research Institutions and Scientists
- Non-Governmental Organizations (NGOs) and Humanitarian Agencies
- International Organizations and Donor Agencies
- Public and General Users

## Massive Open Online Courses (wlc.un.edu)

**New Course Launch:**
Introduction to Geospatial Data Analysis with ChatGPT and Google Earth Engine

**Course Start:**
**08 Dec 2023**



Introduction to Geospatial Data Analysis with ChatGPT and Google Earth Engine

This online course introduces the participants to ChatGPT and Earth Engine Code Editor platform to process and interpret geospatial data.

**View Course**

| Course Start | Course End | Duration | Certificate |
|---|---|---|---|
| Dec 18, 2023 | Dec 31, 2024 | 10 hours | Yes |

# Building institutional capacity for the use of integrated spatio-temporal data in local SDGs monitoring and decision-making

**Objective:** To increase the use of integrated spatio-temporal and statistical data for local SDG monitoring and decision-making.

**Outcome:** Enhanced institutional capacity of national geospatial information applications agencies, and local governments in target countries, to utilize integrated spatio-temporal and statistical data for local SDG monitoring and decision-making



# Building the Pan-Asia Partnership for Geospatial Air Pollution information

**Objective:** To enhance the capacity of government agencies in target countries to strengthen national level air pollution monitoring and management.

**Outcomes:** Access to and utilize space applications to monitor and introduce measures to improve air quality; Enhance capacity to utilize remote sensing data for air pollution monitoring; Engage in cooperative dialogue; Support evidence-based decisions for improving national and subregional air quality.

Bangladesh
SPARRSO

Cambodia
MoE

Indonesia
BRIN

Lao PDR
MONRE

Mongolia
IRIMHE

Philippines
PhilSA

Thailand
GISTDA

Viet Nam
MONRE

| Subject Area | # | Member States |
|---|---|---|
| Space | 4 | BG, IN, PH, TH |
| Envir. | 4 | KH, LA, MN, VT |

**Building resilient agricultural practices by integrating geospatial information for agricultural monitoring in the Lower Mekong Basin**

**Objective:** To strengthen the capacity of the lower Mekong countries to implement the recommendations contained in the Asia-Pacific Plan of Action on Space Application for Sustainable Development 2018-2030 particularly those related to disaster risk management, natural resource management and climate change.

**Outcome:** Government officials at the national and sub- national levels use the cloud-based crop monitoring system for the effective development of climate resilient agricultural practices in rice crop production.



**Central Asia Drought Information System (CADIS) Pilot Project**

**Objective:** To strengthen the capacity of target Central Asian countries to use satellite data and geospatial information for effective drought monitoring and early warning.

**Outcome:** Target Central Asian countries use the pilot drought information system for drought monitoring and early warning.
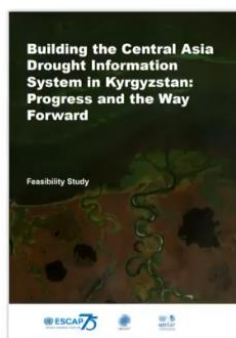
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