Agenda item 3: Liaison Reports from ESCAP

# Progress in implementing the Asia-Pacific Plan of Action on Space Applications for Sustainable Development (2018-2030)

9 November 2023
Bali, Indonesia

ESCAP
Economic and Social Commission for Asia and the Pacific

# Contents

# Outcome of the 4th Ministerial Conference on Space Applications

Requests the secretariat to facilitate consideration of the initiatives of the Government of Indonesia concerning disaster risk management tools.

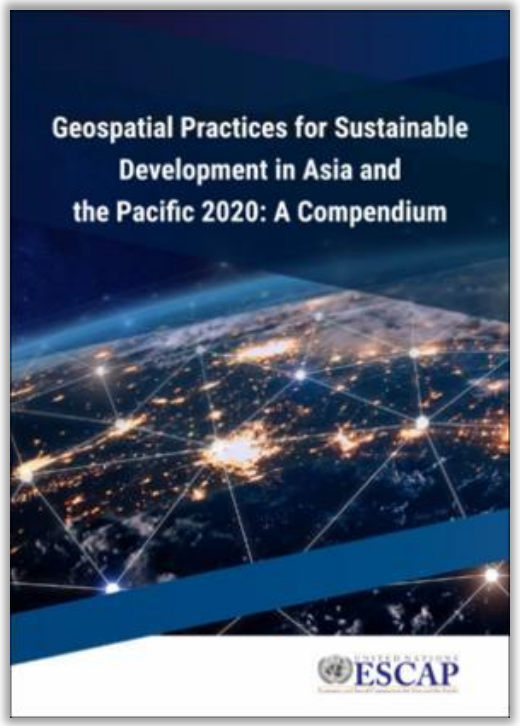
October 2022, in Jakarta

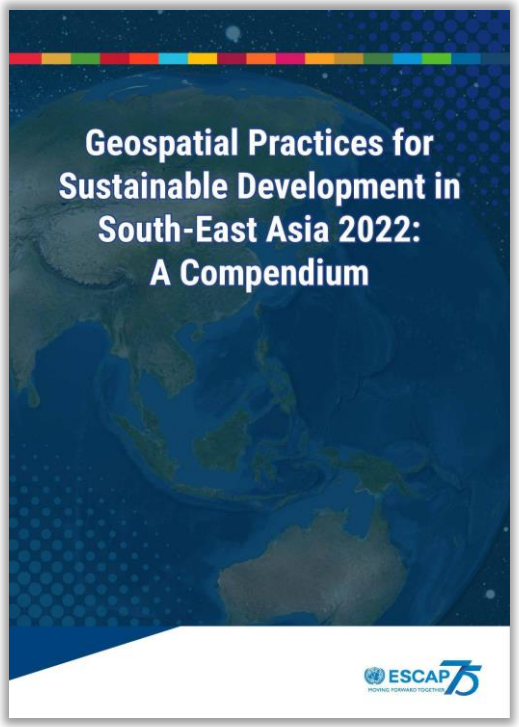
**Proposed initiatives of the Government of Indonesia:**

- Virtual satellite constellation disaster risk management focused on continuous pre-disaster risk assessments in risk hotspots
  *(contributes to 9 actions of the Plan of Action)*
- Rapid mapping of disaster hotspots through digital innovation tools such as machine learning
  *(contributes to 9 actions of the Plan of Action)*
- Establishment of a Youth forum on Space+ for our Earth and Future
  *(contributes to 4+ actions of the Plan of Action)*

# Innovative geospatial information applications for disaster resilience and sustainable development

**Compendium series** sharing knowledge and experience

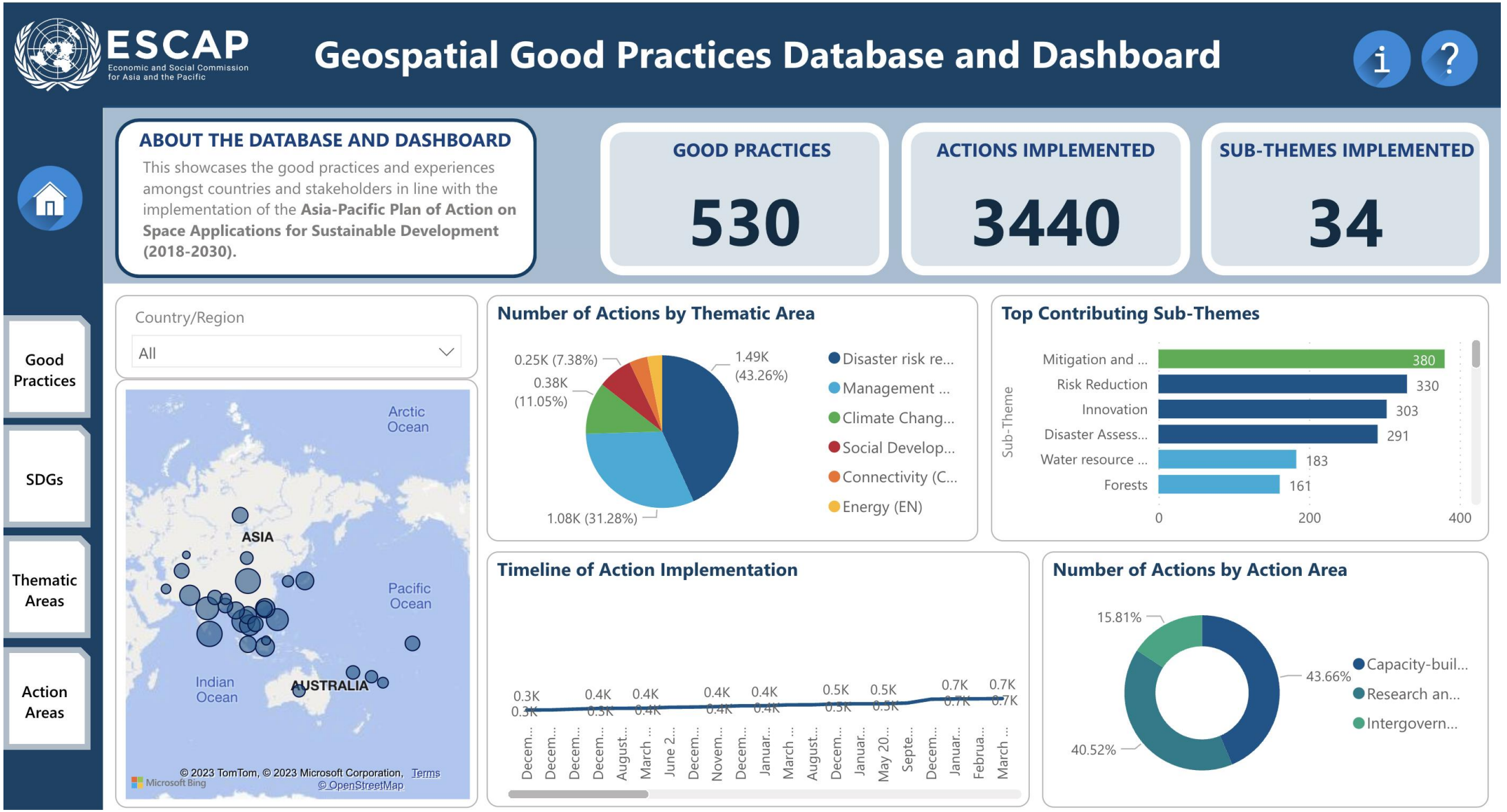



**Geospatial Practices for Sustainable Development in East and North-East Asia 2024: A Compendium**

# Geospatial Good Practices Database and Dashboard:

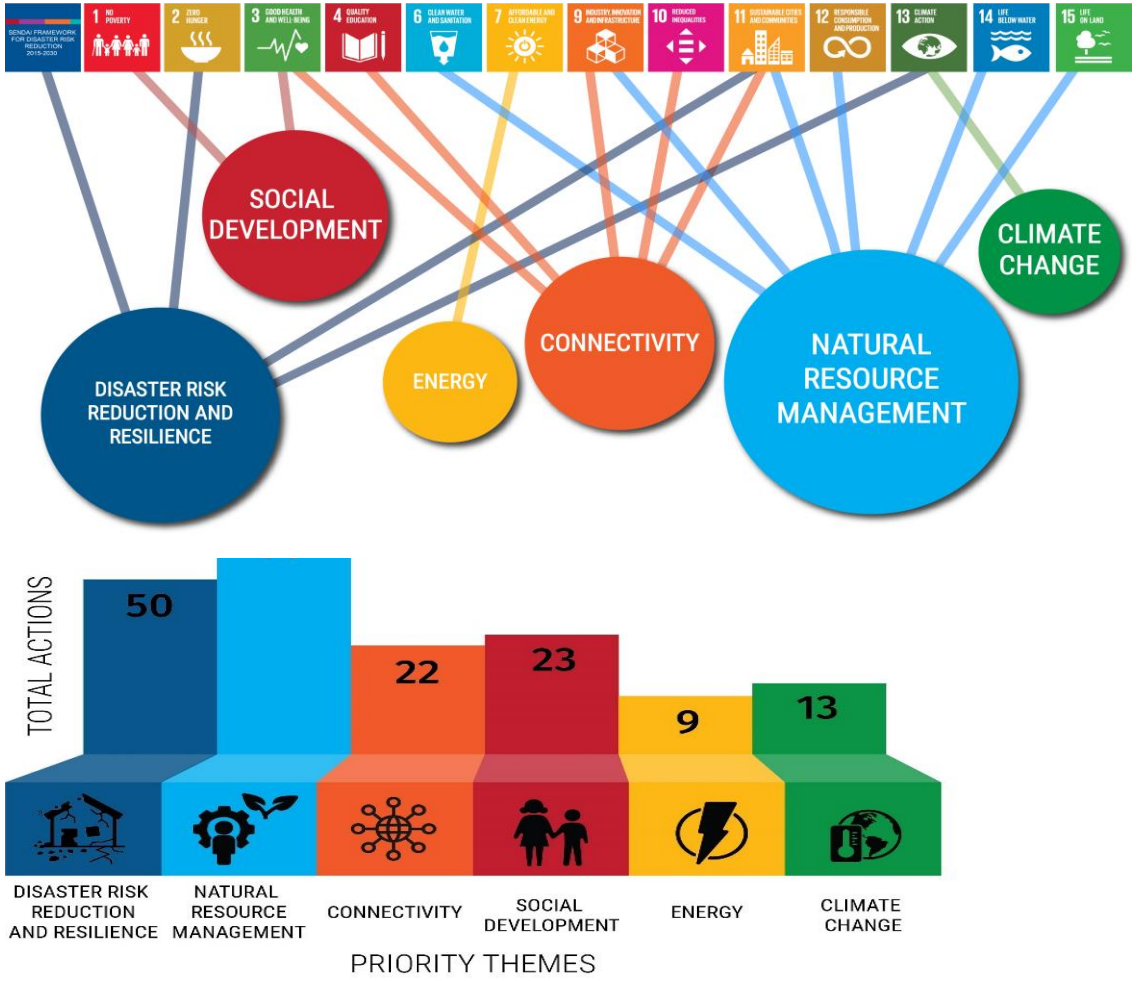
*Achievements reported by ESCAP Members, Associate Members, and other organizations in the Asia-Pacific region*



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

- Members and associate members have taken actions in (a) disaster risk reduction and resilience; (b) management of natural resources; (c) connectivity; (d) social development; (e) energy; and (f) climate change.

- 3,440 activities have been reported by member and associate members. Over 43% of activities are taken in the area of disaster risk reduction, 44% of them are on capacity building and technical support.



# 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

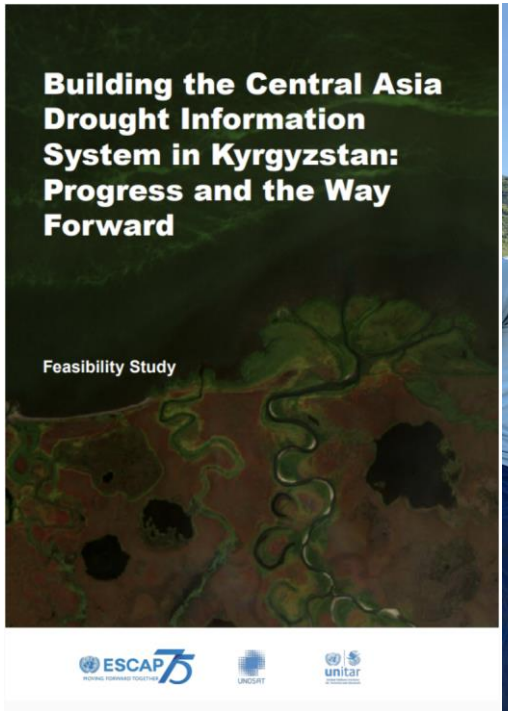
**Outcome** Government officials at the national and sub- national levels use the cloud-based crop monitoring system for the effective development of climate resilient agricultural practices in rice crop production.

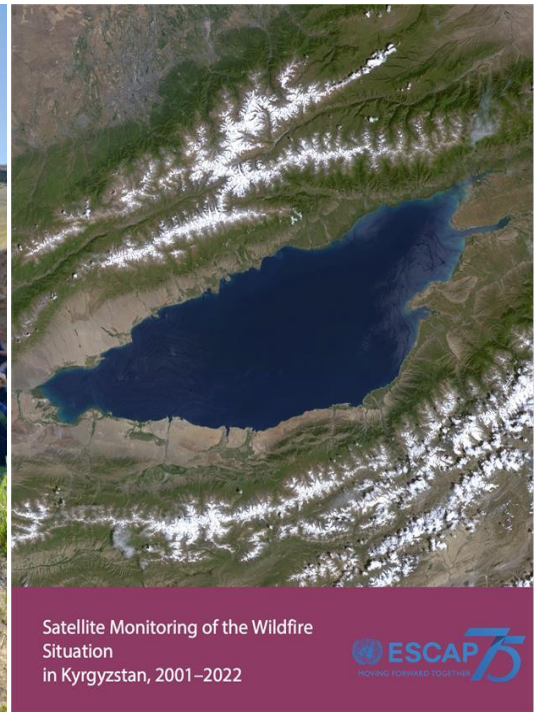
**Partnership**

# 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.

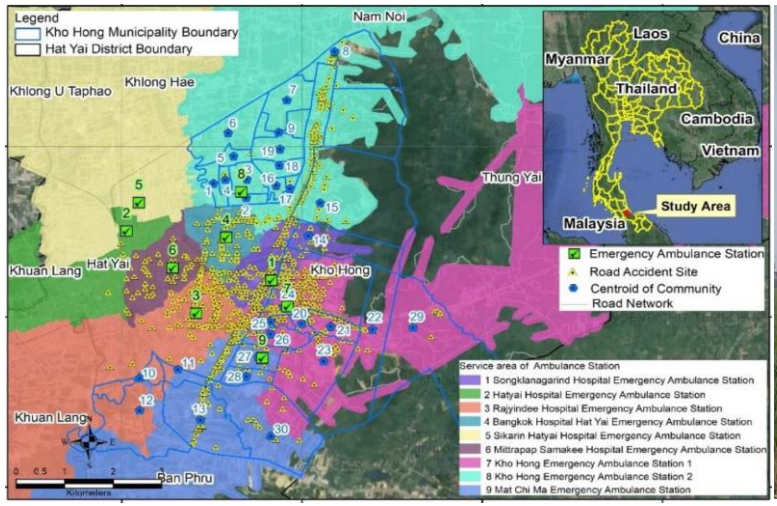



# Building institutional capacity for the use of integrated spatio-temporal data in local SDGs monitoring and decision-making

**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




**Partnership**

BRIN
BADAN RISET
DAN INOVASI NASIONAL

GISTDA

PSU
PRINCE OF
SONGKLA
UNIVERSITY

UN-GGIM-AP
REGIONAL COMMITTEE OF
UNITED NATIONS
GLOBAL GEOSPATIAL
INFORMATION MANAGEMENT
FOR ASIA & THE PACIFIC

Hunan University of Science and Technology

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

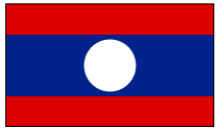
**Objective** To enhance the capacity of government agencies in target countries to strengthen national level air pollution monitoring and management.

**Outcome** 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**

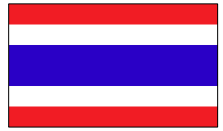

Cambodia
**MoE**


Indonesia
**BRIN**

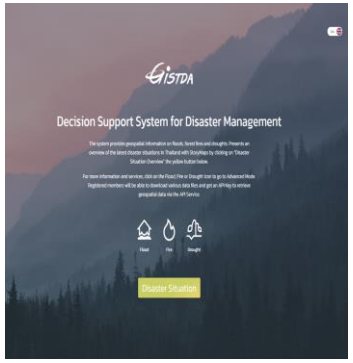

Lao PDR
**MONRE**

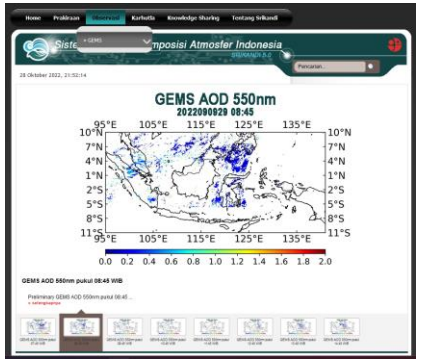

Mongolia
**IRIMHE**


Philippines
**PhilSA**


Thailand
**GISTDA**


Viet Nam
**MONRE**




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

# Collaborations

- Timely provision of 55GB satellite imagery for flood in Bangladesh with the support of RESAP members and UNOSAT
- Inspiring young professionals and researchers in the innovative use of geospatial information for disaster resilience, smart city, and sustainable ecosystem through organizing Youth Forum with MGA, HKU and CUHK
- Encouraging ESCAP members to sponsor the Junior Professional Officers (JPO) to enhance the development and capacity development work
- Supporting six young professional officials from developing countries to attend the post-graduate courses on remote sensing and GIS at CSSTEAP
- Providing opportunities for young students from ESCAP members to work with the space applications team.

# 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

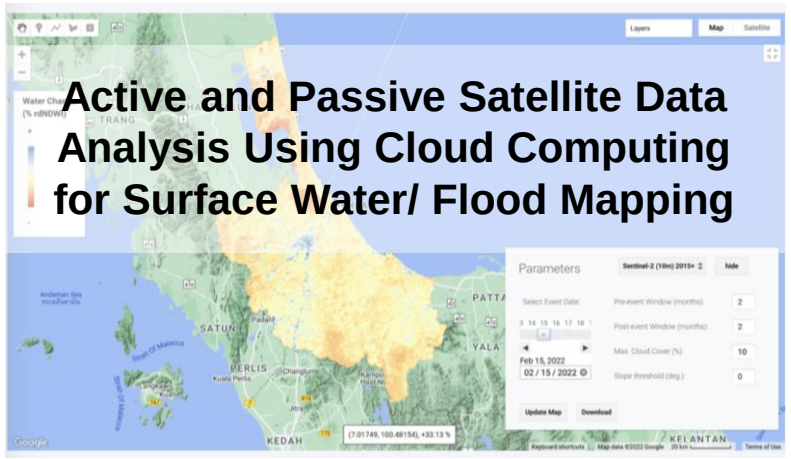
Wildfire Hotspot Mapping

**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]




**1205** Total number of participants

Completion rate **23%**

**7** Participants from Cambodia



**513** Total number of participants

Completion rate **19%**

**3** Participants from Cambodia



**New Course Launch:**

**Course Start:**
**01 August 2023**

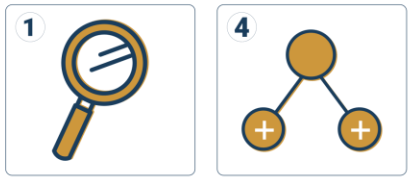
Spatiotemporal Drought Assessment by Leveraging Google Earth Engine Platform (Russian)

*Reporting date: 21 Apr 2023/Course launch date: 28 Dec 2022 *Participants are from universities, research institutes, and government agencies.

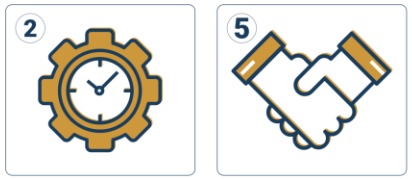
# VSC (Virtual Satellite Constellation) for Disaster Risk Management

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

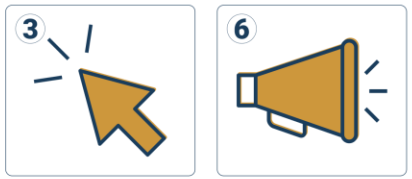
**1** **Set up an informal working group** to work out the operational details and conduct a study to map free and commercial remote sensing data providers and share the catalogue with all member States.




**2** **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.




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




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




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




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




**7** **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**

**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

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

**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.

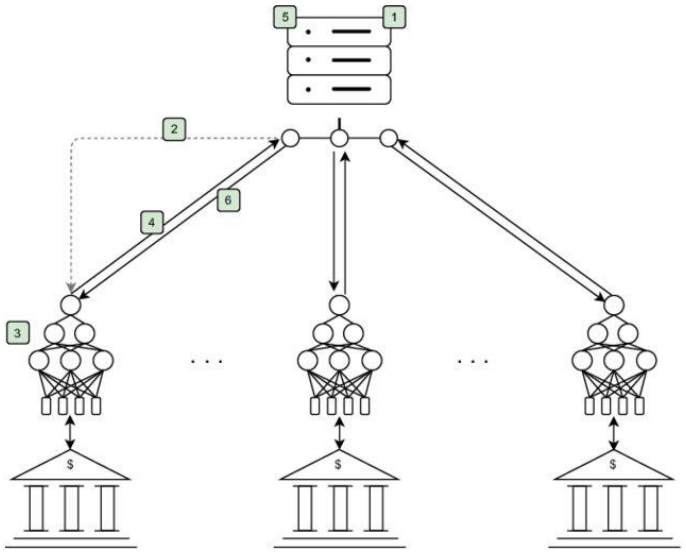
**Extract features**
LLMs will be used to extract features from remote sensing data, such as the location of a disaster, the severity of the damage, and the risk of future disasters.

# Federated Learning (FL)

To develop a decentralized collaborative platform for sharing geospatial information and capacity building.

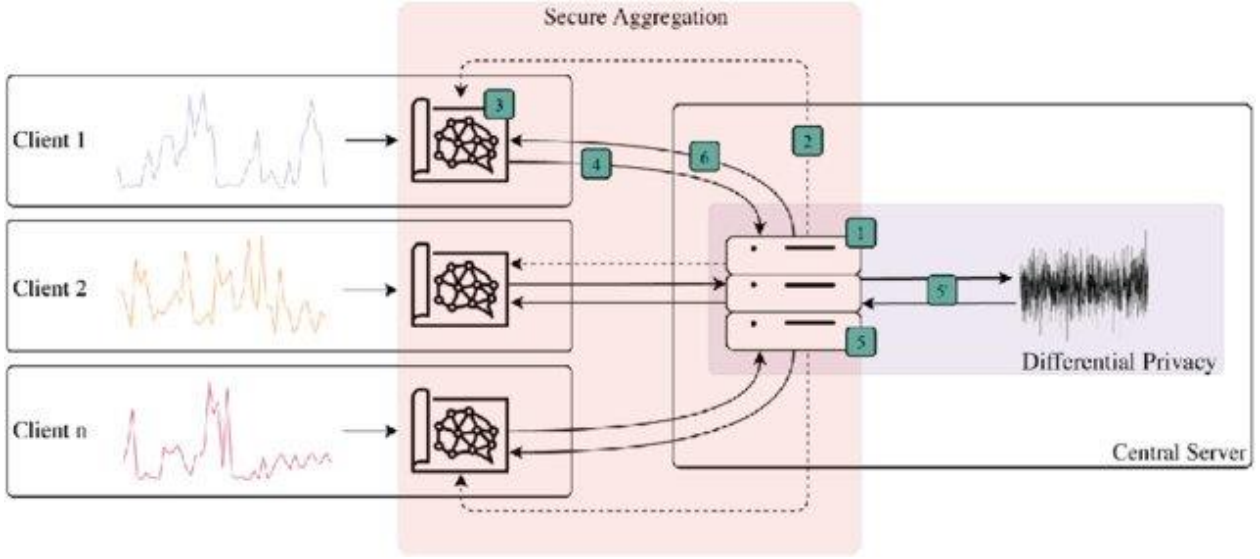
Application of innovative technologies:

**Diagram of the network communication scheme of FL**



*Source: Lee et al., 2023*

**Implementation of FL with privacy-preserving techniques**




*Source: Delgado Fernandez et al., 2022*

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