BRIN
BADAN RISET
DAN INOVASI NASIONAL

29th sessions of the Intergovernmental Consultative Committee on the Regional Space Applications Programme for Sustainable Development (ICC-29)

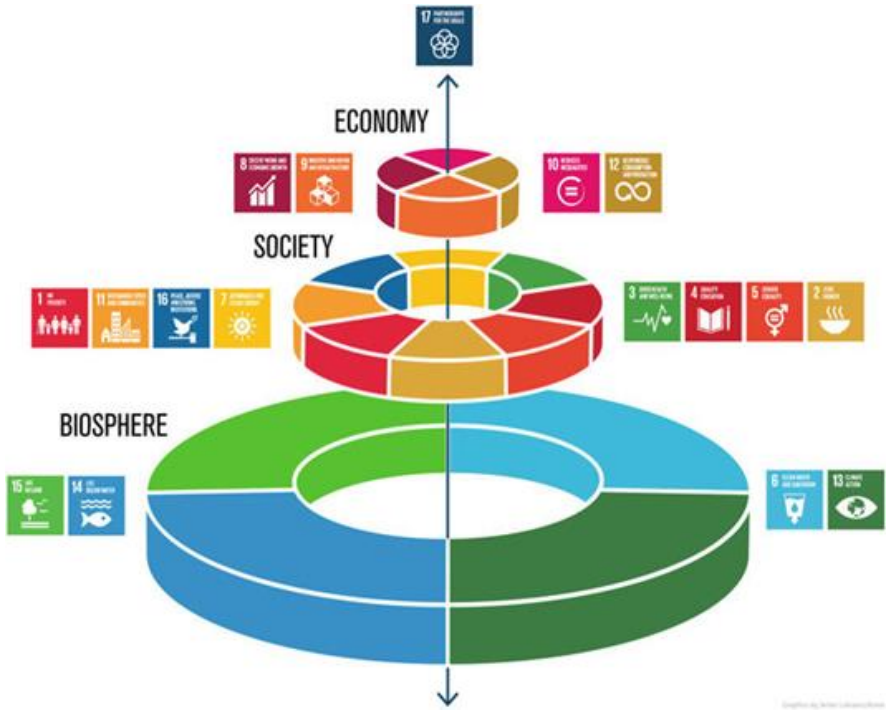
Seoul, 2 to 4 September 2025

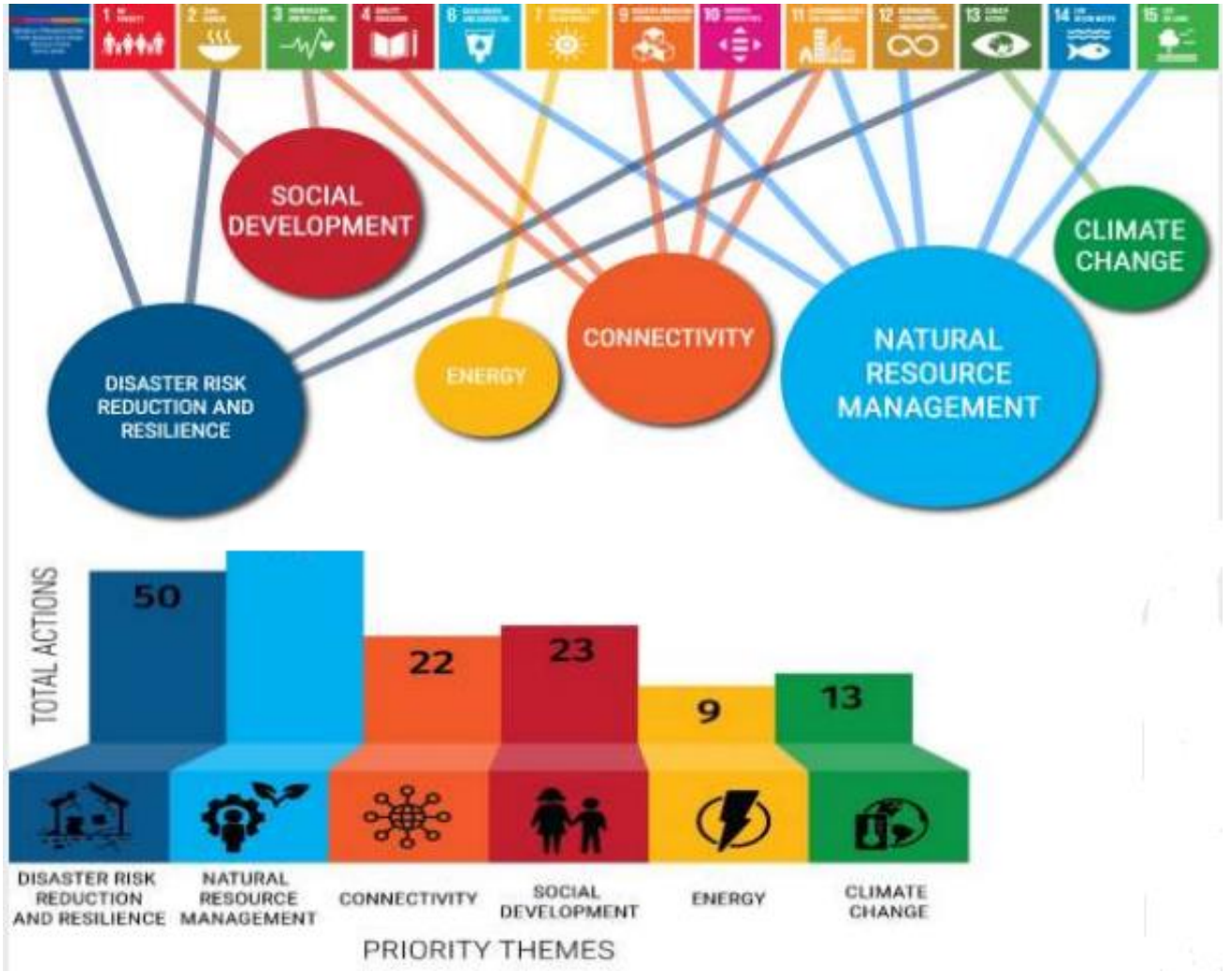
ESCAP
Economic and Social Commission for Asia and the Pacific

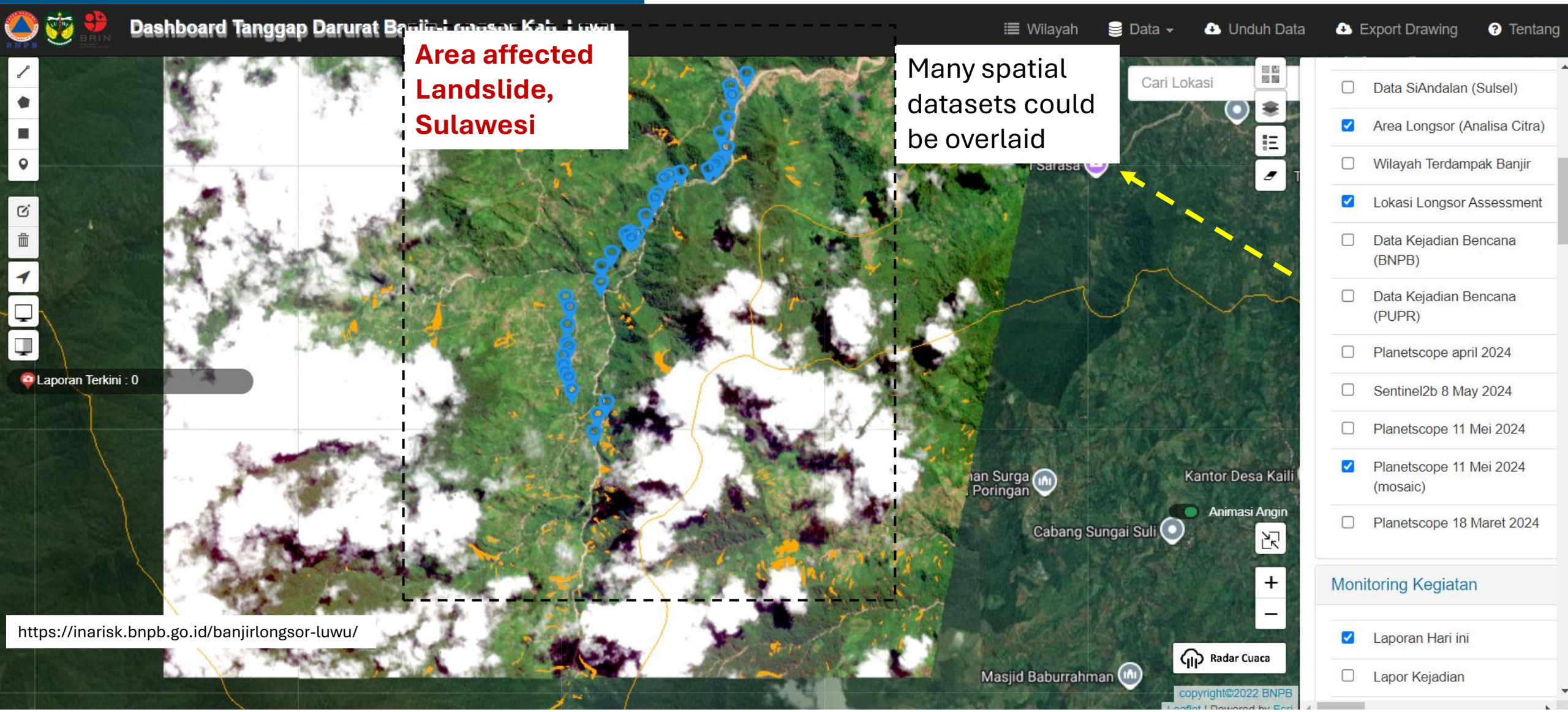
Indonesia's Progress in Implementing the Asia-Pacific Plan of Action on Space Applications for Sustainable Development (2018-2030)

Erna Sri Adiningsih
Indonesian Space Agency (INASA)
National Research and Innovation Agency (BRIN)
E-mail: space@brin.go.id; rrer001@brin.go.id

Priority Themes of Space Technology Contributions on SDGs

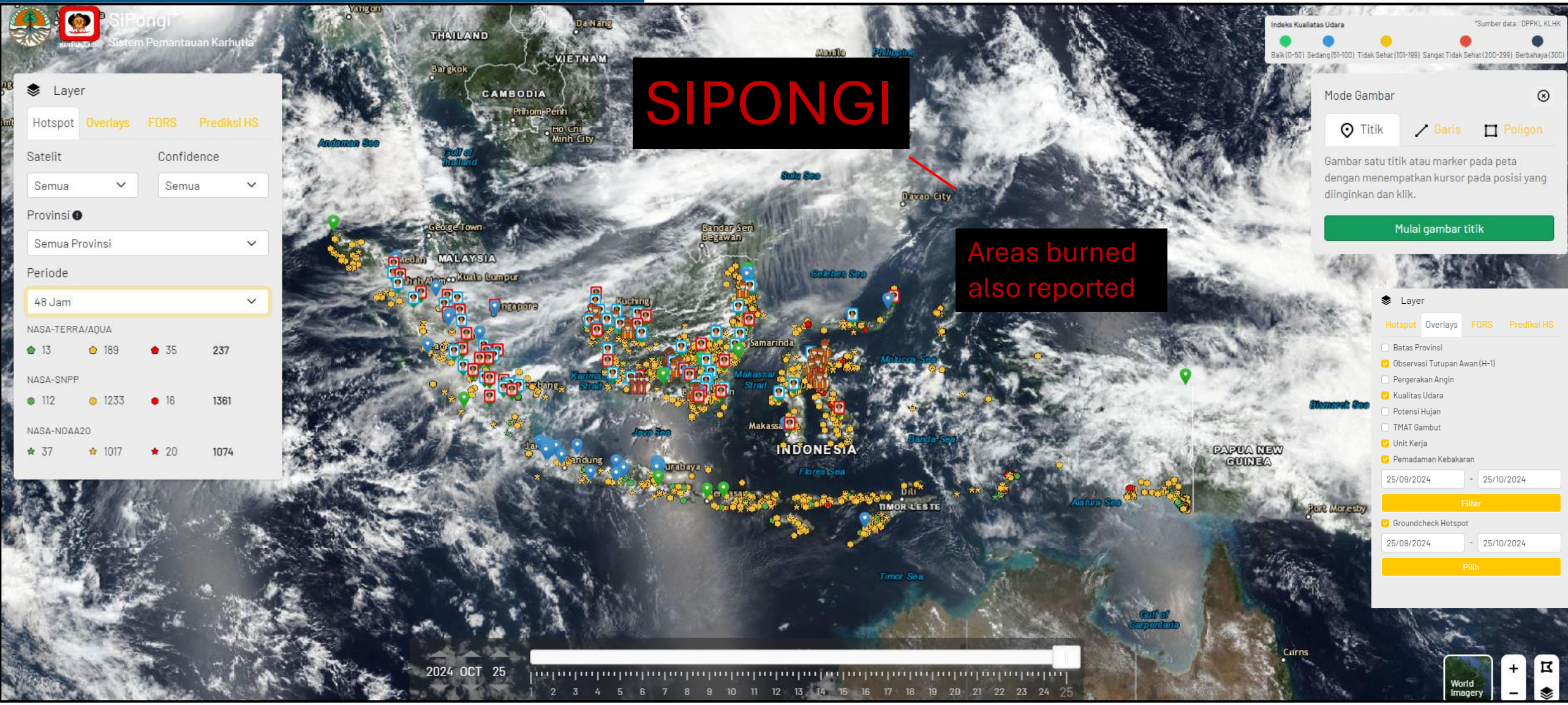






InaRISK: A risk assessment portal utilizing GIS Server as a data service (National Disaster Management Authority)

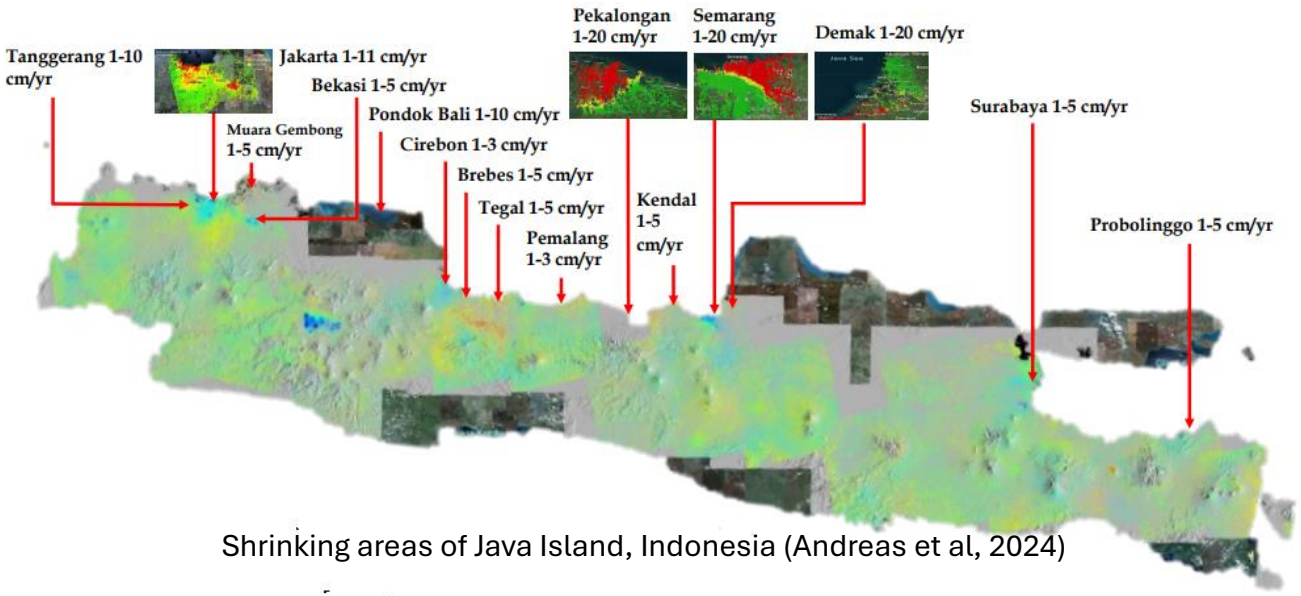
DISASTER RISK REDUCTION AND RESILIENCE



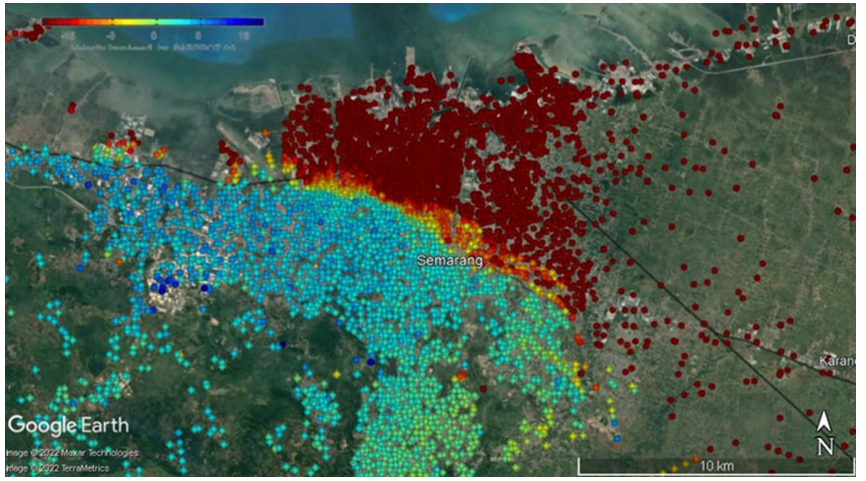
- A system developed by the Ministry of Environment and Forestry of Indonesia to monitor forest and land fires across the country providing information on hotspots detected by satellites, fire incidents, affected areas, and fire control efforts.

Land Subsidence Monitoring in Indonesia Using Remote Sensing Application

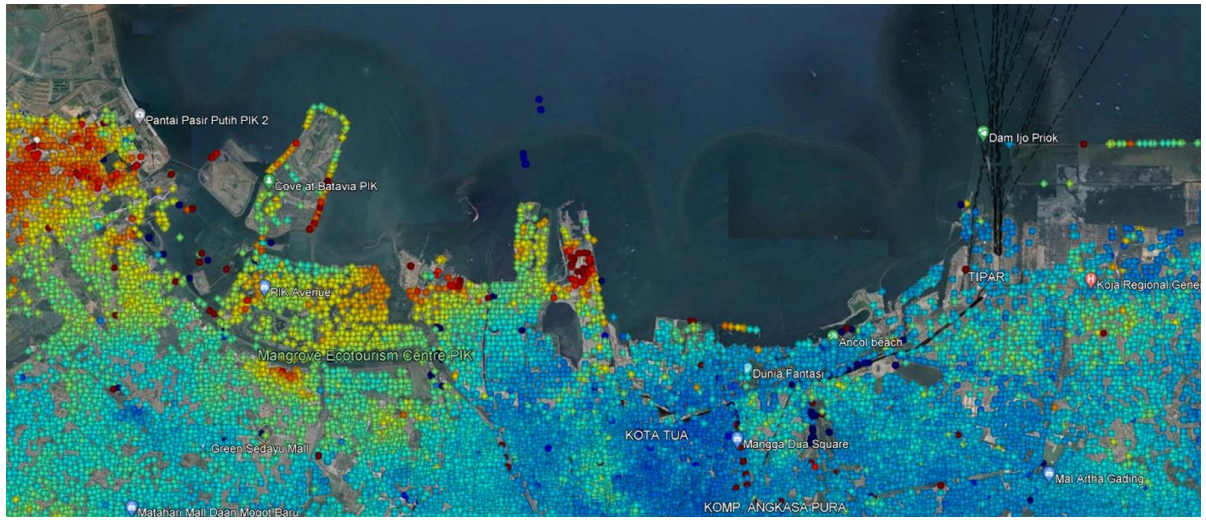
Collaboration: BRIN, Ministry Coordinator of Maritime, JAXA, Japan



Shrinking areas of Java Island, Indonesia (Andreas et al, 2024)



Shrinking areas of Semarang and Demak based on PS-InSAR analysis using ALOS-2 PALSA-2 Data by JAXA, Japan is shown in red & yellow color (Widodo, 2024)



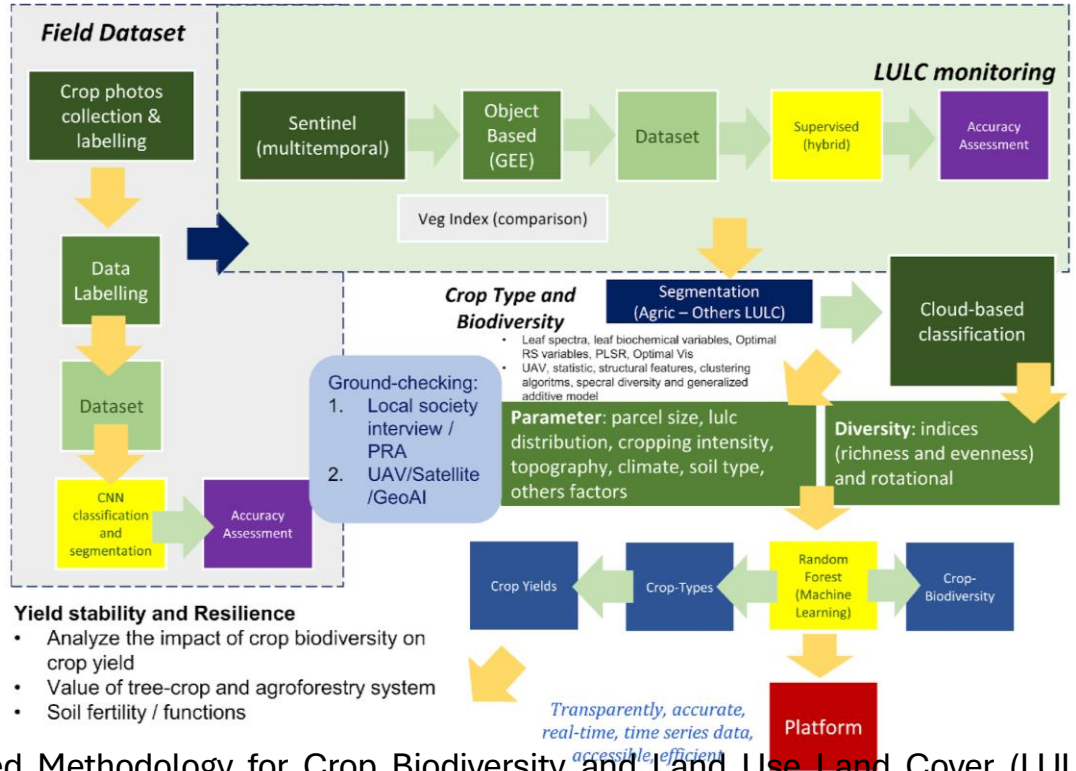
Shrinking areas of Jakarta are shown in red & yellow color (Widodo, 2024)



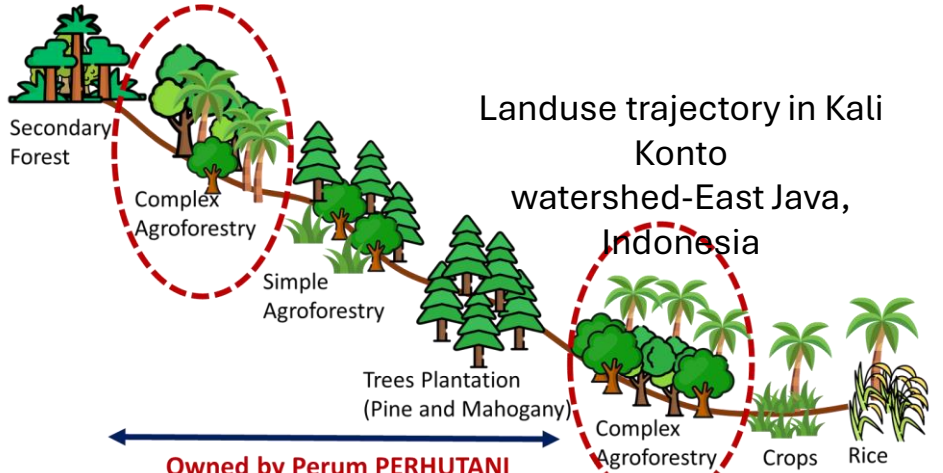
Muara Baru Jakarta 2.4 meters under the sea level (Widodo, 2024)

PROMOTING CROP BIODIVERSITY THROUGH INNOVATIVE SPACE APPLICATIONS (CROP-BIO PROJECT)

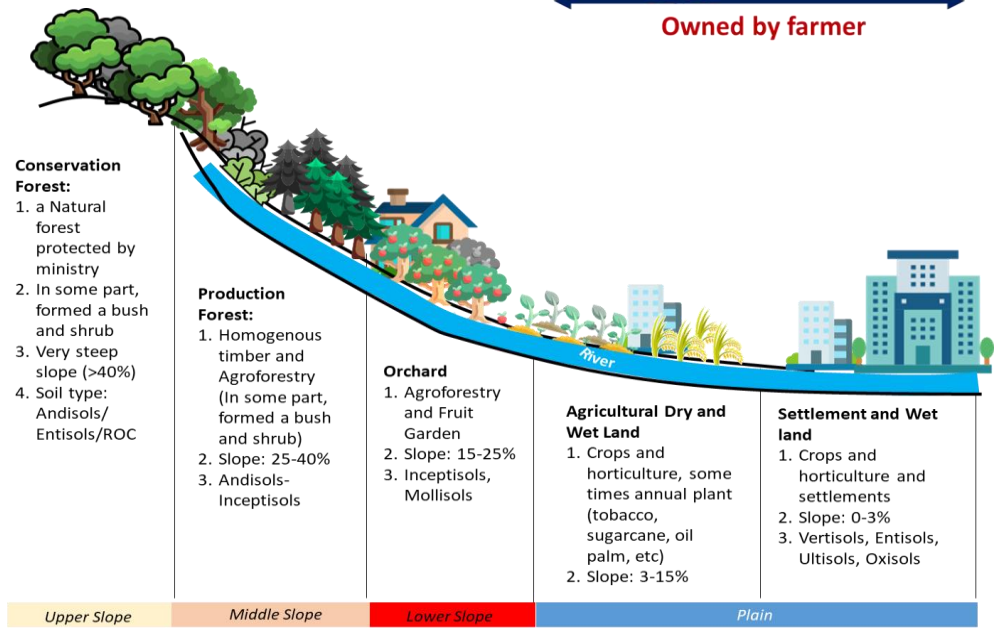
This project aims to promote crop diversity in selected South-East Asia countries through innovative space applications. To achieve this objective, it will enhance the availability and accessibility of data on crop biodiversity in selected subnational locations in Indonesia, Malaysia, and Philippine by building geospatial crop databases and conducting a crop diversity assessment that could become a model for conducting future assessments in other locations. This project was initiated by ESCAP and AIRCAS in line with the Asia-Pacific Plan of Action on Space Applications for Sustainable Development (2018-2030).



Integrated Methodology for Crop Biodiversity and Land Use Land Cover (LULC) Assessment Using Field Data, Remote Sensing, and Machine Learning



Landuse trajectory in Kali Konto watershed-East Java, Indonesia



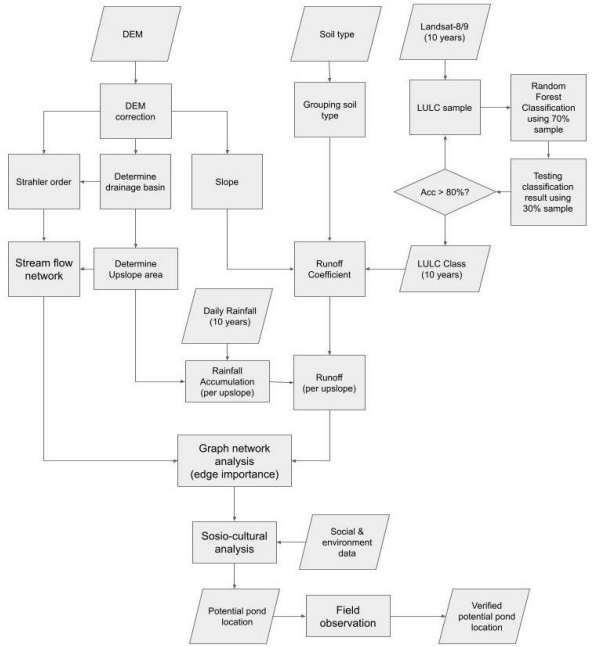
Basic Characteristic of Land Use in Indonesia

DEVELOPMENT OF POTENTIAL POND RETENTION LOCATION METHODS IN THE CIMANUK-CISANGGARUNG RIVER BASIN OF WEST JAVA PROVINCE USING BIG DATA AND ARTIFICIAL INTELLIGENCE

Objectives

- To develop data-driven approaches for identifying strategic water infrastructure solutions.
- To strengthen flood mitigation and climate resilience through improved water resource management.
- To contribute to the achievement of Sustainable Development Goal 6 by promoting sustainable and equitable water access.
- To integrate Big Data and Artificial Intelligence into environmental and disaster-related decision-making processes.
- To support the long-term environmental and economic sustainability of communities in the Cimanuk-Cisanggarung Basin.

I



- DEM-based hydrological analysis
- Land use/land cover classification
- Runoff estimation
- Graph-based hydrological network analysis and socio-environmental integration
- Field observation and final selection

Model validation

Model's results



Field's conditions







ESCAP
Economic and Social Commission for Asia and the Pacific

Oceans for Prosperity (LAUTRA)

The Oceans for Prosperity Project (or *Laut untuk Kesejahteraan*/LAUTRA) seeks to enhance the sustainable management of marine protected areas and coral reef fisheries while improving access to economic opportunities for local communities in Eastern Indonesia. The project is implemented by Ministry of Marine Affairs and Fisheries (MMAF) and Ministry of National Development Planning (BAPPENAS) with funding support from the World Bank (US$200 million), PROBLUE (US$5 million), and the Government of Canada (US$7.3 million) through the Indonesia Oceans, Marine Debris and Coastal Resources Multi-Donor Trust Fund.

The project will:

Finance	Work in	Located in
4 components	**20** MPAs and 75 surrounding villages	**11** Provinces in Eastern Indonesia

Component 1

Infrastructure and Institutional Strengthening for Sustainable Marine Protected Areas Management – led by MMAF.

Component 1 will strengthen ecosystem-based and participative management of about 20 MPAs **(encompassing 8.3 million ha)** and selected coral reef-associated fisheries within three target Fisheries Management Areas (WPP).

Component 2

Expanding Economic Opportunities in and around Marine Protected Areas – led by MMAF.

Component 2 will enhance the values and benefits that local communities capture from marine resources in and around MPAs by taking a multipronged approach to improving access to economic opportunities, especially in the tourism, fishery, and aquaculture sectors.

Component 4

Project Management



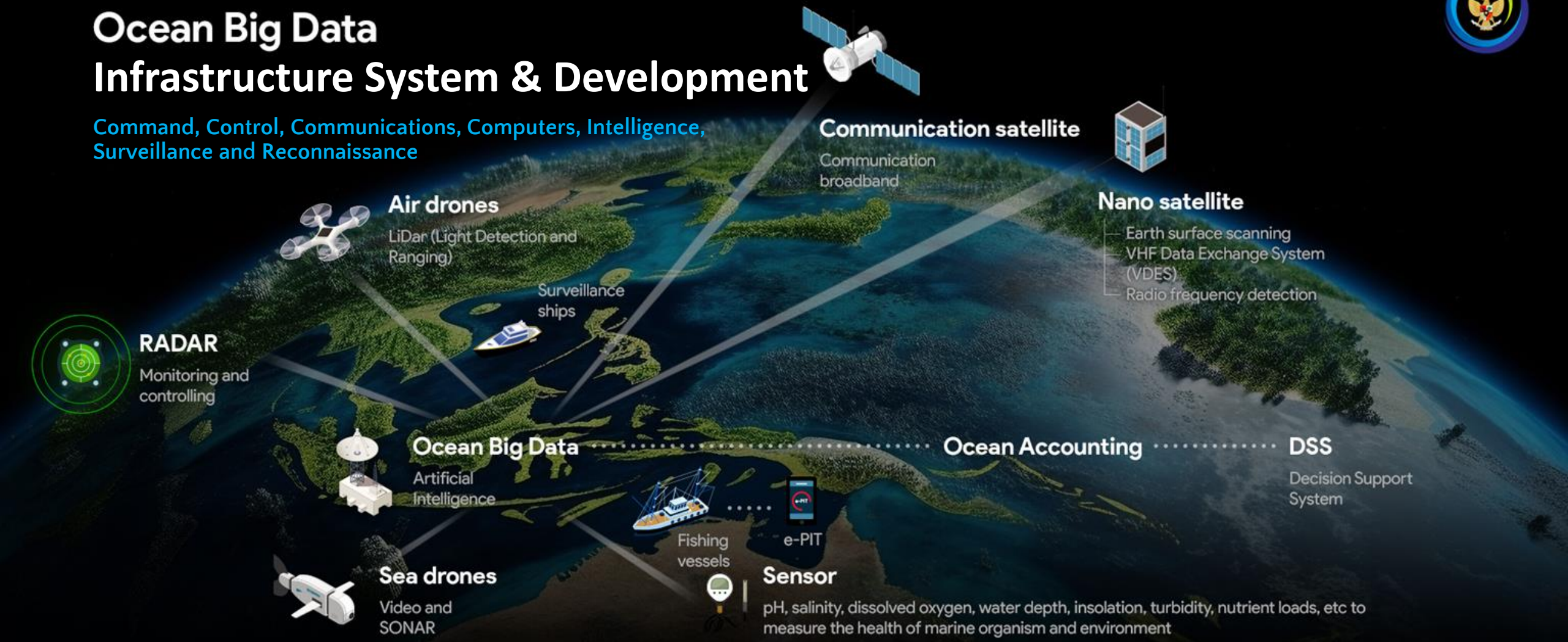
Component 3

Sustainable Financing for Marine Protected Areas and Livelihoods – led by BAPPENAS through Indonesia Climate Change Trust Fund (ICCTF) in collaboration with MMAF.

Component 3 will improve the government's policy framework and capacity to mobilize long-term blue financing for: (a) MPAs operating and capital investments; (b) developing coastal infrastructure with biodiversity-positive impacts; and (c) enhancing MSME access to finance.

Ocean Big Data
Infrastructure System & Development

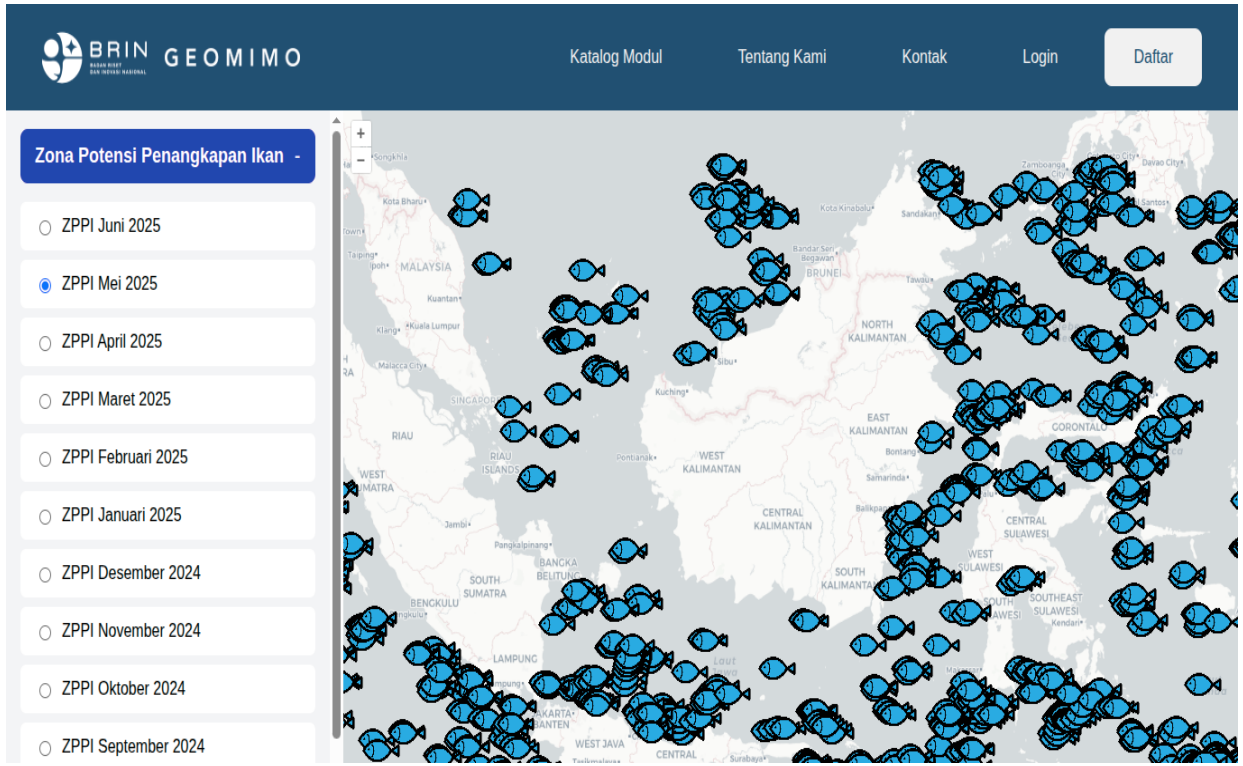
Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance

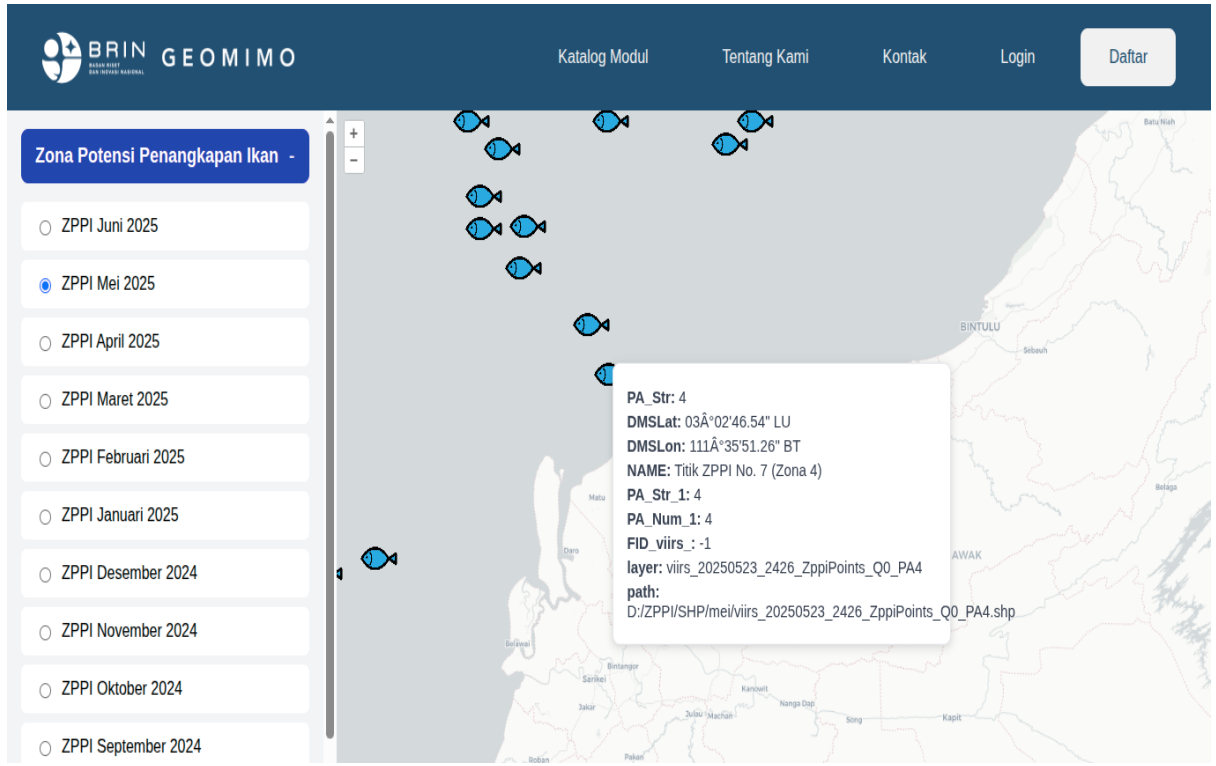


- Monitoring and expanding the conservation areas
- Marine and Fisheries Resources Management (PIT)
- Monitoring the Sustainable Aquaculture System
- Monitoring the marine, coastal and small island ecosystems (real-time data)
- Marine and Fisheries Resources Database for identifying fish and coral reef species in Indonesian ocean

GEOMIMO – Geoinformatics Multi-Input and Multi-Output Potential Fishing Zone

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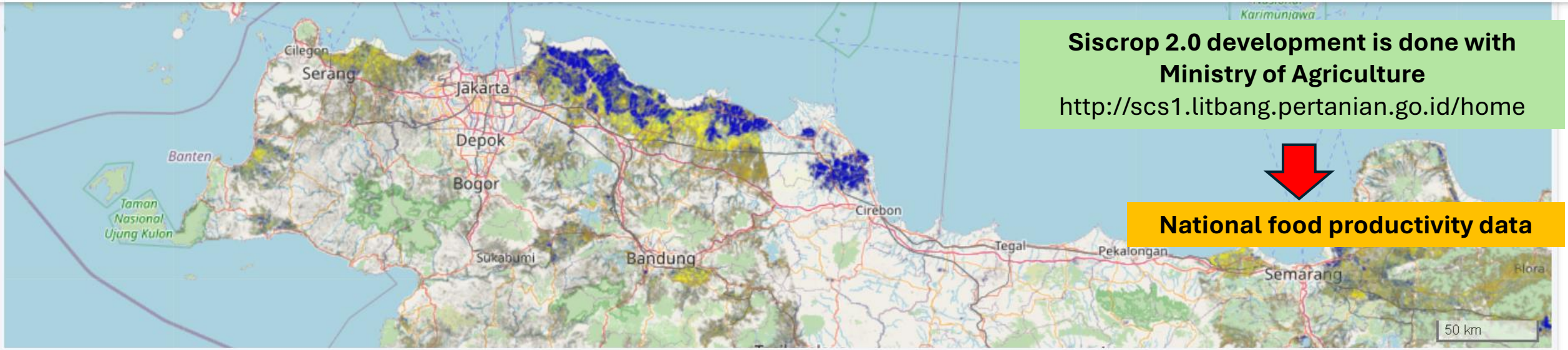




SISCrop Paddy growth monitoring

INDONESIA

SISCrop 2.0
2025-08-31



Siscrop 2.0 development is done with Ministry of Agriculture
http://scs1.litbang.pertanian.go.id/home

National food productivity data

Level Propinsi Tema Standing Crop

- Fase pengairan
- Fase vegetatif 1 (<41 HST)
- Fase vegetatif 2 (41-64 HST)
- Fase generatif 1 (65-95 HST)
- Fase generatif 2 (96-112/120 HST)
- Fase bera

PETA INTERAKTIF STANDING CROP PROVITAS PUPUK

BAPPENAS BADAN PUSAT STATISTIK BRIN BADAN RISET DAN INOVASI NASIONAL



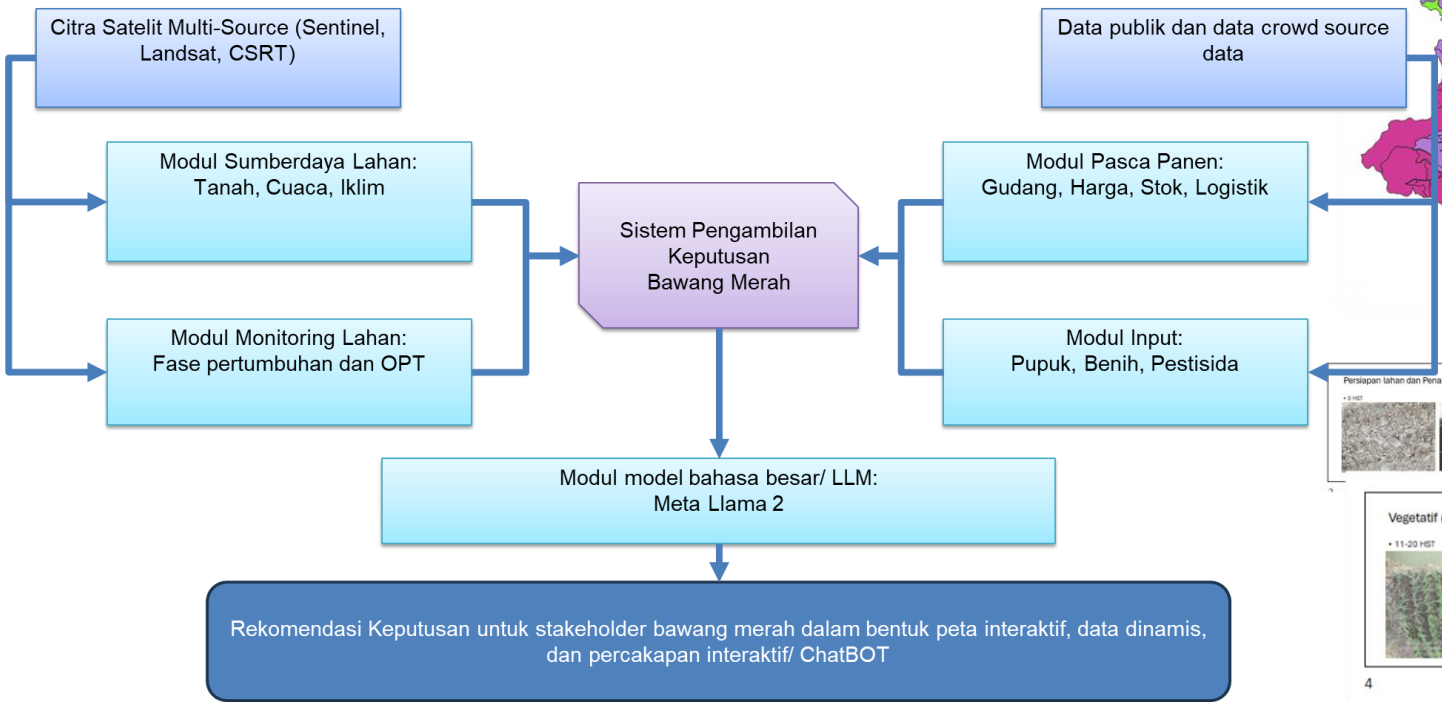


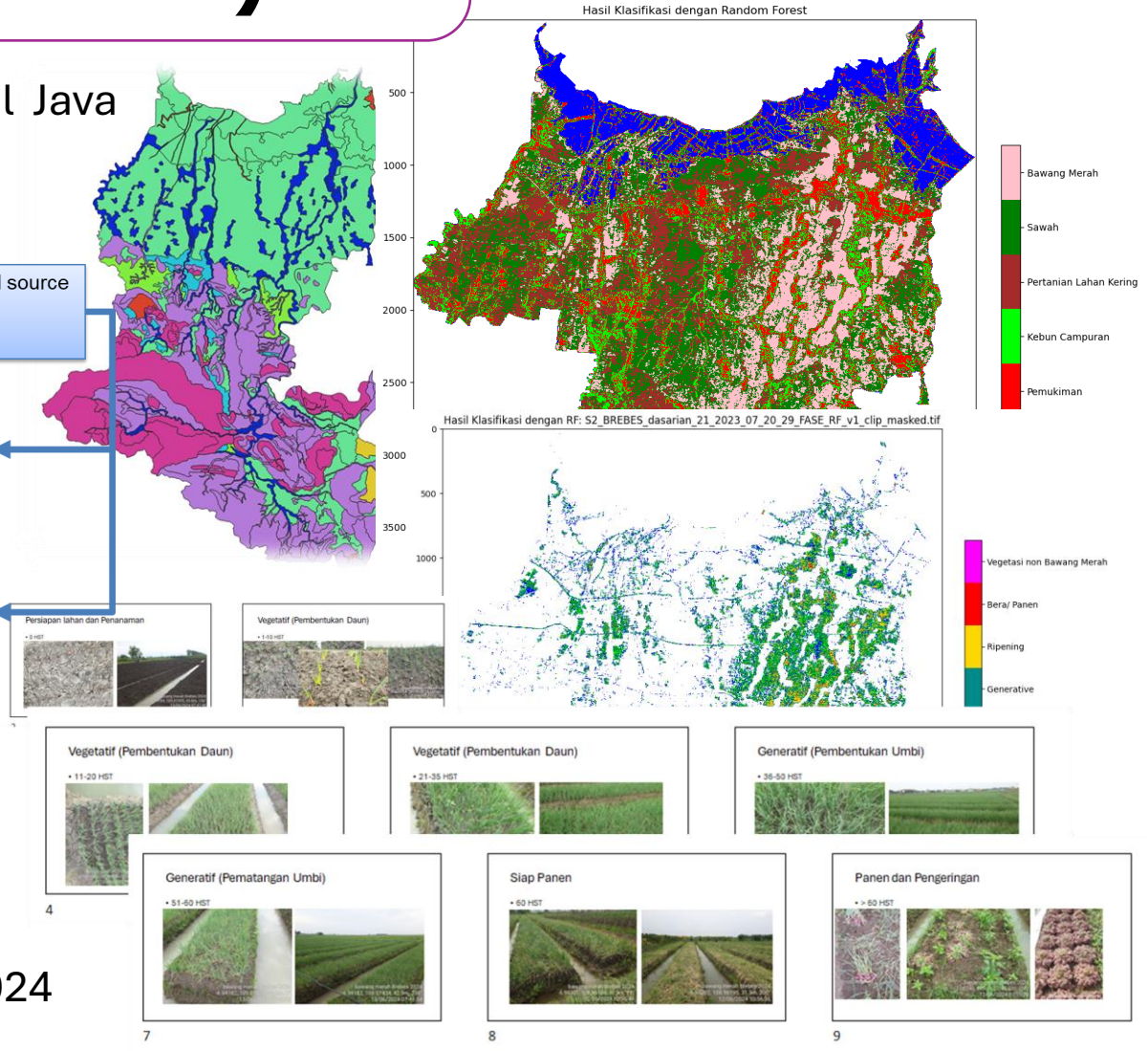
Integrated Shallot Commodity Decision Making System Based on Geospatial Technology, Satellite Imagery, and Artificial Intelligence

(Integrated-Smart Shallot DSS)

Partner : District of Agriculture Service Brebes Regency, Central Java

Collaborator : BRIN and Gunadarma, University





Source: Ramadhani et al. 2024

SOCIAL DEVELOPMENT

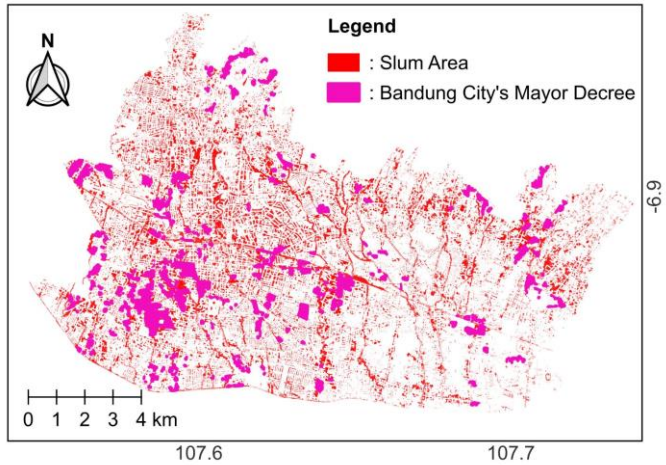
11 SUSTAINABLE CITIES AND COMMUNITIES

DEVELOPMENT OF A WEB-BASED OPERATIONAL PLATFORM TO MAP SLUMS IN BANDUNG CITY, WEST JAVA PROVINCE AND MAKASSAR CITY, SOUTH SULAWESI PROVINCE – INDONESIA

(Oct 2022 – Oct 2024)

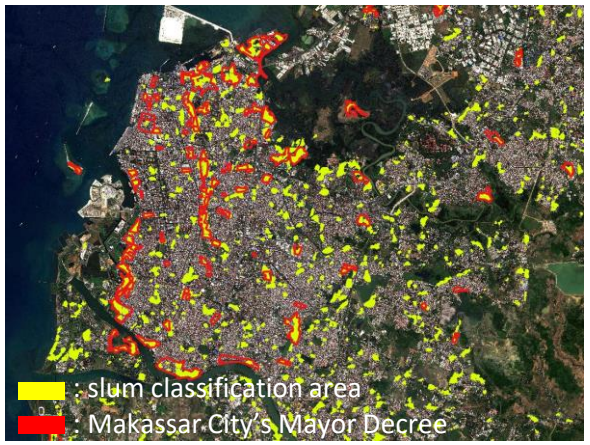
Slum classification

Bandung City



Machine learning-based Random Forest algorithm and local knowledge

Makassar City



Machine learning-based Convolutional Neural Network (CNN) model

Operational platforms

Bandung City

Platform for running model

Google Earth Engine

Operational display

dispérkin

Department of Housing and Settlements of West Java Province

Makassar City

Platform for running model

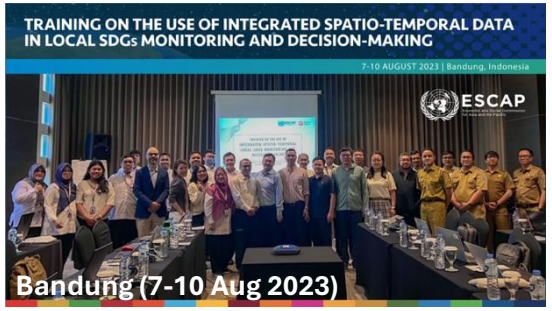
U-Net

Operational display

BAPPEDA KOTA MAKASSAR

Regional Development Planning Agency of Makassar City

Capacity building activities



Bandung (7-10 Aug 2023)







Bandung (7-11 Nov 2023)



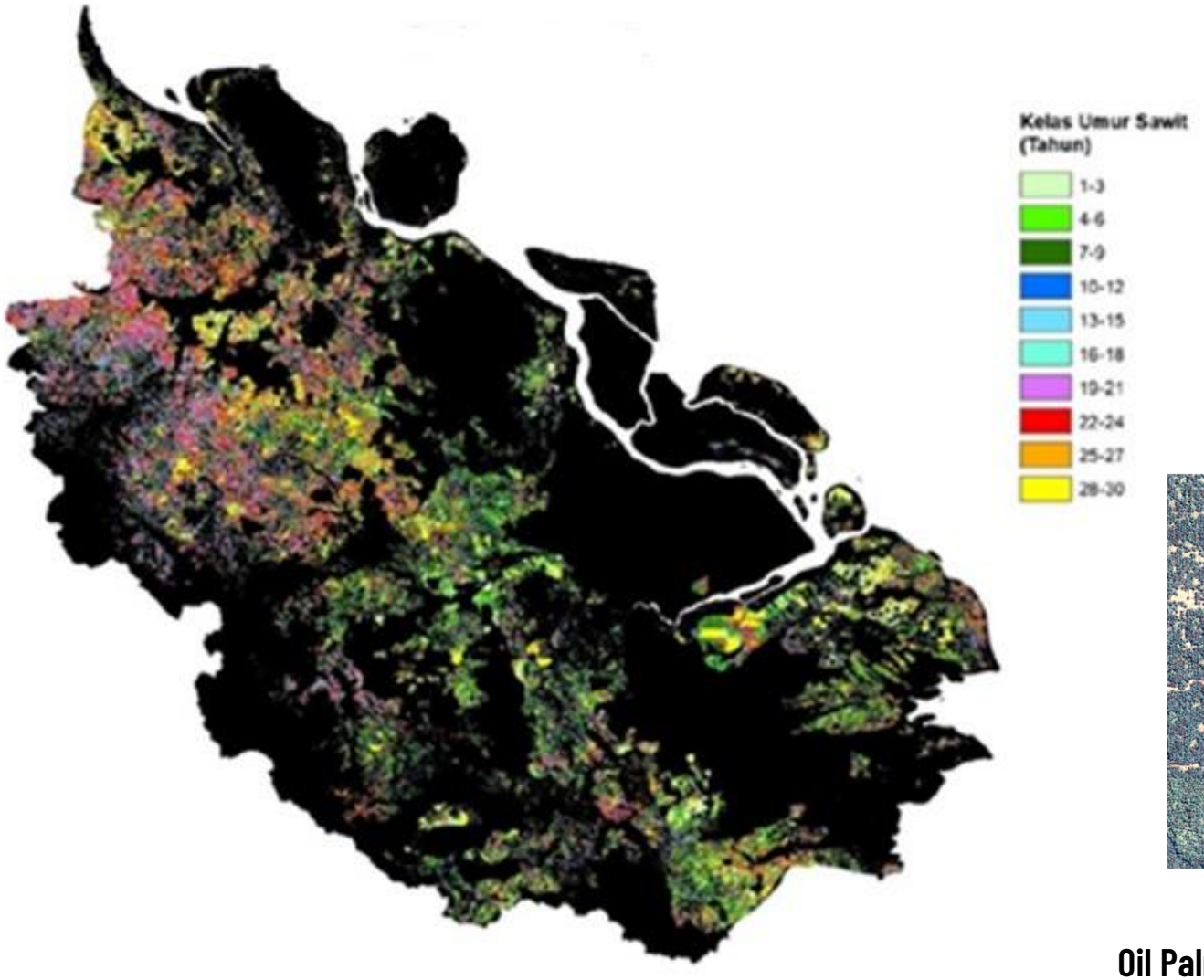


Makassar (2-6 Sep 2024)



ENERGY

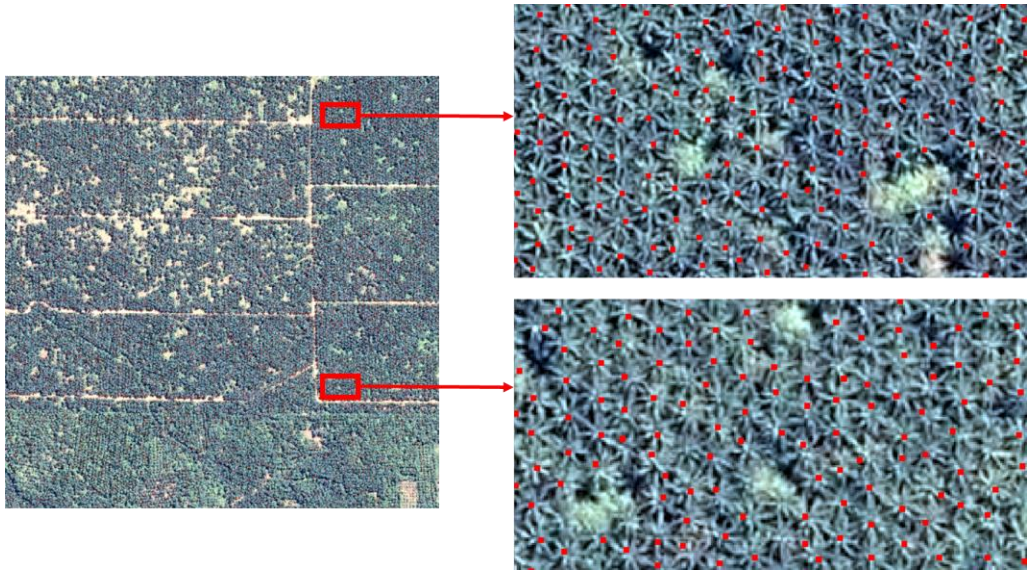
PALM OIL TREE AGE MAPPING TO SUPPORT BIOENERGY PROGRAM



The input data:
SPOT 6/7 satellite imagery.

The key benefits :
Providing detailed information on the age of palm oil trees, which can be used to estimate production levels, assess tax potential, and aid in the planning of plantation rejuvenation efforts

User: Ministry of Agriculture, Ministry of Energy and Mineral Resources

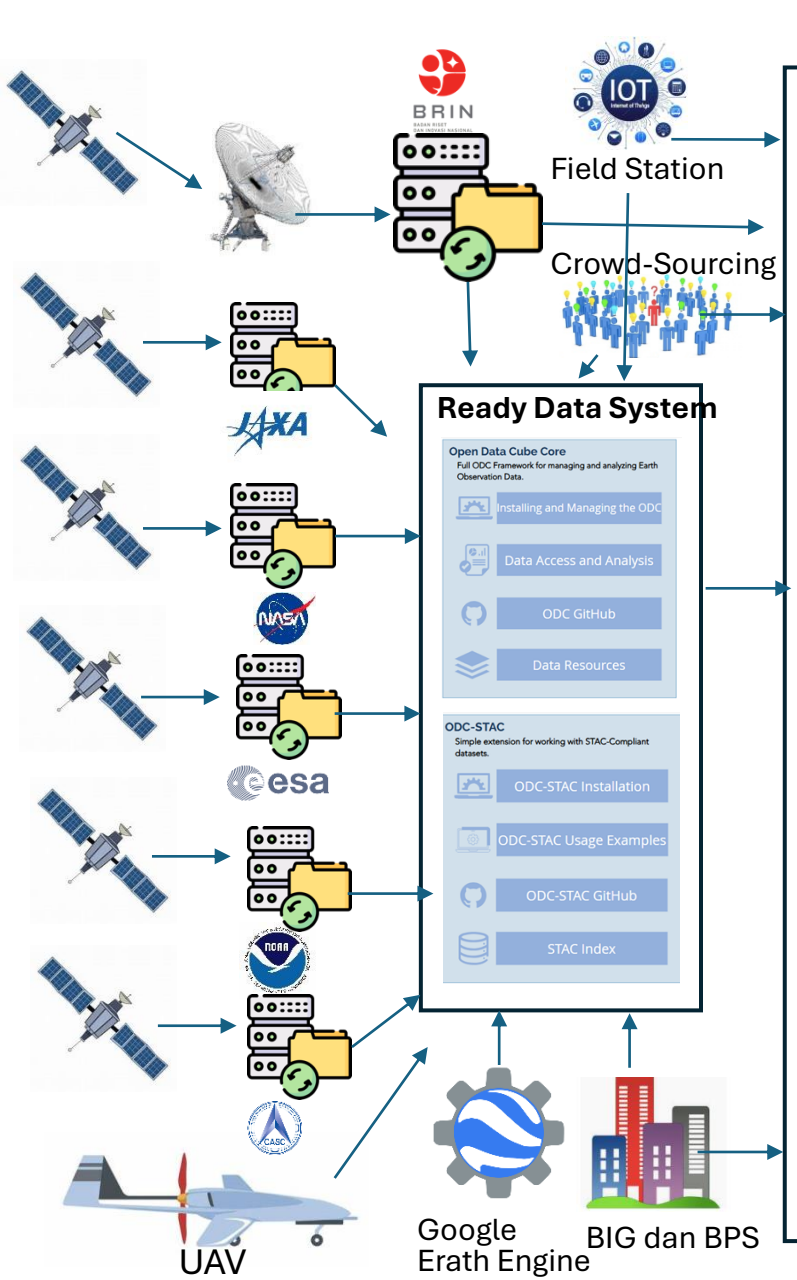


Oil Palm Tree Detection and Counting using Convolution Neural Network

CONNECTIVITY

GEOMIMO = GEOINFORMATICS MULTI-INPUT MULTI-OUTPUT INDONESIA

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Ready Data System

Open Data Cube Core
Full ODC Framework for managing and analyzing Earth Observation Data.
- Installing and Managing the ODC
- Data Access and Analysis
- ODC GitHub
- Data Resources

ODC-STAC
Simple extension for working with STAC-Compliant datasets.
- ODC-STAC Installation
- ODC-STAC Usage Examples
- ODC-STAC GitHub
- STAC Index

BRIN ENGINE



Sistem Otomatisasi

Modul/Algorithm Library

I. Modul Ketahanan Pangan
- Modul1
- Modul2
- Modul3
- dst

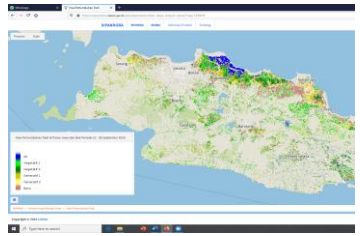
II. Lingkungan dan Kebencanaan
- Modul1
- Modul2
- Modul3
- dst

III. Emisi Gas Rumak Kaca
- Modul1
- Modul2
- Modul3
- dst

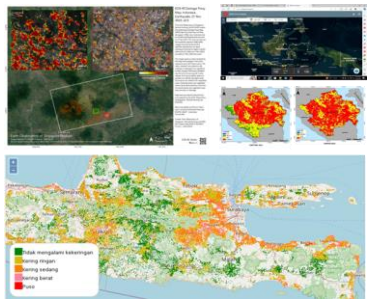
IV. Pertahanan Keamanan
- Modul1
- Modul2
- Modul3
- dst

BRIN PRODUCT

KETAHANAN PANGAN



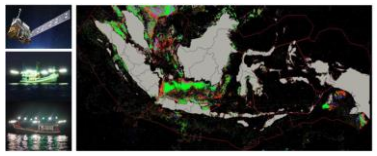
LINGKUNGAN DAN KEBENCANAAN



EMISI GAS RUMAH KACA



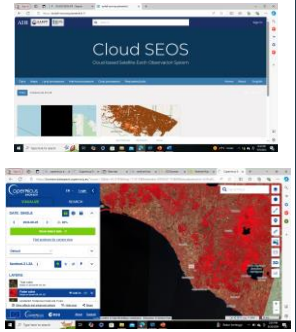
PERTAHANAN DAN KEAMANAN







Geovisualisasi (web, IOS, android based)



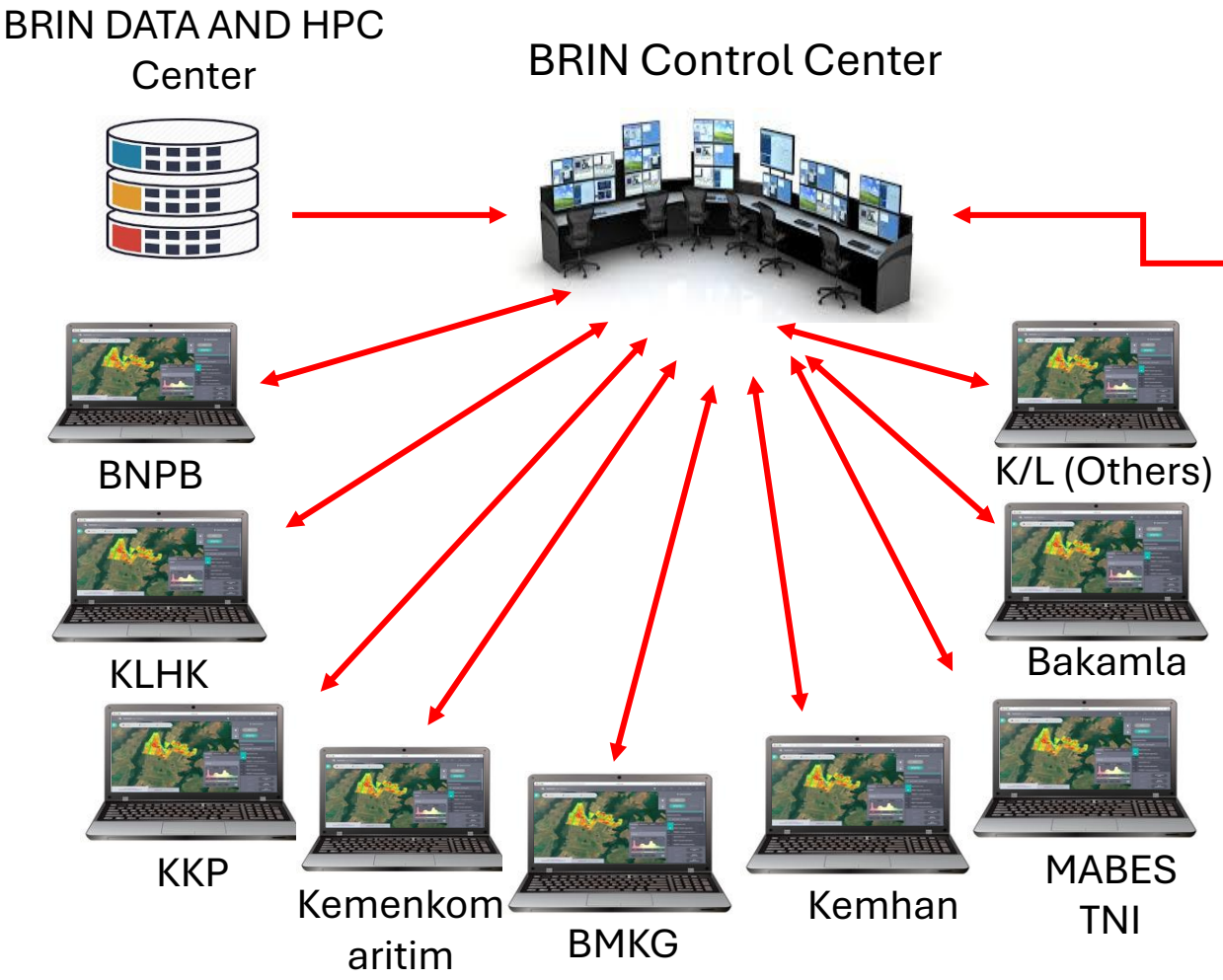
Interactive Mapping

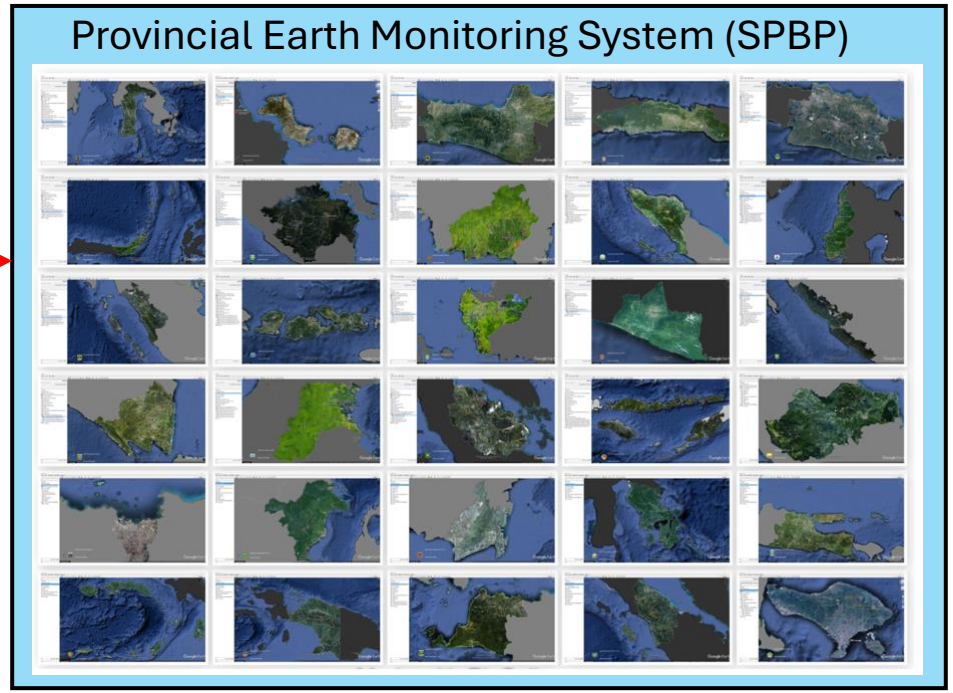
Public Users
(Produk dengan kategori publik)

Dedicated User
(Kementerian/Lembaga/ Daerah dengan Perjanjian Kerjasama)

Private User
(Melalui Perjanjian lisensi)

Dedicated Users





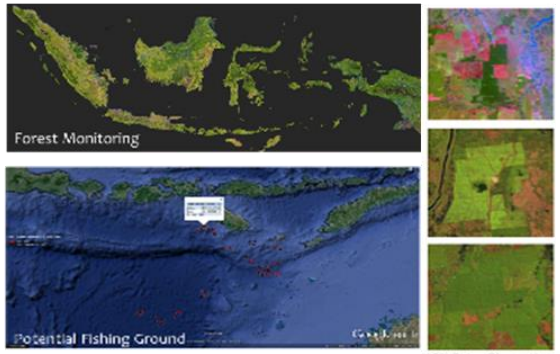
RESEARCH NEEDS

- Analysis Ready Data
- Data Processing (AI, M/D L)
- Spatial Analisis dan Spatial Modelling
- Platform Development

Geoinformatics Applications

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NATURAL RESOURCES



ENVIRONMENT AND DISASTERS

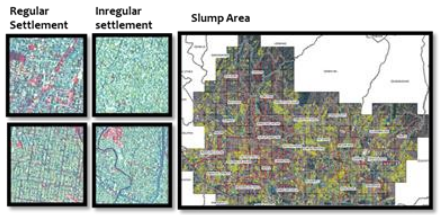


OTHER STRATEGICS

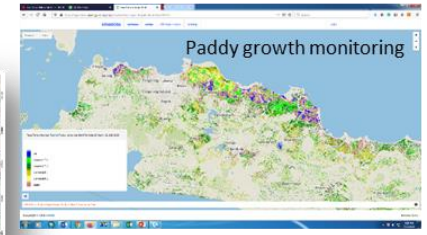


SUSTAINABLE DEVELOPMENT GOALS (SDGS)

SDGs01: No Poverty



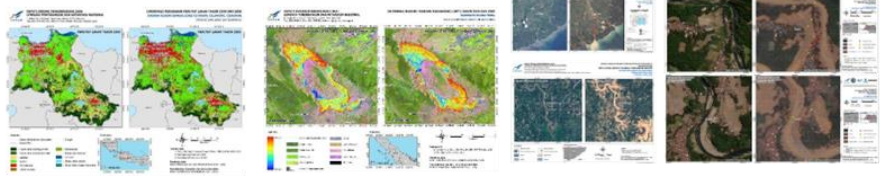
SDGs02: No Hunger



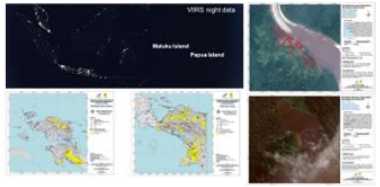
SDGs03: Good Health and Well Being



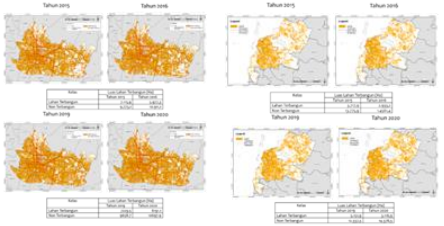
SDGs06: Clean Water and Sanitation



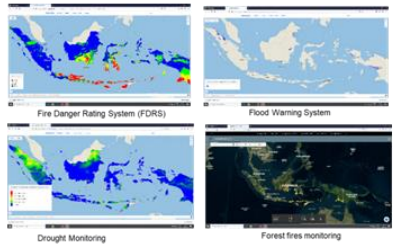
SDGs07: Affordable and Clean Energy



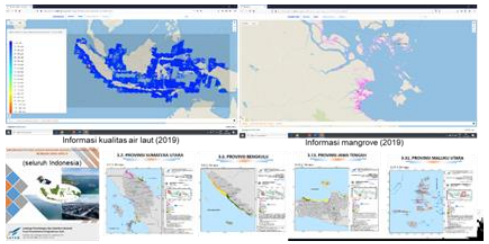
SDGs11: Sustainable Cities and Communities



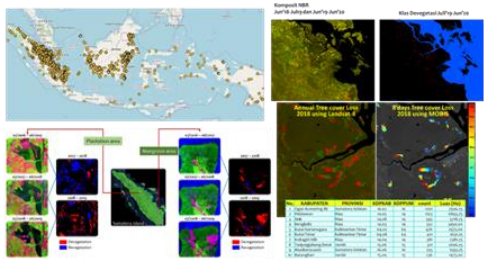
SDGs13: Climate Action



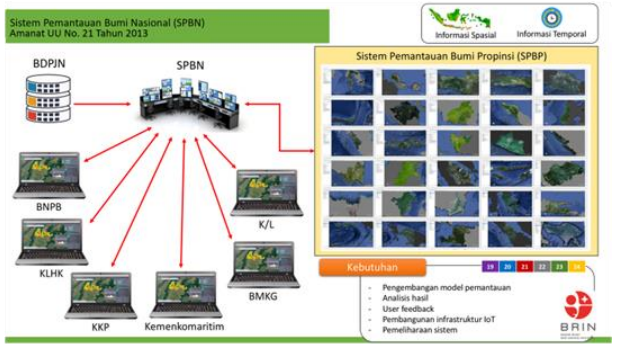
SDGs14: Life Below Water



SDGs15: Life on Land



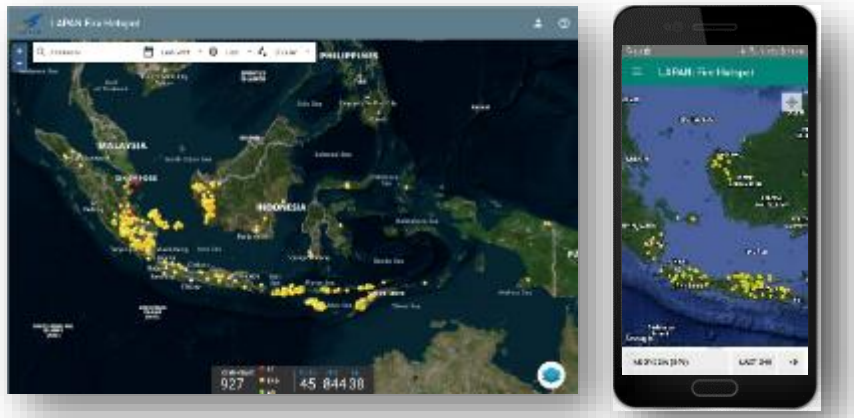
REMOTE SENSING PLATFORM



Examples of Publics Services (forest fires monitoring) https://hotspot.brin.go.id/



BRIN Fire Hotspot
Web/Android/API/FTP



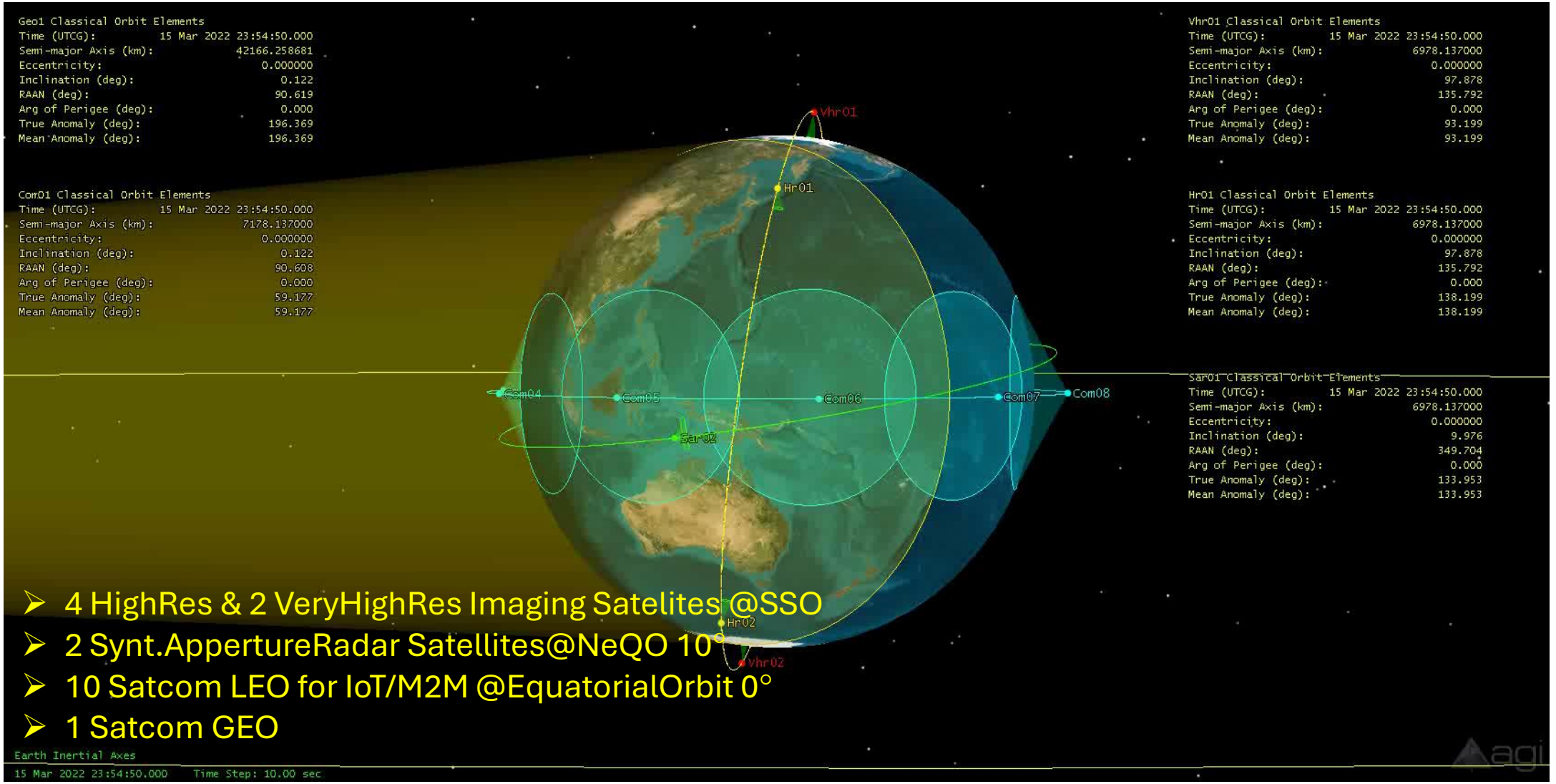


Forest Fres Monitoring
ASAP DIGITAL POLRI

Forest Fres Monitoring
SIPONGI KLHK

Forest Fres Monitoring
BMKG

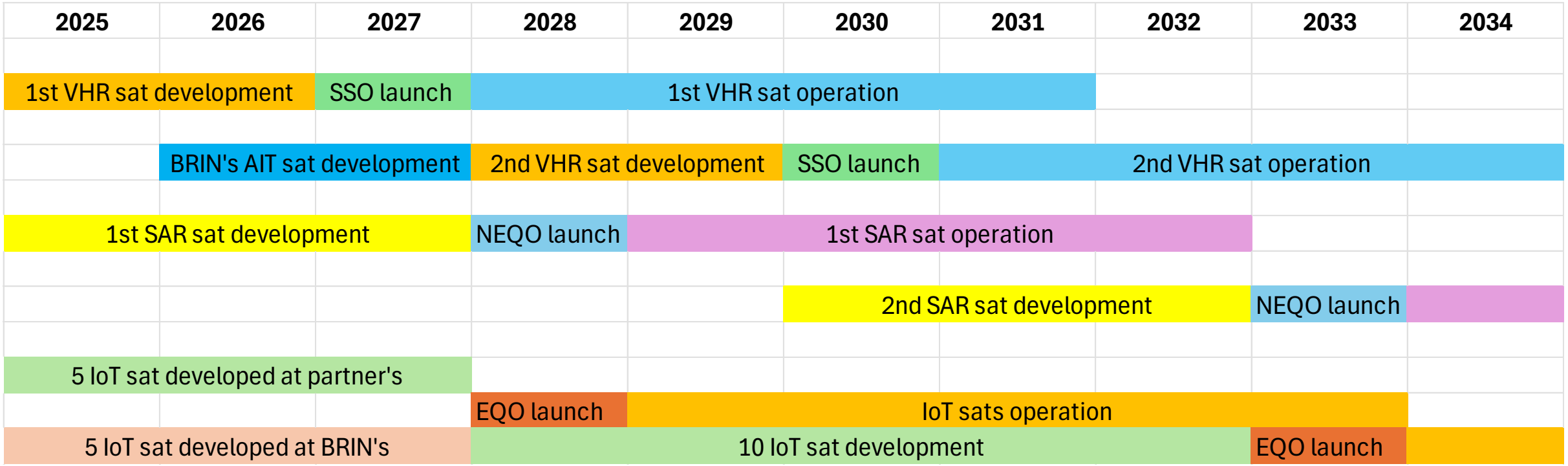
Nusantara Satellite Constellations Plan



- 4 HighRes & 2 VeryHighRes Imaging Satelites @SSO
- 2 Synt.AppertureRadar Satellites@NeQO 10°
- 10 Satcom LEO for IoT/M2M @EquatorialOrbit 0°
- 1 Satcom GEO

CONNECTIVITY

Enhancement of National Remote Sensing Service Capability : Satellite Timetable



Notes :

- Application development time to be done during every satellite development, involving all stakeholders and private enterprise (software developers)
- Commercial partners will be selected during the 1st VHR satellite development, to resell the images outside Indonesian territory. The generated income will be used to developed the subsequent satellites

CLIMATE CHANGE

Space Applications for Environment (SAFE) CH4Rice Project

Project Title: **Assessment of Methane Emission from Rice Paddies and Water Management**

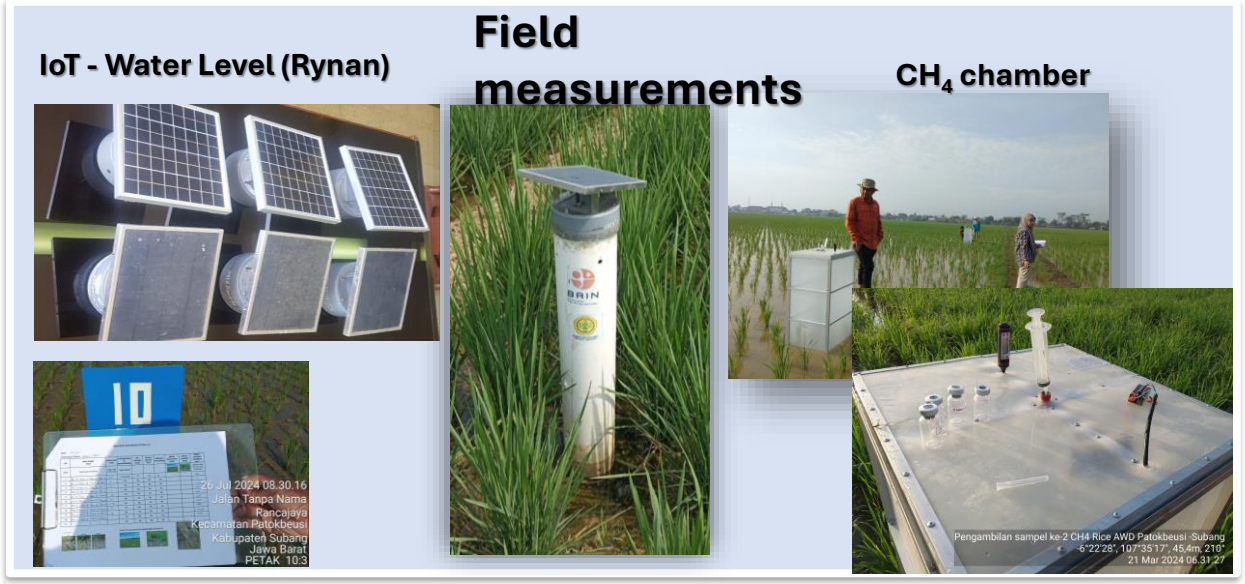
Duration : **2023 - 2027**

Countries Involved:

- **VNSC** Vietnam (Project Leader)
- **BRIN** Indonesia
- **GISTDA** Thailand
- **JAXA** Japan
- **PUST** Bangladesh
- **PhilSA** Philippine

Outcome:

- Climate change mitigation such as carbon credit through CH4 MRV (Monitoring, Reporting and Verification) using satellite and in-situ data
- Water management by efficient irrigation with lower CH4 emission (e.g. Alternate Wetting and Drying or water saving irrigation)
- Regional and global sustainable agriculture related initiatives/activities



remote sensing

MDPI

Article

Utilization of Multisensor Satellite Data for Developing Spatial Distribution of Methane Emission on Rice Paddy Field in Subang, West Java

https://www.mdpi.com/3371160

Contact person: Parwati Sofan (Parwati@brin.go.id)

Peatland Carbon Emission Calculation Based on InSAR Using ALOS-2 PALSAR-2 (BRIN , BRGM, and JAXA, Japan)

Kenampakan lahan bekas terbakar



Kenampakan subsiden

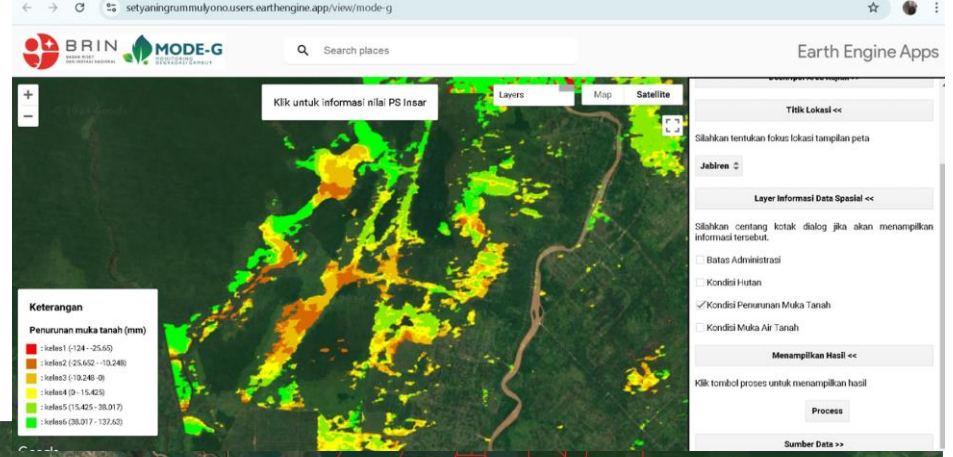


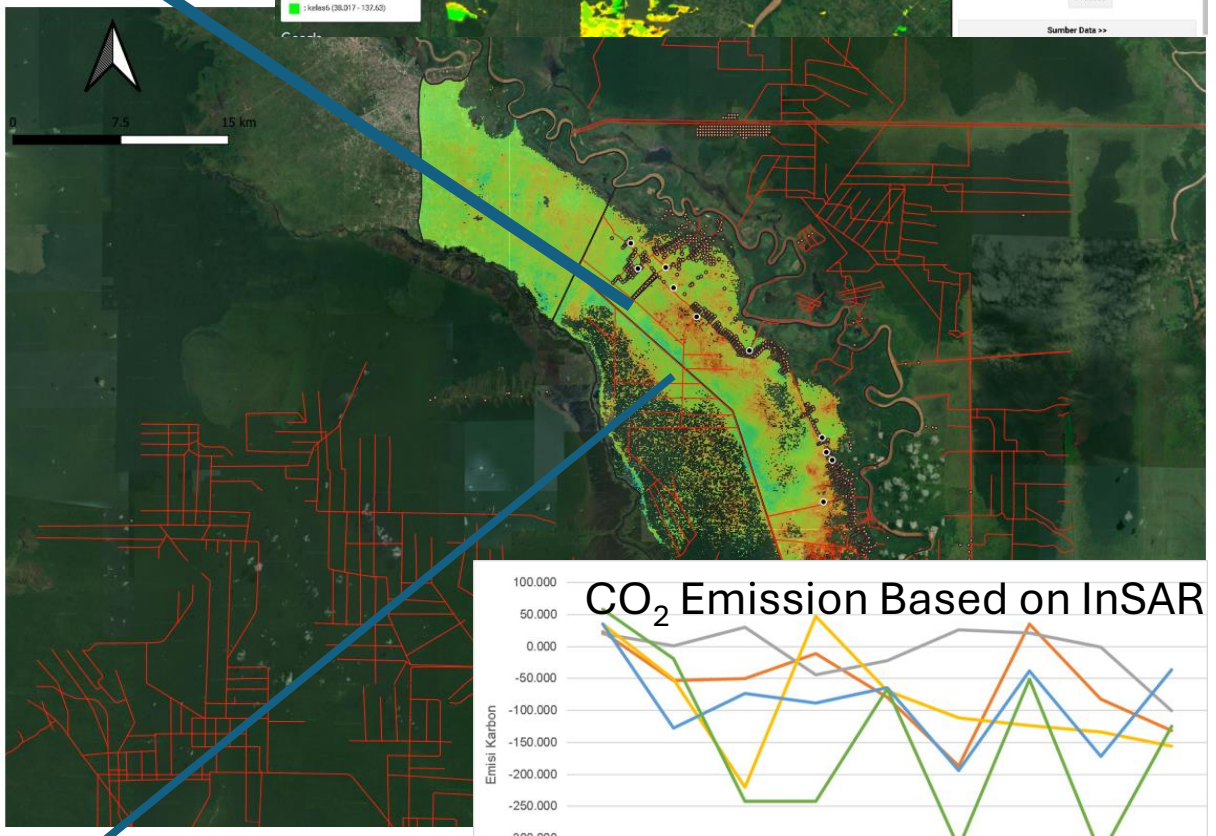
Kenampakan subsiden dari akar pohon



Pengambilan sampel tanah



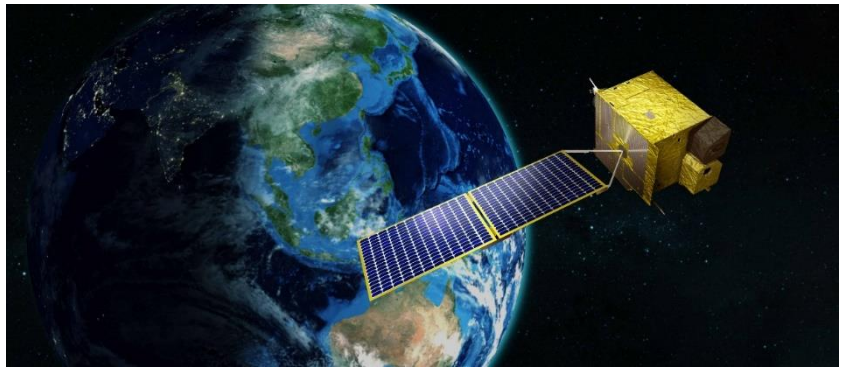




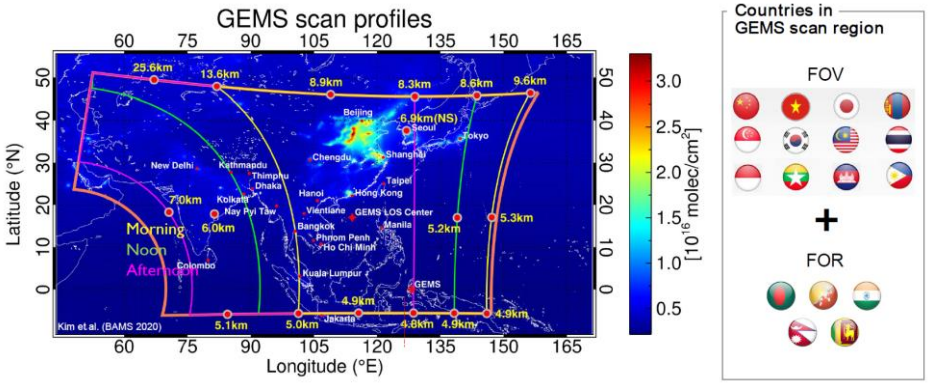
Area Jabiren,
Central Kalimantan

	Emisi_LS 20180307	Emisi_LS 20180530	Emisi_LS 20180919	Emisi_LS 20181212	Emisi_LS 20190306	Emisi_LS 20190918	Emisi_LS 20191211	Emisi_LS 20200304	Emisi_LS 20200916
Series2	22.696	-53.575	-49.828	-10.508	-79.243	-186.694	35.186	-81.956	-131.655
Series3	20.470	0.817	29.789	-43.670	-22.046	26.664	20.751	-0.422	-100.433
Series4	35.270	-50.794	-219.596	47.766	-69.602	-111.696	-123.936	-133.830	-156.093
Series5	35.071	-127.117	-72.941	-87.847	-64.202	-193.362	-37.870	-172.062	-36.395
Series6	58.271	-19.405	-242.332	-242.445	-65.874	-314.390	-50.725	-326.419	-124.939

Geospatial Air Pollution Monitoring & Research



Geostationary Environmental Satellite (GEMS)

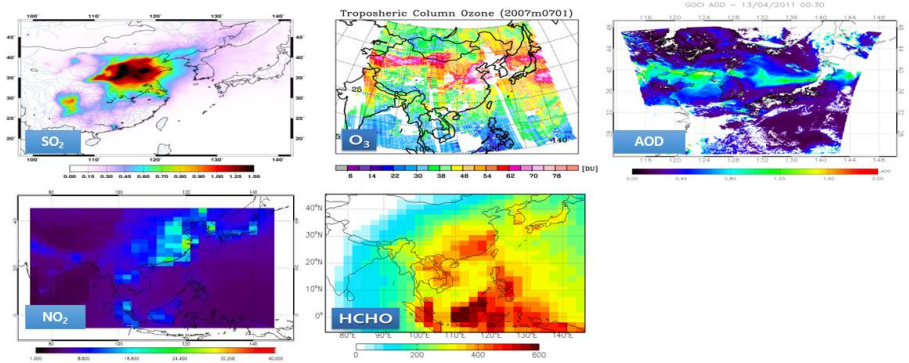


GEMS coverage and participating countries

- Pan-Asia Partnership for Geospatial Air Pollution Information in Indonesia (BRIN, NIER, KOICA, and UNESCAP)
- Instalation and operation of Pandora Sun Spectrometer at BRIN station (Agam, Pontianak, and Bandung)
- Training on GEMS data Processing (online & in Korea)
- GEMS related research activities at the Research Center for Climate and Atmosphere, BRIN

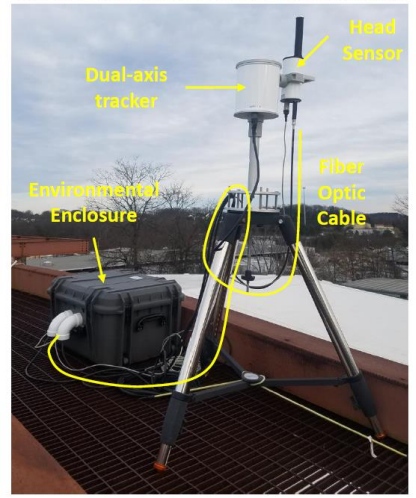
- **Products : Trace gas (SO_2, O_3, NO_2, HCHO), Aerosol Properties**

  - **(Column Density)** NO_2, SO_2, HCHO, O_3 (possibly CHOCHO, BrO)
  - **(O3)** column density @ troposphere and stratosphere, entire quantity, profile
  - **(Aerosol)** Optical depth, Index, Single scattering albedo, height
  - **(Cloud)** effective cloud cover, pressure
  - Surface reflectance, UV index



GEMS products

PANDORA SUN & SKY SPECTROMETER



Courtesy of SciGlob

Pandora Instrument

United Nations/Indonesia Workshop on the Applications of Global Navigation Satellite Systems
17 - 21 November 2025
Jakarta, Indonesia

Jointly organized by
the United Nations Office for Outer Space Affairs (UNOOSA),
the National Research and Innovation Agency (BRIN)
and
the Universitas Indonesia

Co-organized and co-sponsored by
the International Committee on Global Navigation Satellite Systems (ICG)

Website:
https://www.unoosa.org/oosa/en/ourwork/psa/schedule/2025/united-nations-indonesia-workshop-2025.html

Venue:

BRIN Headquarters, Jalan MH Thamrin No. 08, Jakarta

VENUE





BRIN (Badan Riset dan Inovasi Nasional)
Gedung B.J. Habibie, Jl. M.H. Thamrin No. 8
Jakarta, Indonesia





Info Note

Application Form **(Deadline: Sunday, 24 August 2025)**

Agenda

Working Methods:

Participants of the workshop are requested to deliver a presentation paper and materials covering information on the thematic sessions subject in their respective countries

Session 1:	• **Current and planned GNSS and satellite-based augmentation systems**
Session 2:	**GNSS-based applications**
Session 3 (Seminar):	**GNSS spectrum protection and interference detection and mitigation**
Session 4:	**GNSS data processing**
Session 5:	**GNSS and Space Weather**
Session 6:	**Capacity building, training, institutional strengthening and education in the field of GNSS**
Discussion Sessions	• Issues, concerns and approaches for pilot projects/initiatives, mechanisms and resources of implementing; • Possible follow-up projects, initiatives and proposals for future workshops/training courses/technical seminars.

BRIN
BADAN RISET
DAN INOVASI NASIONAL

ESCAP
Economic and Social Commission
for Asia and the Pacific

THANK YOU