Implementation on UN-IGIF for Country Action Plan on Climate Changes

Utilization of Geospatial Information

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UN·IGIF
INTEGRATED GEOSPATIAL INFORMATION FRAMEWORK

Previous Case Study

Originally presented by : Dr. Alue Dohong, Vice Minister of Environment and Forestry of Indonesia during The Fourth Plenary Meeting of the High-level Group of the IGIF in New York, United States of America On August 6th , 2024

INDONESIA'S FOLU NET SINK 2030 POLICY AS A CLIMATE ACTION STRATEGY TO ACHIEVE NET ZERO EMISSION

UN-IGIF CASE STUDY:
CLIMATE ACTION IN INDONESIA

CASE HIGHLIGHTS

SECTOR
- Climate Action/Environment
- Forestry and Other Land Use (FOLU)

CHALLENGE
Indonesia faced significant challenges effectively monitoring and managing its vast and diverse landscapes to achieve emission reduction committments set under the Paris Agreement.

SOLUTION
The FOLU Net Sink 2030 Initiative set forth an ambitious vision for transformative climate action, with geospatial information and infrastructure recognized as key components of its success. To support this vision, the United Nations Integrated Geospatial Information Framework (UN-IGIF) provided a comprehensive, structured approach to geospatial information management, serving as the foundation for data-driven forestry, land use, and emissions management.

IGIF PATHWAYS UTILIZED
All nine Strategic Pathways were used to support climate action.

OVERVIEW

Indonesia's rapid economic growth throughout the late 20th Century drove extensive logging, conversion of forests to agricultural land, and peatland drainage. These activities released large amounts of greenhouse gases, especially carbon dioxide and methane, significantly contributing to climate change issues.

Recognizing the urgent need to address these issues, Indonesia signed the Paris Agreement and committed to ambitious voluntary Nationally Determined Contributions (NDCs) to reduce its greenhouse gas emissions and combat climate change. Indonesia's NDC included a commitment to reduce greenhouse gas emissions 29% by 2030, with the potential to increase this to 41% with international support.

Indonesia struggled to meet the NDC targets due to strong economic pressures, deforestation, and land-use changes. Transformative change was needed in the FOLU sector to deliver the NDC. The FOLU Net Sink 2030 Initiative, launched in 2022, laid out a path to transform the sector into a net carbon sink by 2030, focused on reducing deforestation, promoting reforestation, and implementing key sustainable land management practices. This bold new initiative empowered Indonesia to set more ambitious targets, updating their NDC in 2022 to reduce emissions 31.89% by 2030 and 43.20% with international support.

CHALLENGE

Indonesia's diverse landscapes span over 17,000 islands and include tropical rainforests, peatlands, mountain ranges, vast coastal ecosystems, and grasslands. Effectively monitoring and managing these varied environments presents significant challenges to achieving emission reduction goals.

Despite efforts to curb deforestation, illegal logging and forest and peatland conversion for agriculture remained significant issues, hindering emission reduction efforts. Indonesia's peatlands and grasslands are also prone to frequent fires, which increase emissions. Coastal degradation in Indonesia, such as the destruction of mangroves and coral reefs also increase emissions and further complicate the achievement of reduction goals.

Historically, environmental data was siloed across ministries, local governments, and institutions, making it difficult to track emissions, monitor land-use changes, and enforce policies effectively. Without a unified approach, decision-making lacked precision, and opportunities for targeted interventions were often missed. Strengthened cross-sector coordination, improved data-sharing policies, and collaborative financing were needed to successfully support the initiative. Innovative new data sources, geospatial technologies, and targeted training were also needed to provide comprehensive and integrated data to more effectively monitor and manage these diverse landscapes to achieve emission reduction goals.

UN-IGIF

Enabling a Better Future with Location Data

SOLUTION

Geospatial information was pivotal to Indonesia's FOLU Net Sink 2030 Initiative, with the nine strategic pathways of the UN-IGIF providing a strong framework to enhance geospatial information management and infrastructure—ensuring the program's ambitious goals were both achievable and sustainable.

The **Governance and Institutions Pathway** outlined the formal arrangements that clearly defined geospatial information management roles and responsibilities, and the processes for coordination and management within the Ministry of Forestry and across various agencies, local governments, forest management units, and academic institutions. The **Policy and Legal Pathway** established new geospatial regulations and guidelines in 2021 to strengthen the administration and use of geospatial data to support Indonesia's climate action strategies. The **Finance Pathway** ensured the long-term sustainability of geospatial information for the FOLU Initiative, securing funding from national, state, and regional budgets, alongside private sector investments, international grants via government to government schema with the Norweigian Ministry of Climate and Environment, and funding from partners like the United Nations Development Program and the World Bank. These efforts ensured the robust governance essential for success.

The Ministry of Forestry implemented the **Data and Innovations Pathways** to advance innovative new data sources and geospatial technologies like remote sensing and the SIGAP geospatial information system. The SIGAP system enabled the collection, processing, integration, and visualization of spatial data, incorporating 103 thematic datasets from 35 geospatial data producers. These innovations facilitated precise analyses like the Location Priority Index and Environmental Services Index, improved monitoring, and enabled targeted mitigation strategies such as improved forest conservation, peatland restoration, and low-impact logging. The Ministry leveraged the **Standards Pathway** to issue national decrees and geospatial standards to enhance data consistency, interoperability, and accessibility. Together, these pathways empowered data-driven analysis and informed decision-making, driving innovative advancements in forestry and environmental management.

The **Communications and Engagement Pathway** enabled an inclusive stakeholder engagement strategy, including government, international organizations, academia, industry, and communities at all levels—from local to global. The **Partnership Pathway** strengthened collaboration for data-sharing, finance, and capacity-building efforts, ensuring sustainable geospatial support for Indonesia's climate initiatives. Through the **Capacity and Education Pathway**, spatial analysis training was conducted at 22 Environmental Governance Units and multiple provinces, providing the knowledge and skills to apply remote sensing and GIS technologies in support of the FOLU Initiative, including through collaboration with the Centre for Climate Risk and Opportunity Management at IPB University.

The nine strategic pathways of the UN-IGIF provided a solid foundation for Indonesia's FOLU Net Sink 2030 Initiative, strengthening geospatial management, collaboration, and sustainable climate action.

Staff of local Environmental Governance Units receive spatial analysis training.

The Location Priority Index assesses an area's condition based on its risk of deforestation and forest fires and its potential for carbon sequestration. By integrating these factors, the index helps determine which areas should be prioritized for mitigation actions.

PROJECT BENEFITS

The UN-IGIF's comprehensive approach to climate action served as the foundation for Indonesia's FOLU Net Sink 2030 Initiative, enhancing geospatial information management, strengthening partnerships and collaboration, and enabling targeted environmental interventions. As a result, the project has achieved many critical benefits essential for its long-term success, including:

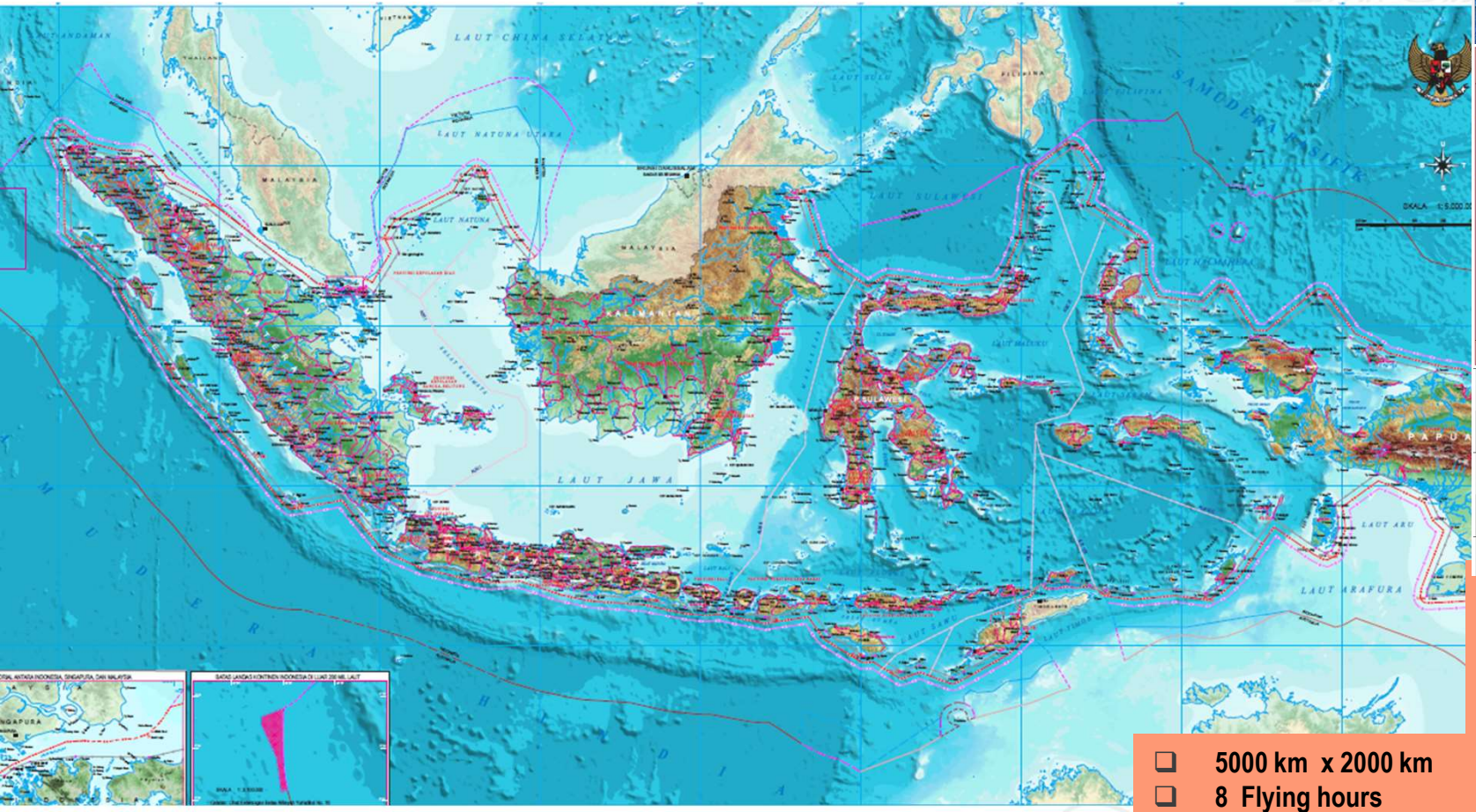
1. Improved inter-ministerial cooperation and coordination, especially between the Ministry of Forestry, the Geospatial Information Agency (BIG), and other relevant stakeholders involved in climate governance and land use planning.
2. Enhanced data integration and interoperability across agencies, allowing for real-time monitoring and evidence-based policy decisions.
3. Strengthened national capacity in geospatial data governance, including improved standards, metadata management, and data sharing practices.
4. Increased transparency and accountability in carbon accounting and deforestation monitoring, supporting national and international reporting obligations.
5. Better alignment of local, regional, and national efforts in forest and land use programs through spatially-enabled planning tools.
6. Empowerment of subnational governments and communities through access to accurate, up-to-date geospatial data for localized climate action.
7. Optimization of land-based mitigation strategies through spatial analysis, enabling identification of priority areas for conservation, restoration, and sustainable land use.
8. Strengthened international collaboration and donor engagement by demonstrating measurable, data-driven progress towards Indonesia's climate commitments.

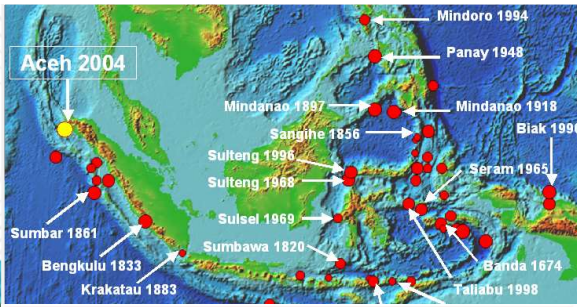
BADAN INFORMASI GEOSPASIAL

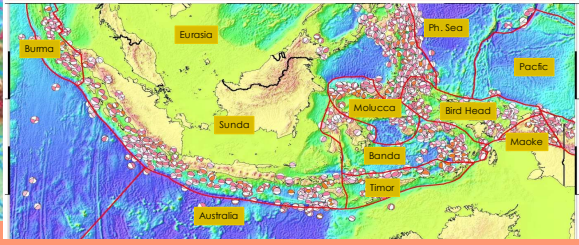
#1 Peta Data Nusantara

55th Satu Peta Satu Data Satu Nusantara

Background







Administrative Territorial:

- ❖ 34 Provinces
- ❖ 514 Cities/Municipalities
- ❖ 7,094 Districts
- ❖ 83,447 Villages

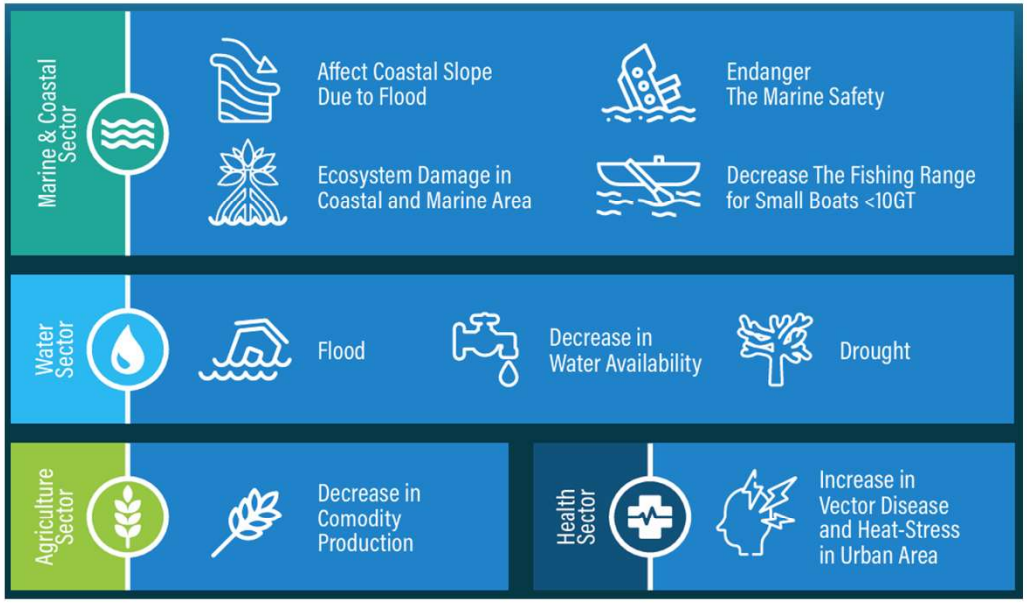
- ❑ 5000 km x 2000 km
- ❑ 8 Flying hours
- ❑ 3 Time zones
- ❑ 17,504 Islands

- ❑ >280 million people
- ❑ 1340 Ethnic groups
- ❑ 6 Religionsy

Background

(Bappenas) National priority handling targets in the document “Climate Resilience Development Policy 2020–2045”

Climate Change Issue		
Climate Projection		• Atmospheric Climate Projection • Oceanic Climate Projection
Potential Hazard	Marine & Coastal	• Potential wave height which affect the marine safety • Coastal vulnerability level
	Water	• Potential drought • Potential decrease in water availability
	Agriculture	Potential decrease in rice production
	Health	Potential increase in DHF, Malaria, and Pneumonia



Bappenas: National Development Planning Agency, Ministry of National Development Planning

Background

Heightened climate risks threaten sustainable growth and resilience

Climate change potentially presents substantial risks to Indonesia's sustainable development, given the nation's high vulnerability to climate-induced natural hazards

Geospatial information intelligence is essential

The United Nations Environment Programme (UNEP) reports that geospatial information is critical in tracking climate mitigation and adaptation progress across nations

A national data platform

There is a need of data and platform foundation for the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) to conduct climate-related disaster analysis in the development of Climate-Informed Spatial Plans

Urgency

High Climate Risk Areas

Urban and coastal zones face land subsidence, sea level rise, flooding, and drought

Adaptive Planning

Spatial data helps manage climate uncertainty and supports infrastructure that can withstand future impacts

Threats to Stability

These hazards endanger land use, infrastructure, and livelihoods in densely populated and economically critical regions

Evidence Based Planning

Geospatial integration enables zoning regulations that protect ecosystems and reduce disaster risks

Need for Accurate Data

Geospatial data is essential for identifying climate-vulnerable zones and guiding risk-aware land use decisions

Multi Scenario Analysis

Allows planners to assess long-term risks and prioritize resilient development pathways

Cross Sector Coordination

Data-driven planning aligns climate adaptation with land use and infrastructure strategies

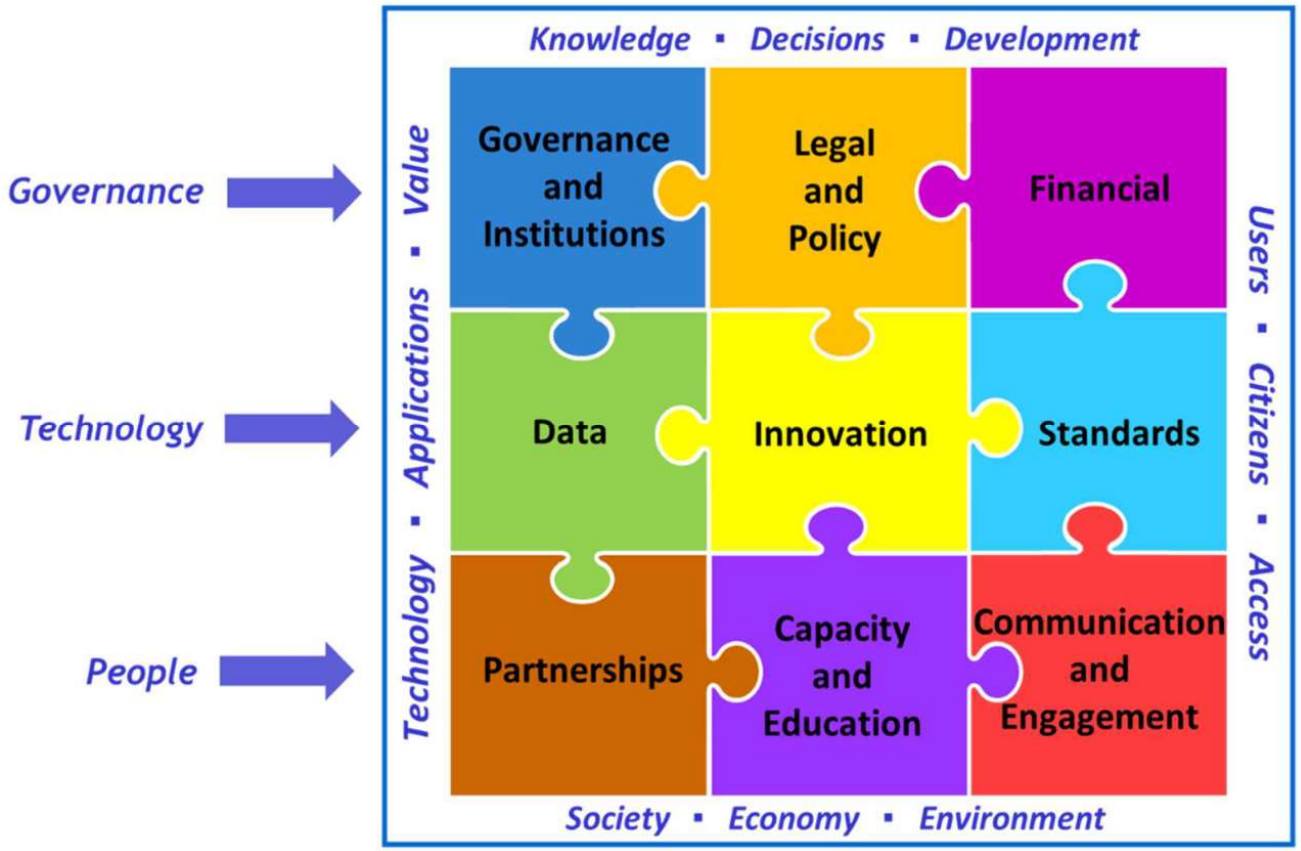
The Important Things to Understand of Utilizing Geospatial Information for SDGs and Climate Resilience

"**Geospatial data** is one of the most promising data sources. It can be applied for monitoring progress in achieving the SDGs" – R. Avtar

Source *: Avtar. R., et al. (2020). Utilizing geospatial information to implement SDGs and monitor their Progress. Journal of Environ Monit Assess (2020) 192:1-21, DOI 10.1007/s10661-019-7996-9*

Strategic Pathways of Integrated Geospatial Information Framework

The Framework is anchored by **nine (9) strategic pathways** in three (3) main areas of influence: governance, technology, and people



***Source** : https://ggim.un.org/UN-IGIF/*

Policy and Regulation

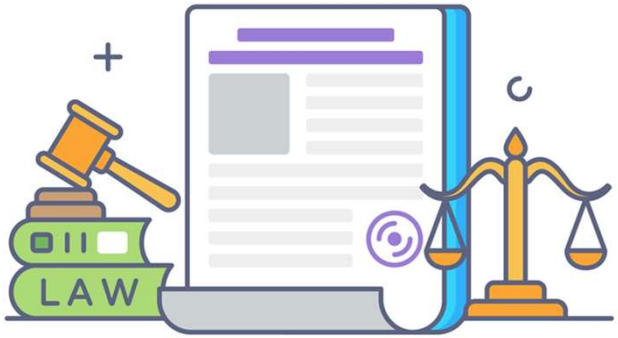
STRATEGIC PATHWAY 2 : LEGAL AND POLICY

Law/Act No. 4 of 2011 on Geospatial Information

- (Article 57); (Article 24, Paragraph 1); (Article 47, Paragraph 2)

Law/Act No. 24 of 2007 on Disaster Management

- (Article 6); (Article 14A, Paragraph 3)



Law/Act No. 26 of 2007 on Spatial Planning

- (Article 34 letter a); (Article 35); (Article 36, Paragraph 3)

Government Regulation 45/2021 on Geospatial Information Management

- (Article 118, Paragraph 1); (Article 62)

Government Regulation No. 21 of 2021 on the Implementation of Spatial Planning

- (Article 7)

Purpose

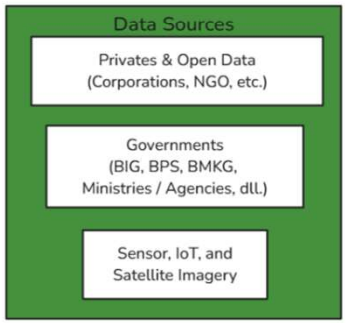
The Implementation of Geospatial Data and Information for Climate Action aims **to optimize the use of geospatial data and information** for applications that *support the analysis, synthesis, formulation, and decision-making* related to climate change risk evaluation supporting mitigation and adaptation actions

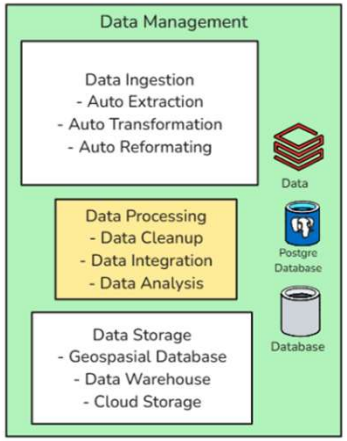
Objectives

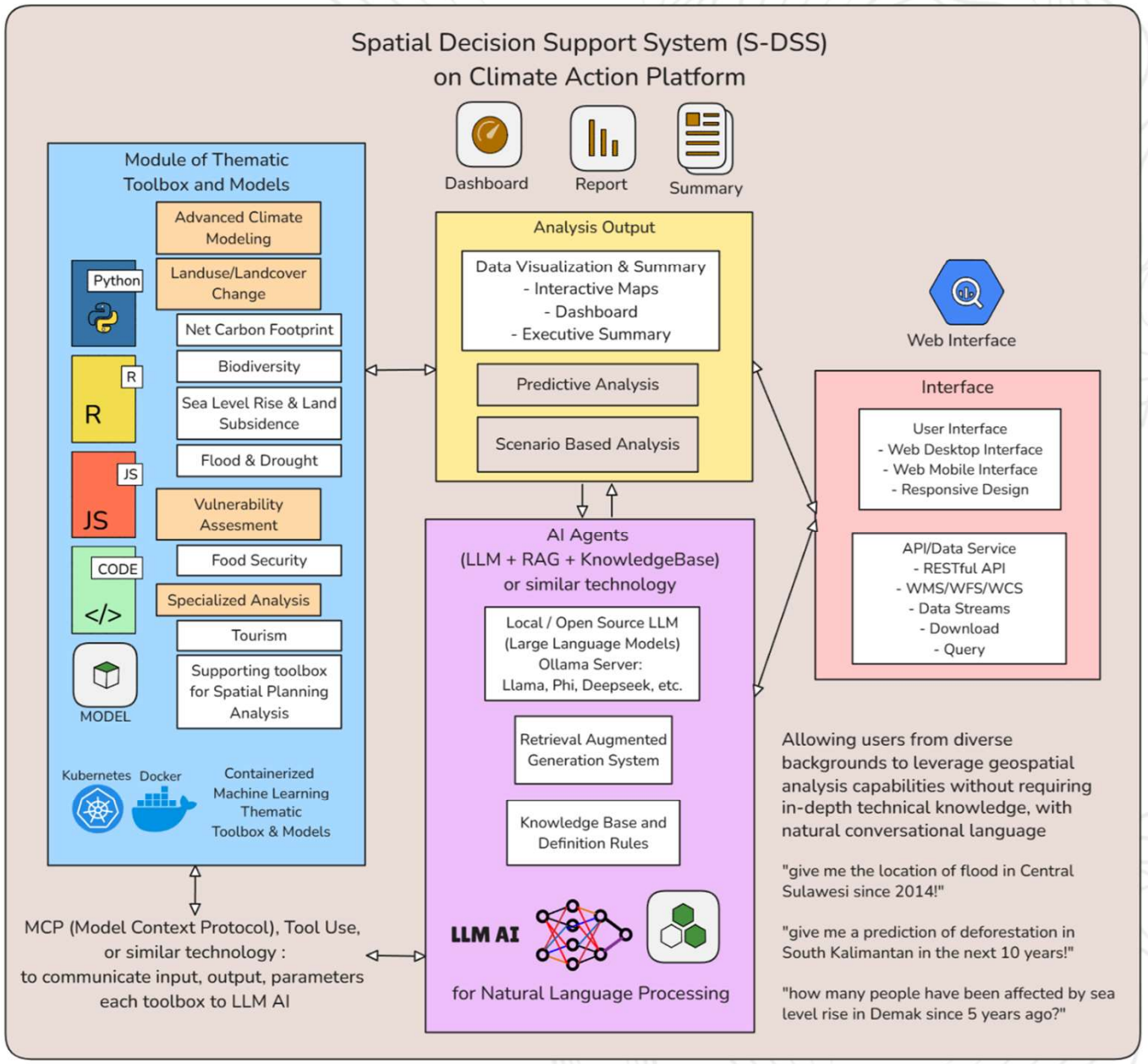
- **Develop a platform** that enables the government, private sector, and society to assess climate change risks and impacts, supporting both mitigation and adaptation strategies.
- **Provide geospatial information and enhance knowledge generated through analytical processes**, serving as a foundation for the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) to conduct climate-related disaster analysis in the development of Climate-Informed Spatial Plans

Data and Innovation

Platform architecture example







End Users with Rules:
- Governments (Full Features)
- Private Sectors (Some Limitations)
- Public Users (Limited)

Users

STRATEGIC PATHWAY 3 & 7 : FINANCIAL AND PARTNERSHIPS

- Loan from the World Bank **$292,000,000**
- Projects implemented by Geospatial Information Agency (BIG)

Production of large-scale geospatial data	Integrated map production, updating, distribution, and quality control systems	**Utilization of geospatial data for climate action**	Geospatial capacity enhancement	Project management, monitoring, and evaluation
$262,000,000	$20,130,000	**$2,970,000**	$6,900,000	$6,000,000

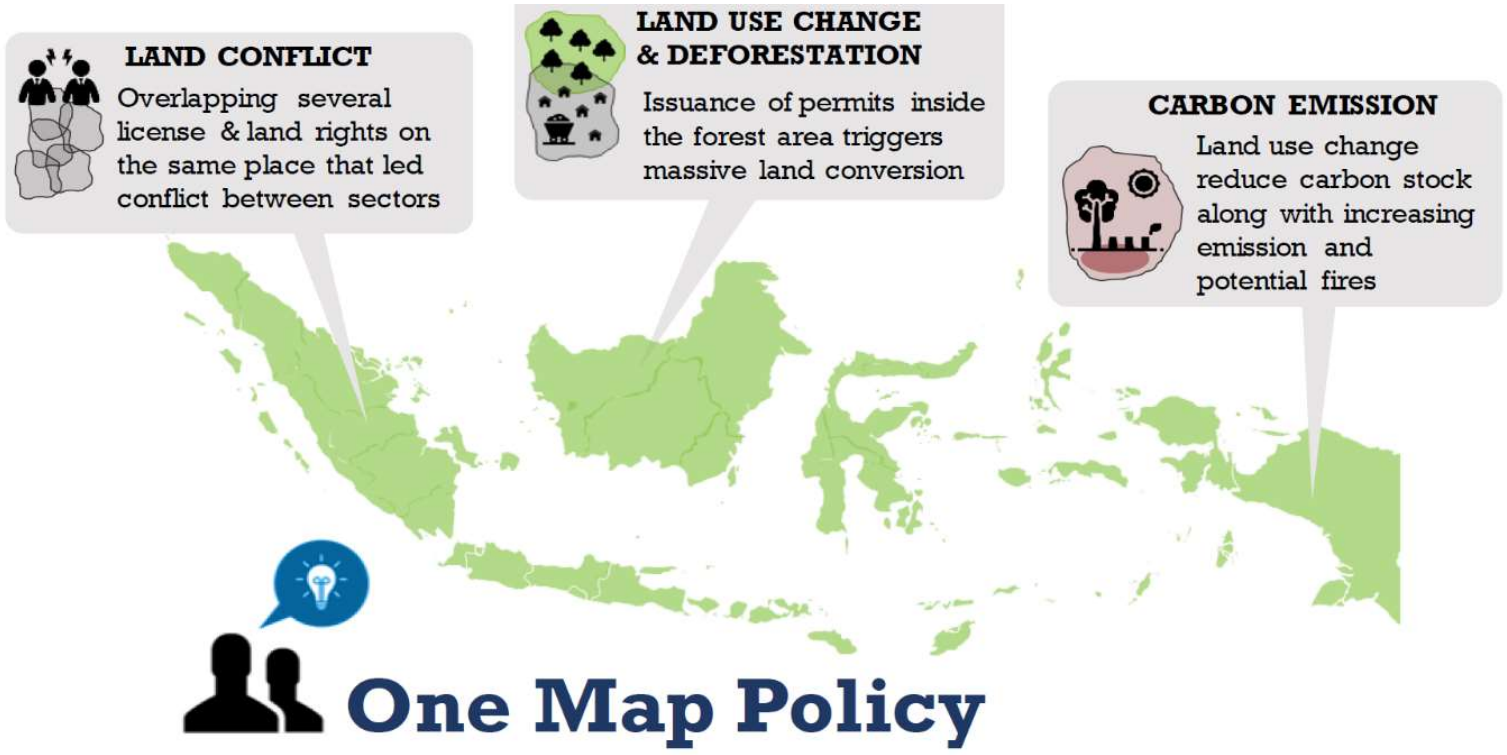
Our climate action platform project is focusing on utilization of large-scale geospatial data that produced, and it can be crucial for climate resilience / mitigation.

The larger initiative aims to strengthen Indonesia's geospatial data capabilities across multiple aspects, from data production to capacity building and quality control systems. This integrated approach ensures that the climate action platform will have strong foundational support through accurate, up-to-date geospatial data and proper institutional capacity for its implementation and maintenance

ONE MAP POLICY

to Reduce Climate Changes Impacts

Geospatial data in Indonesia has been fraught with inaccuracies, differing scales, references, and standard, which impacts on overlapping problems that contribute to Land Use, Land Use Change and Forestry (LULUCF) issues.

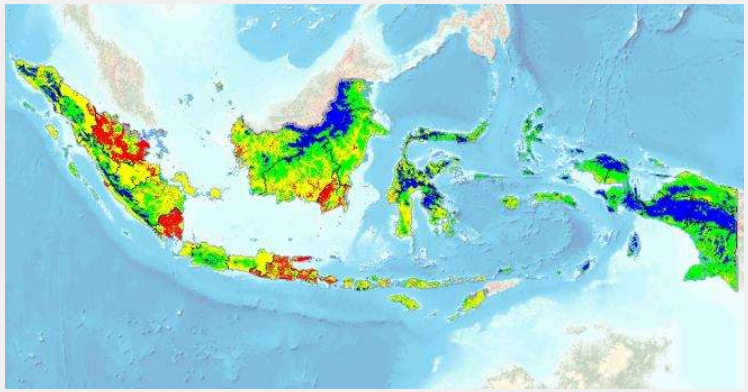


Stipulated under
Presidential Regulation No. 9/2016 &
Presidential Regulation No. 23/2021

launched intended to unify maps from different sectors and develop a single national base maps to be used as a reference in government planning.

Source: Coordinating Ministry of Economic Affairs

Forest and Land Fire Hazard Classification Map



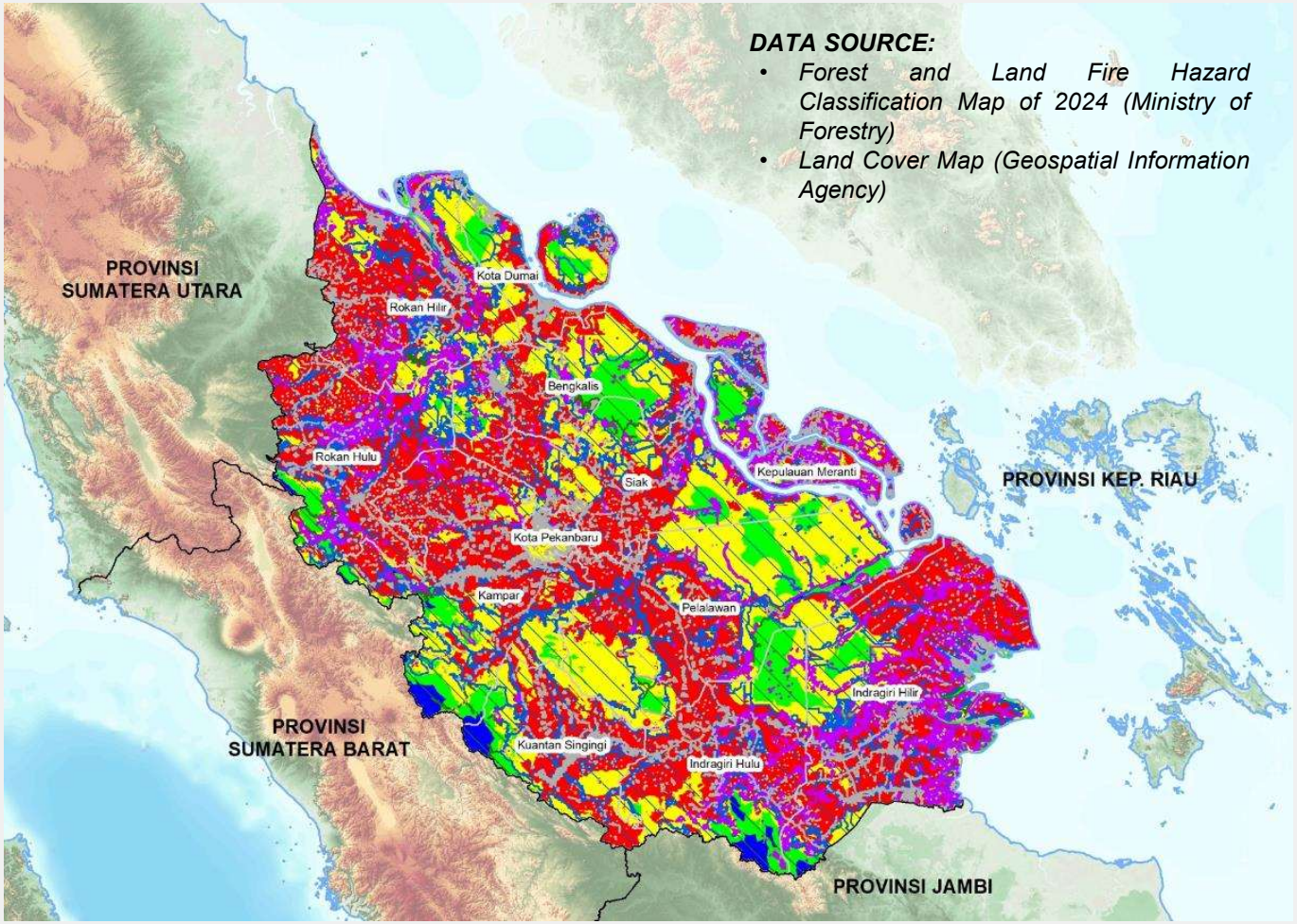
Forest and Land Fire Hazard Classification

- Very High Hazard Area
- High Hazard Area
- Moderate Hazard Area
- Low Hazard Area

Land Cover

- Forest
- Plantation
- Grassland
- Others

- *Based on the Forest and Land Fire Hazard Classification Map, we know that a very high hazard area exists in every province, with the largest found in Riau*
- *If we analyze with land cover, the largest very high hazard area is on Plantation, Grassland, and Forest*



STRATEGIC PATHWAY 8 & 9 : CAPACITY AND EDUCATION COMMUNICATION AND ENGAGEMENT

Implementation on Local Government
(Siak District, Riau Provinces)

- Coordination between local stakeholders in district, municipality, and village levels.
- Establishing Tasking Team on patrol based one fire hazard risk map and NOAA hot spots.
- Capacity Building for fire fighters and locals to detect and put out land or forest fires.
- Apply technologies on fire detection with drones and fire extinguisher.

Coordination local stakeholders

Fire Patrol Team

Extinguished fires by fire brigades

Drone Technology for Fire Monitoring

Capacity Building for local officers

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Thank You

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