Using Earth Observation Data to Support Sentinel Asia Step-3: focus on risk analytics for pre-disaster actions

2024 Sentinel Asia JPTM, Quezon City, Philippines

Peeranan Towashiraporn

6 November 2024

Sentinel Asia Step-3

Sentinel Asia's Step-3 is expected to not only use satellite observations for emergency **response** but also to cover the entire disaster management cycle including **mitigation**, **preparedness** and **recovery** phase after a disaster.

The Needs for Data

Extreme Hydrological Events

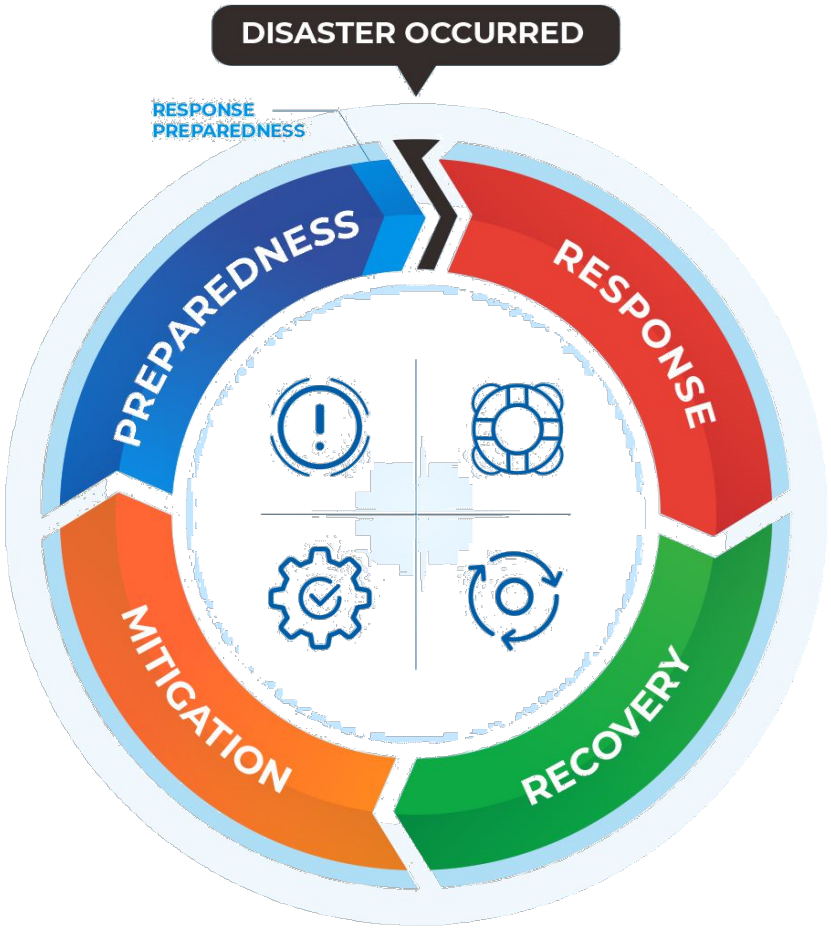
- Flood: The average annual cost of floods in the LMB ranges from **US$60-70 million**. Cambodia and Viet Nam alone commonly account for approximately two-thirds of the region's total annual flood damage.

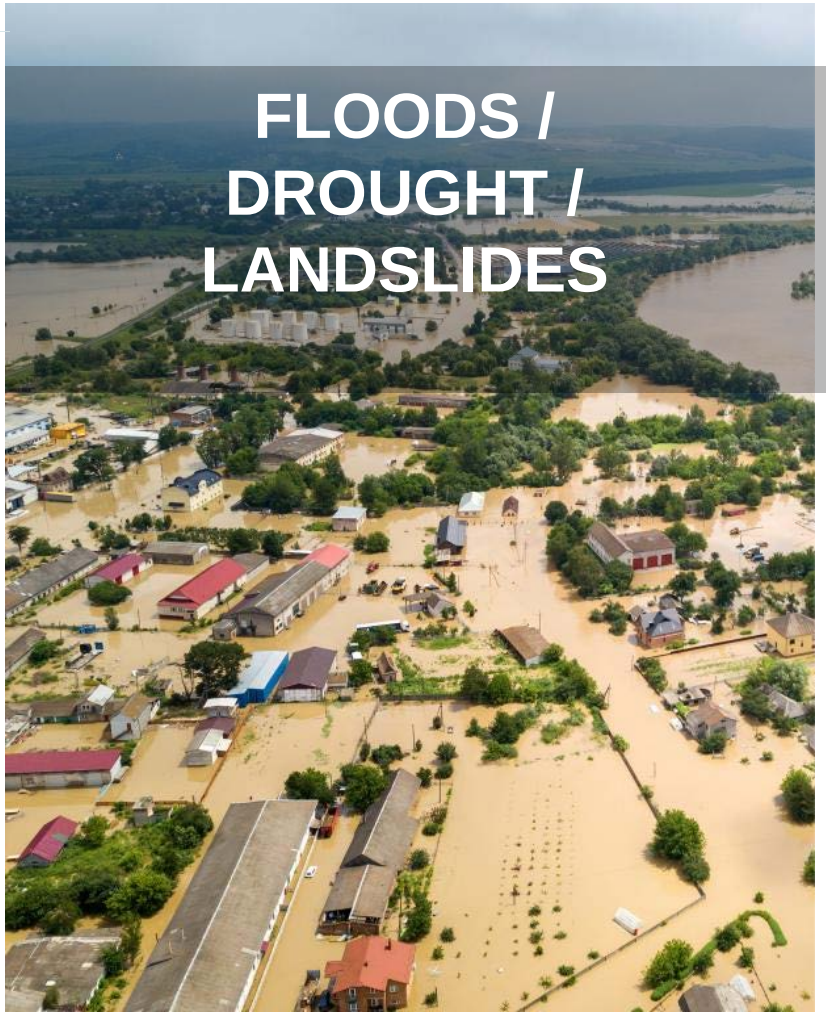
- Drought: Yields of rice and other lifeline crops plummet as a result of water shortages and saltwater intrusion in the Mekong Delta. Water levels become critically low, making transport of goods and services difficult or even impossible.

Accurate, timely, and continuous water-related data are key to managing floods and drought.

Source: the Mekong River Commission

Needs for Pre-disaster Actions!

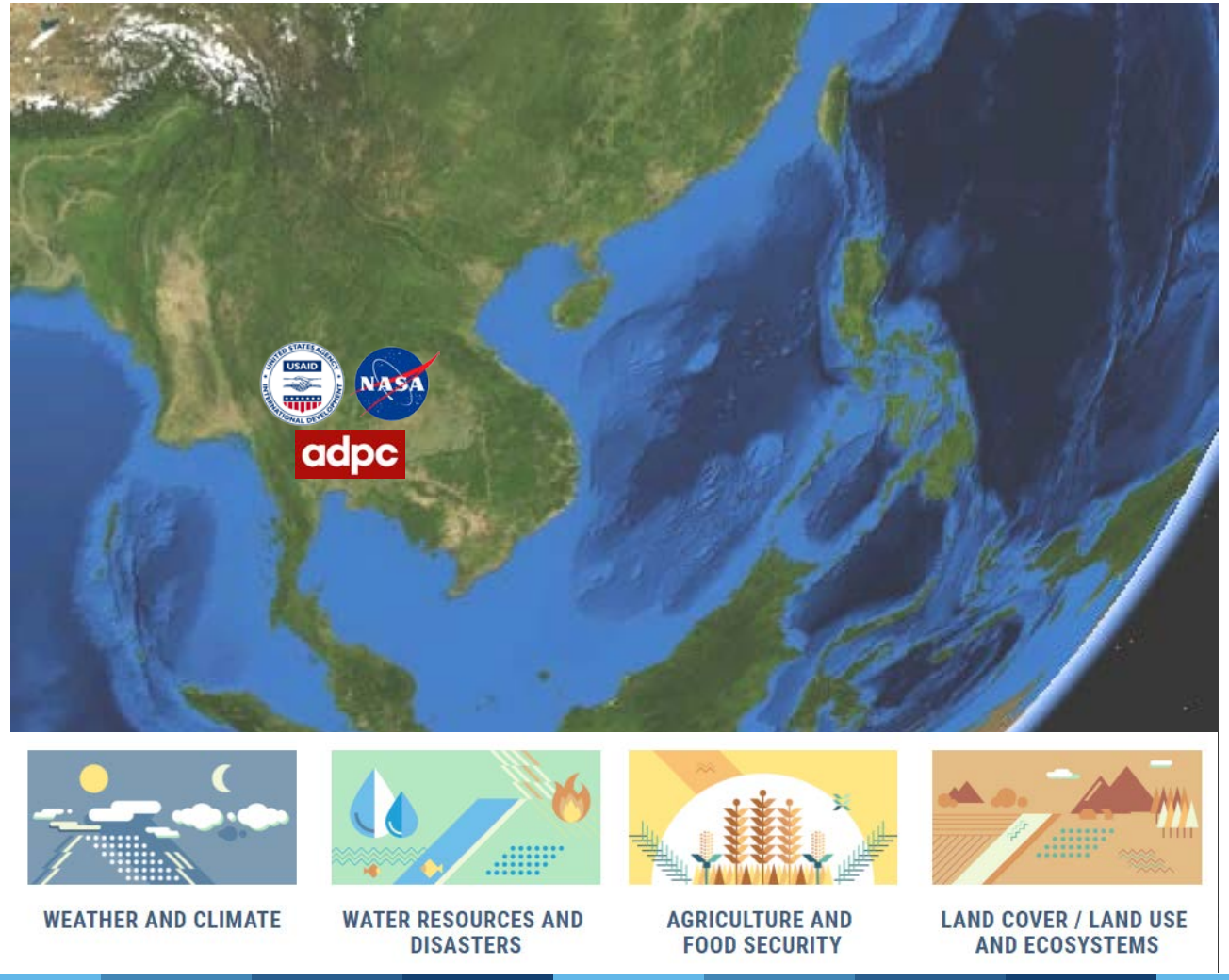




Satellite Data for Disaster Preparedness

SERVIR Southeast Asia: A REGIONAL GEOSPATIAL HUB

A partnership between USAID, NASA and the Asian Disaster Preparedness Center (ADPC)



Supporting Preparedness to Respond

Integrate near real-time storm severity and potential impacts with MRC-FFGS

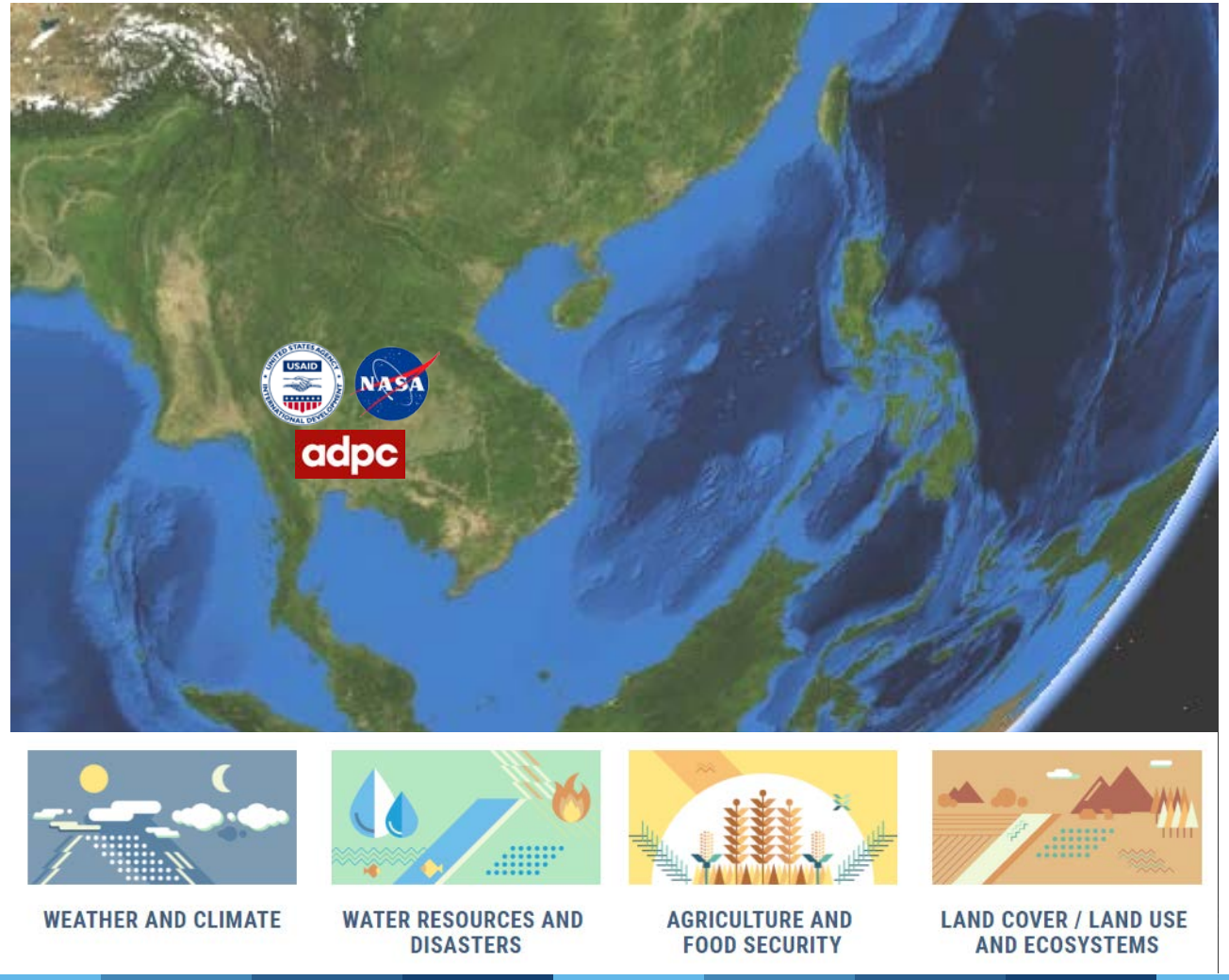
Provide various drought indices through SEA Drought Watch

Enhance drought risk management

Satellite Data for Disaster Preparedness

SERVIR Southeast Asia: A REGIONAL GEOSPATIAL HUB

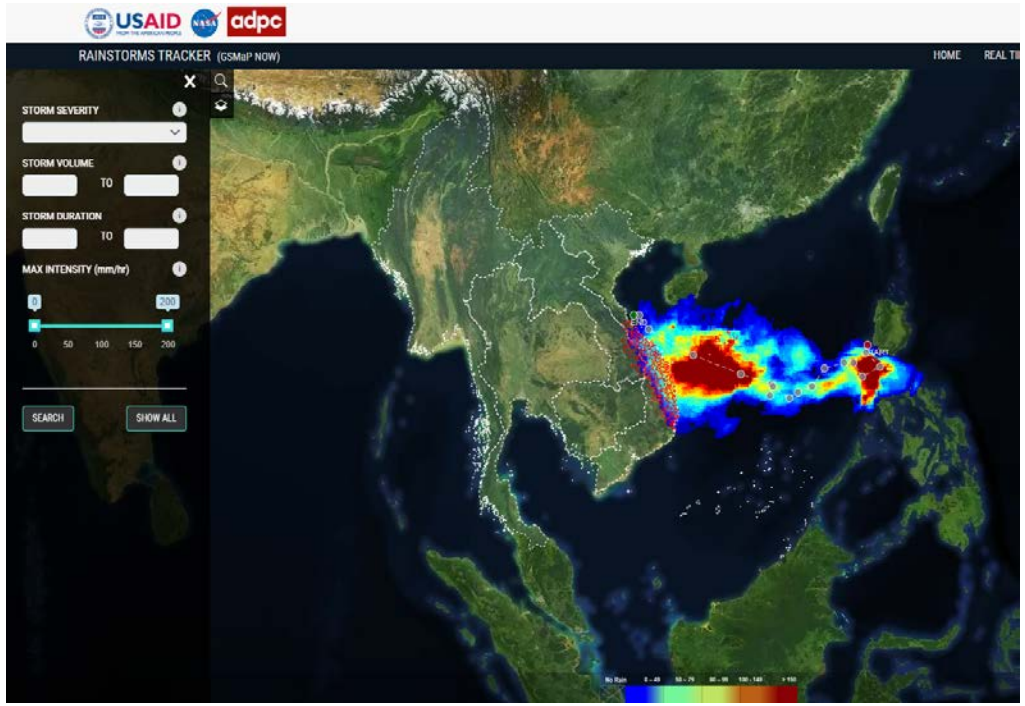
A partnership between USAID, NASA and the Asian Disaster Preparedness Center (ADPC)



Supporting Preparedness to Respond

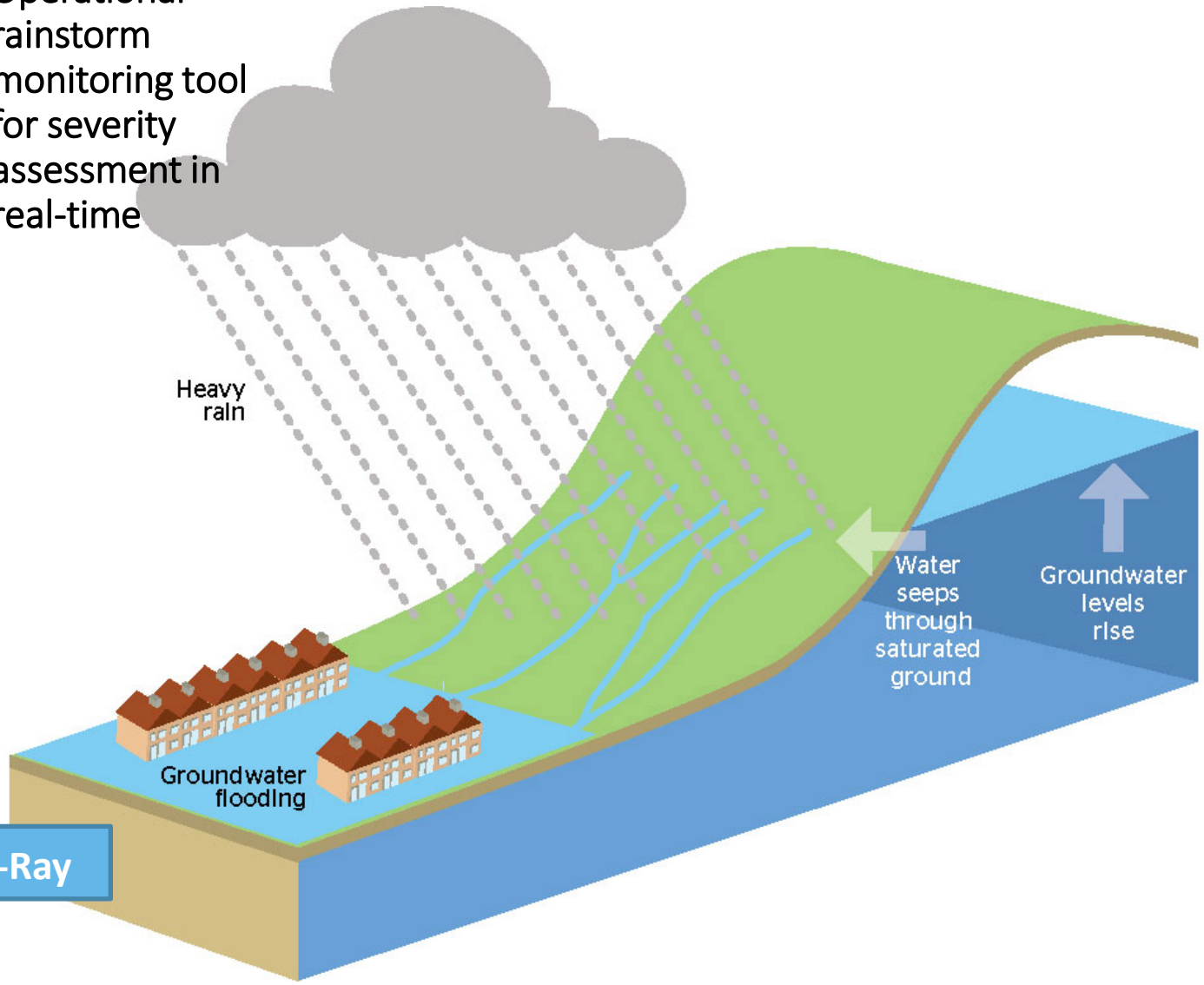
Integrate near real-time storm severity and potential impacts with MRC-FFGS

The Nature of Flash Floods



Rainstorm Tracker

Operational rainstorm monitoring tool for severity assessment in real-time

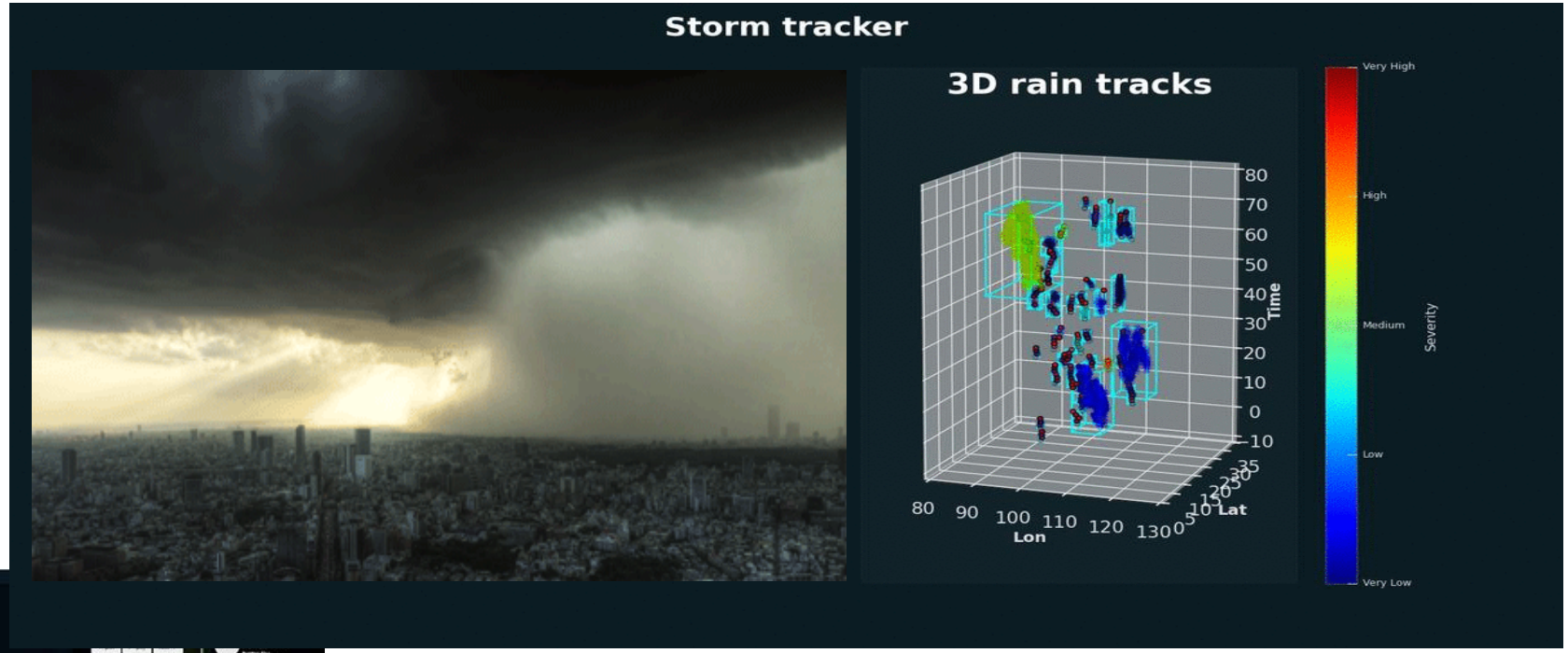


multidimensional vulnerability framework for impact assessment

Mekong X-Ray

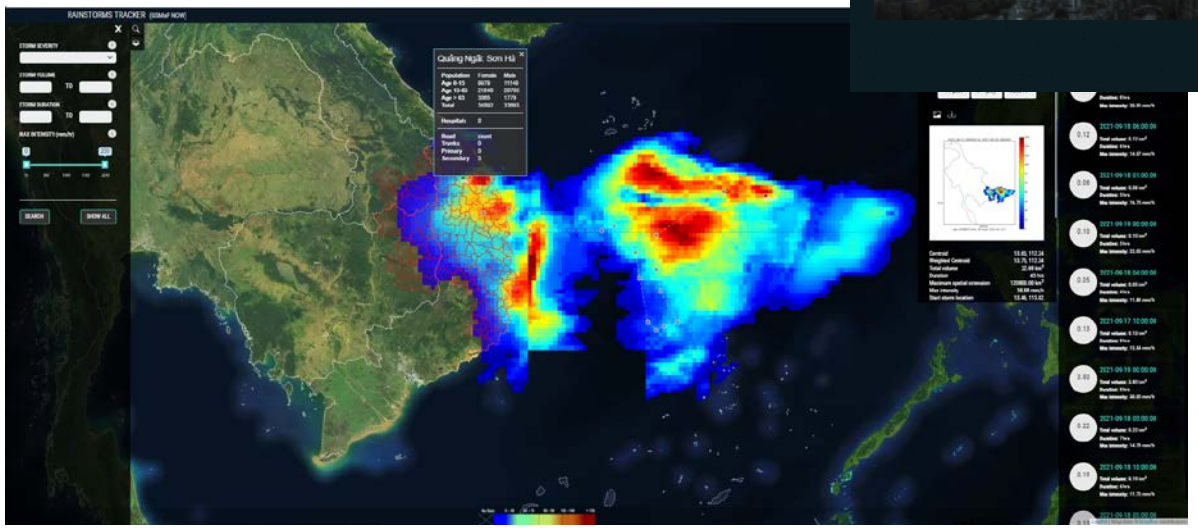
Prepare to Respond – forecasting flash floods

Operational rainstorm monitoring tool for severity assessment in near and real-time



Rainstorm Tracker

Spatiotemporal analysis for rainstorms



https://servir.adpc.net/tools/rainstorm-tracker

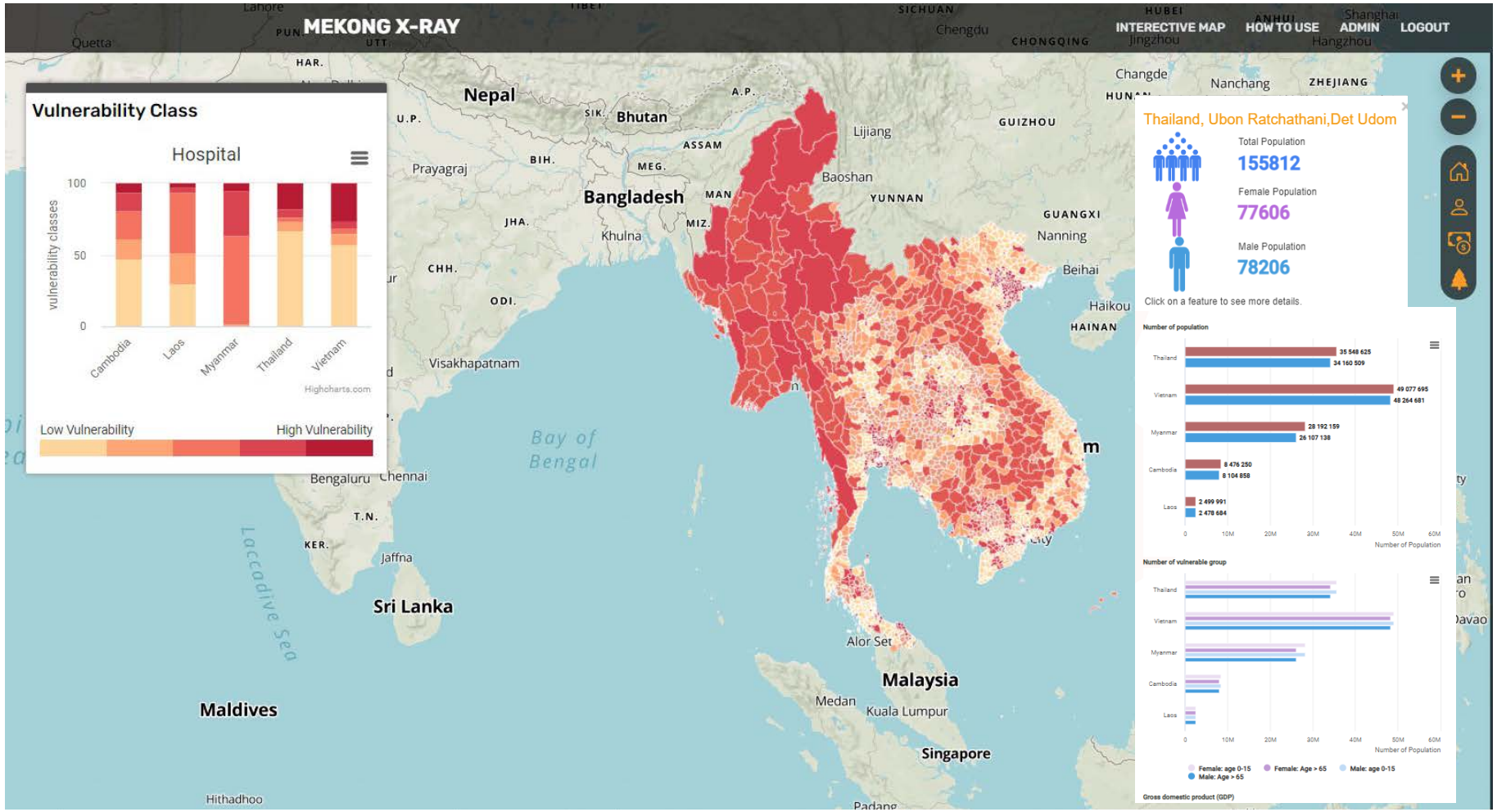
Prepare to Respond – knowing exposure and vulnerability

https://xray-servir.adpc.net/home

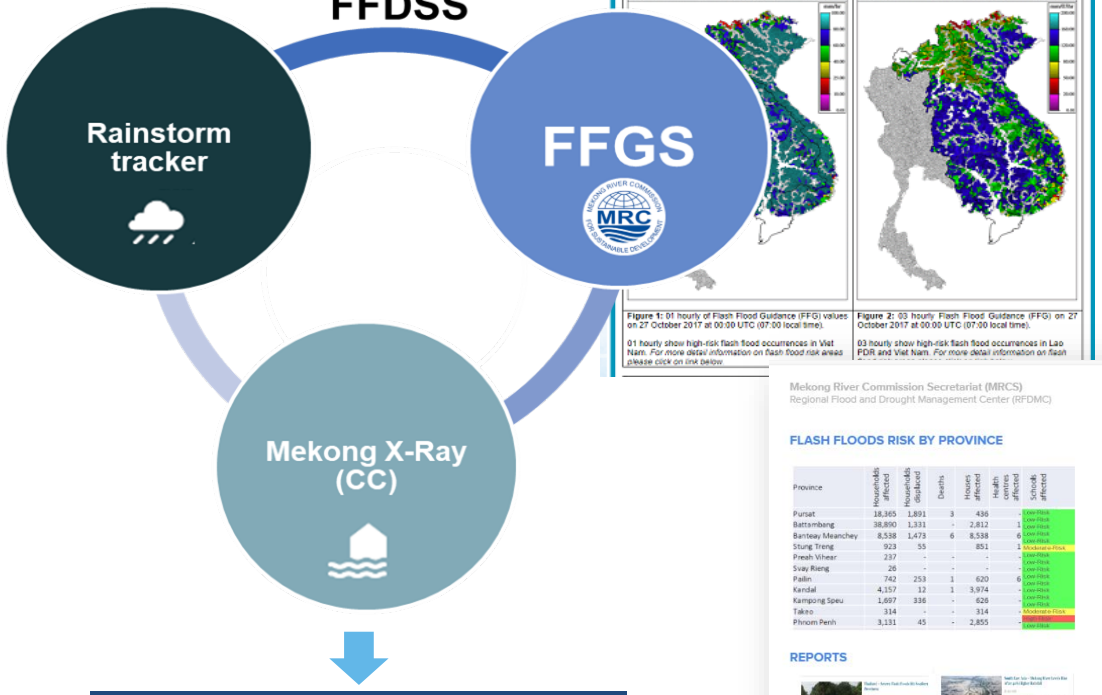
Mekong X-Ray

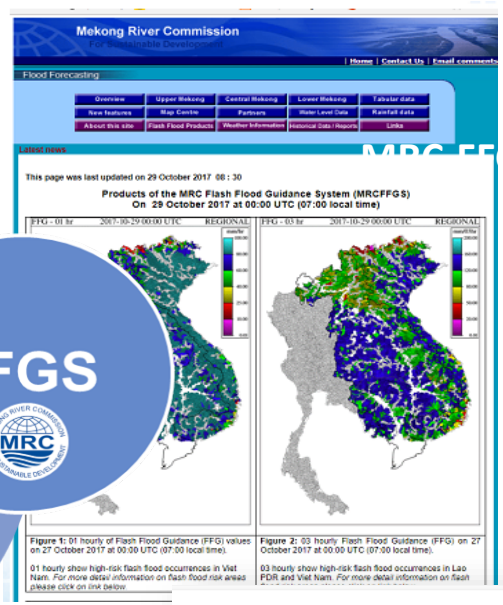
Exposure and Vulnerability Data

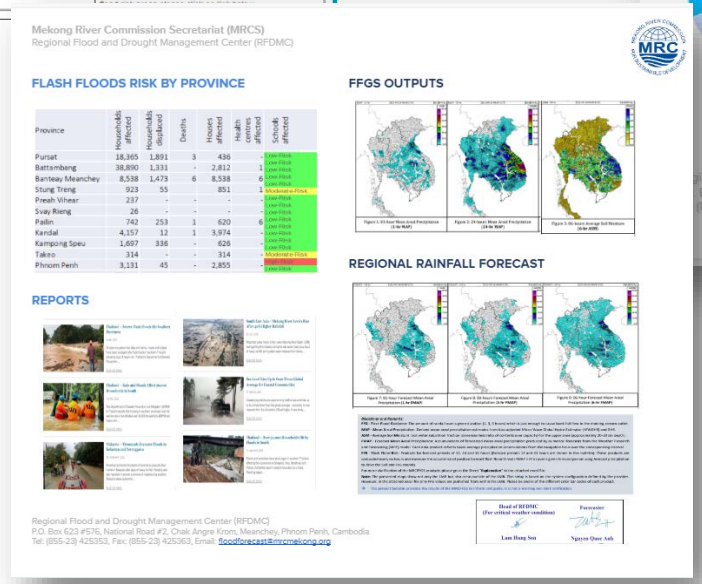
An exposure and multidimensional vulnerability data for impact assessment (integrable to hazard dashboards)

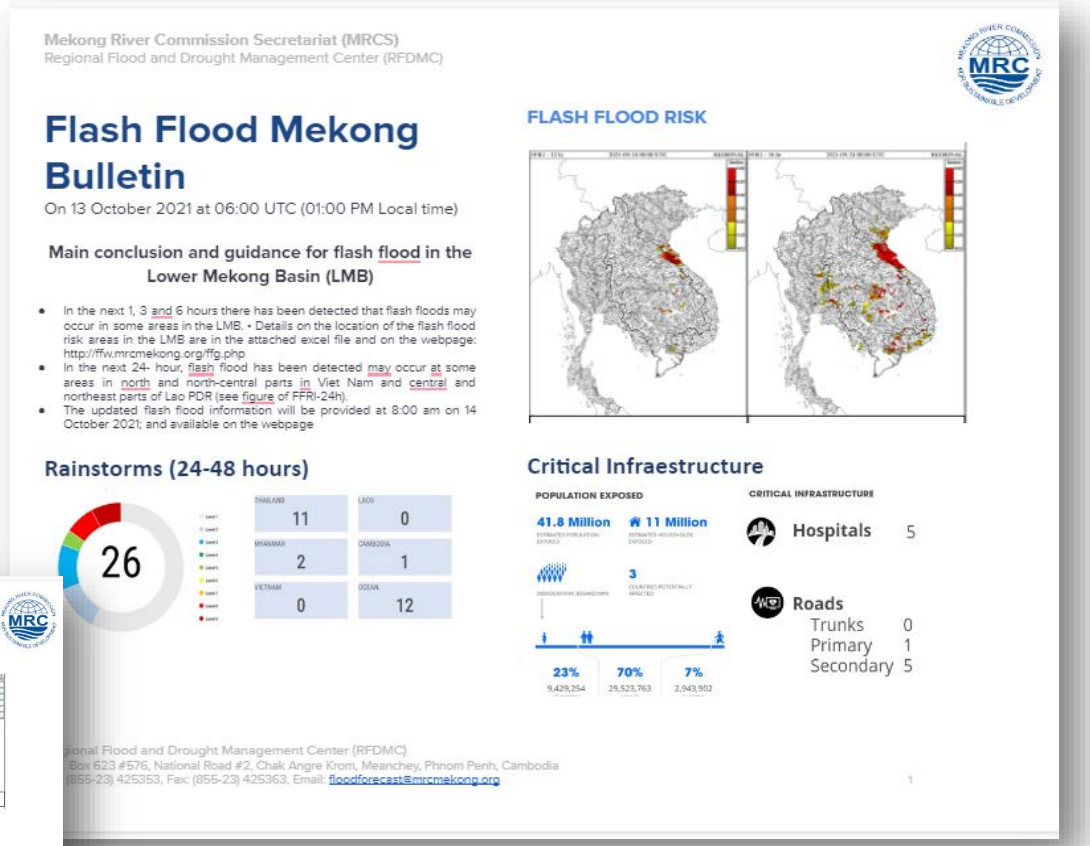


Prepare to Respond – impact forecasting and early warning









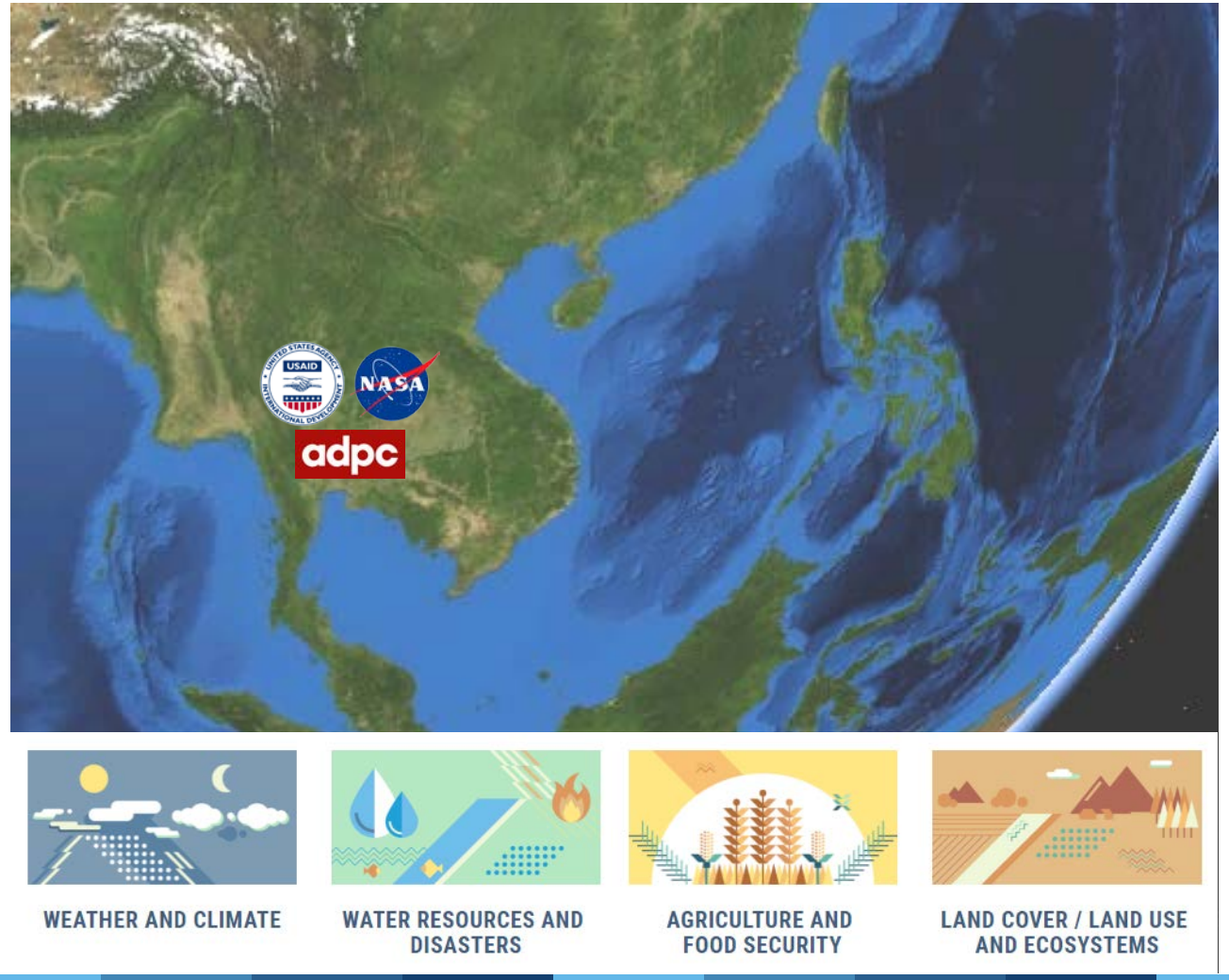
Flash Flood Bulletins

disseminated to the public

Satellite Data for Disaster Preparedness

SERVIR Southeast Asia: A REGIONAL GEOSPATIAL HUB

A partnership between USAID, NASA and the Asian Disaster Preparedness Center (ADPC)



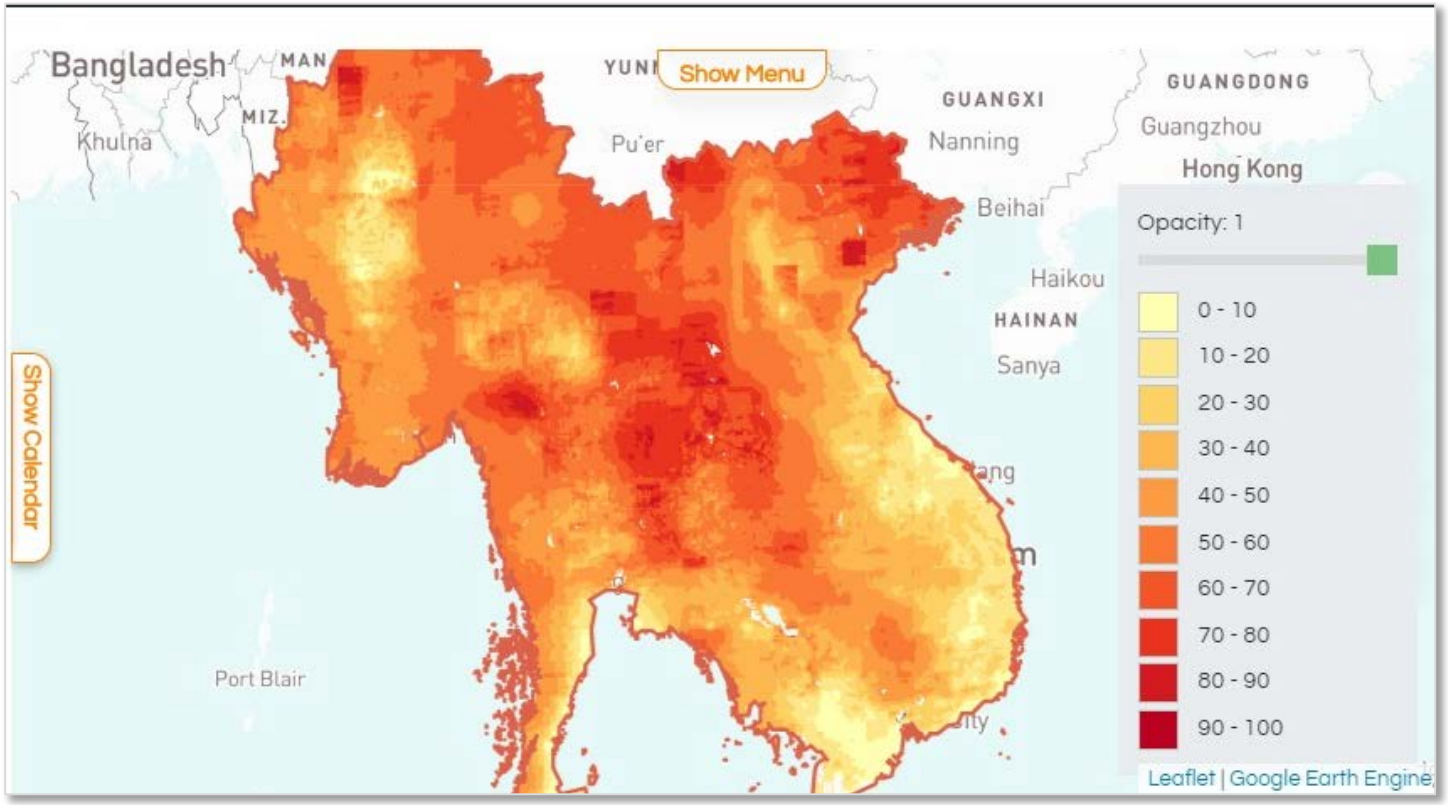
Supporting Preparedness to Respond

Provide various drought indices through SEA Drought Watch

Enhance drought risk management

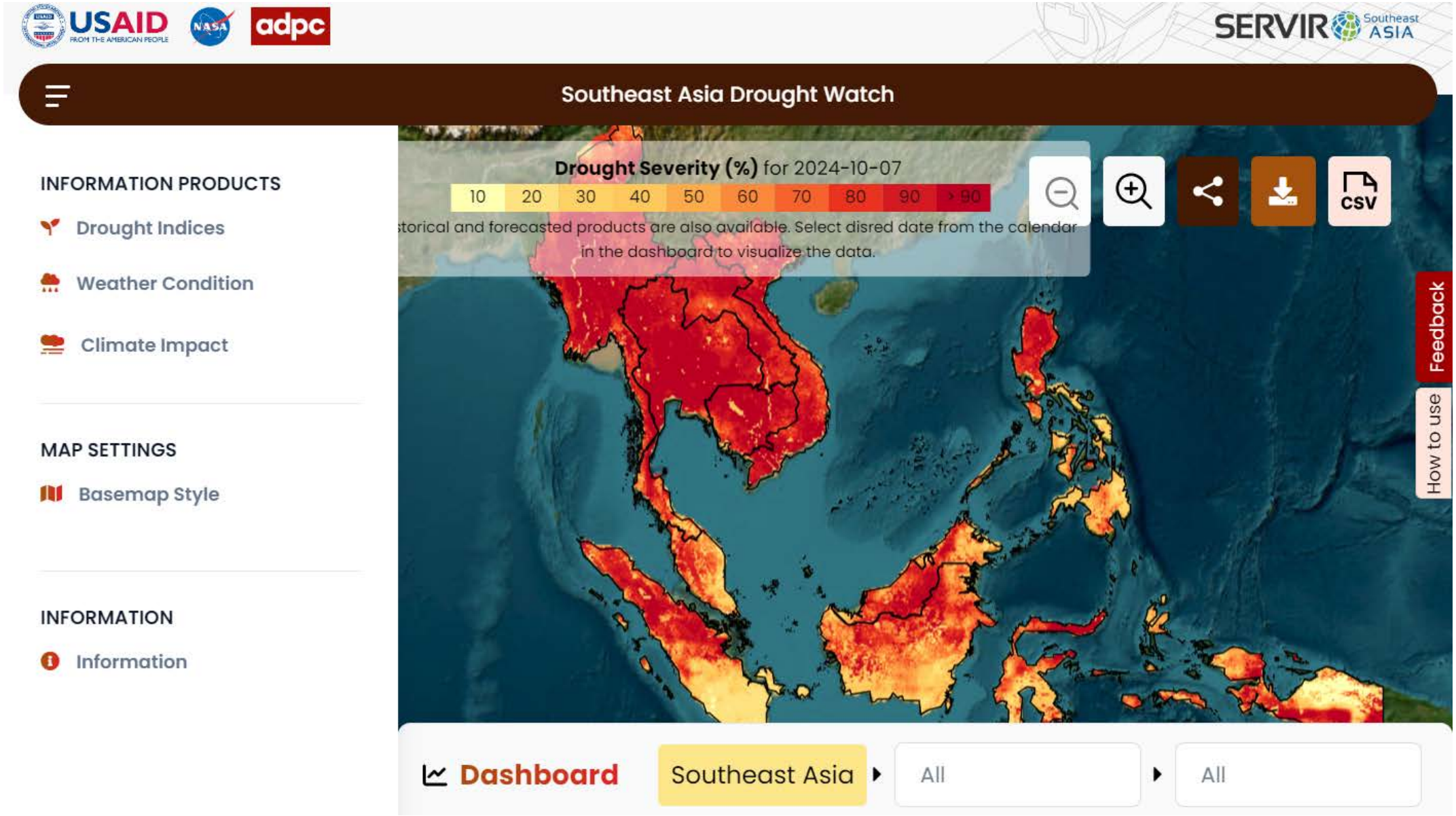
Drought and Asia's Livelihoods

Disaster Preparedness – forecasting slow onset hazards



SEA Drought Watch

- Uses publicly-available satellite data; hydrology and crop models
- Provides drought information on a variety of time scales:
  - Historic
  - Near-real-time
  - 3-month forecast
  - Long-term climate change outlooks



https://servir.adpc.net/tools/southeast-asia-drought-watch-seadw

Disaster Preparedness – informing the people ahead of time

Weekly Drought Bulletin

The Southeast Asia Drought Monitoring System (SEADW) weekly bulletin is produced by the SERVIR Southeast Asia and is funded by USAID. This bulletin presents the overall situation of the drought conditions in both the current and past week for Southeast Asia.

Southeast Asia ▸ All

Updated on 2024-09-29

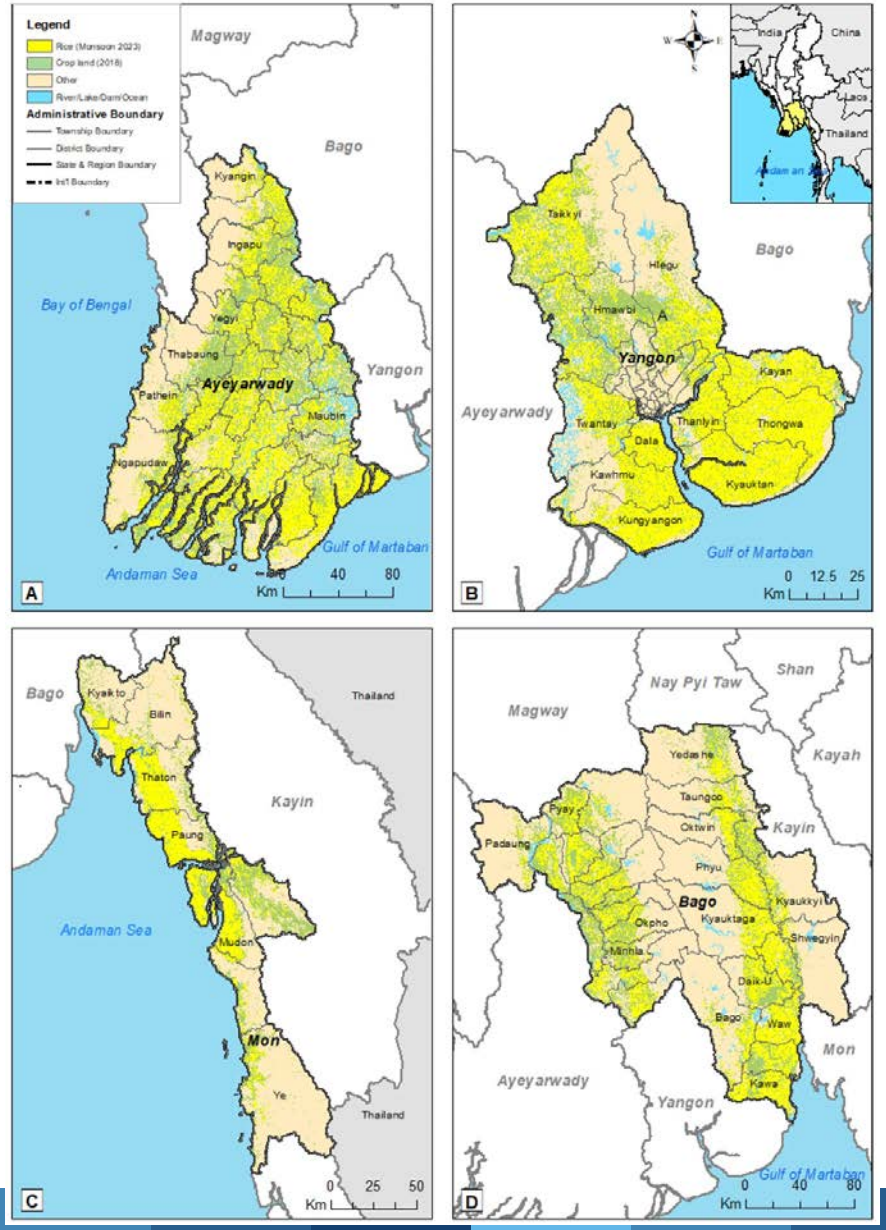
Based on the provided table summarizing drought-related data for various regions in Southeast Asia, several key points emerge:

- **Rainfall Variation**: The regions may show diverse rainfall levels, ranging from a low of 2.27 mm in Timor-Leste to a high of 116.64 mm in Brunei during this week. This indicates significant variation in precipitation across different areas.
- **Soil moisture:**: Brunei is likely to have the highest at 86.28 mm while Vietnam is likely to indicate the lowest at 83.25 mm.
- **Standardized Precipitation Index (SPI)**: SPI values, which indicate drought conditions. Notably, Thailand may shows a positive SPI (0.84) in no drought conditions, whereas Brunei has the lowest SPI (negative SPI: -0.28) which indicates no drought conditions.
- **Drought Conditions**: The Combined Drought Index (CDI) , which shows the seasonal dryness, may record its lowest values that indicated "No drought" conditions over Philippines (CDI: 0.34). Whereas the Singapore is likely to record its highest values, which indicates the "No drought" status (CDI: 1).

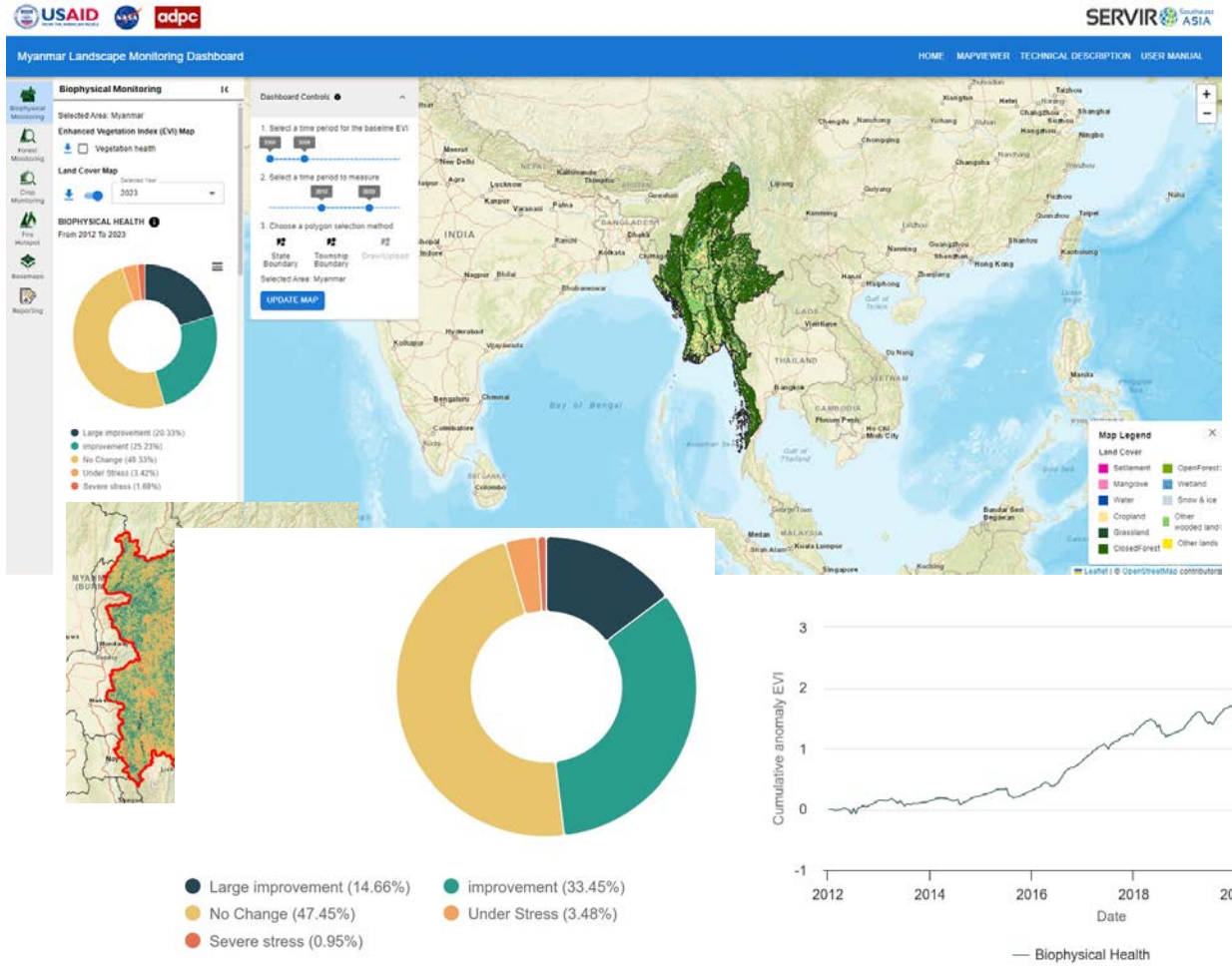
Regions	Rainfall (mm)	Soil Moisture (mm)	SPI 1 months	Combined Drought Index (CDI)
Brunei	116.64	27.32	Normal or Wet (-0.28)	No Drought (0.97)
Cambodia	68.16	43.85	Normal or Wet (0.77)	No Drought (0.96)
Indonesia	100.51	32.69	Normal or Wet (0.4)	No Drought (0.81)
Laos	63.5	43.57	Normal or Wet (0.66)	No Drought (0.97)
Malaysia	110.61	28.98	Normal or Wet (0.4)	No Drought (0.98)
Myanmar	68.02	43.79	Normal or Wet (0.61)	No Drought (0.97)
Philippines	80.29	23.61	Normal or Wet (0.31)	No Drought (0.34)
Singapore	105.53	35.36	Normal or Wet (0.56)	No Drought (1)
Thailand	65.31	38.26	Normal or Wet (0.84)	No Drought (0.91)
Timor-Leste	2.27	15.88	Normal or Wet (-0.27)	No Drought (0.73)
Vietnam	82	46.89	Normal or Wet (0.69)	No Drought (0.84)

Disaster Preparedness – forecasting the impacts on crops

Crop Areas



Biophysical and Crop Conditions



EO-based data and analytics should be used more for Disaster Mitigation and Preparedness

New Technology

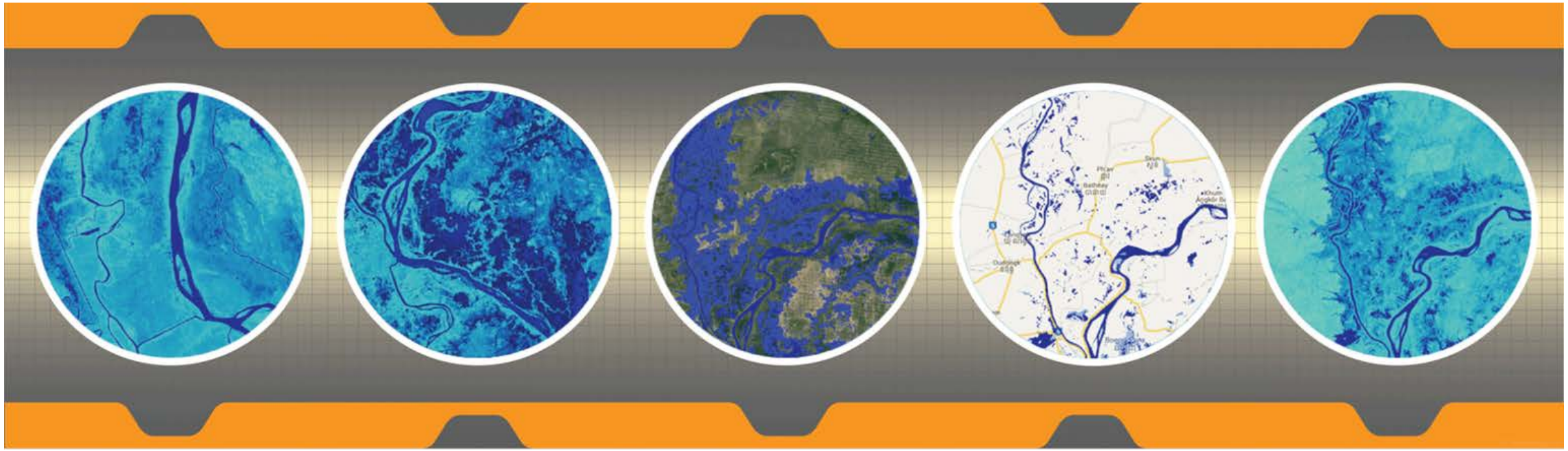
Satellite imagery and other technology is becoming more widely available faster than the community level can comprehend.

New Opportunity

DRM Communities can make better risk informed decisions if they could understand the data available.

Lack of understanding

If there was a better understanding of this new technology at the community level it could be a vital resource to DRM activities.



Thank You

peeranan@adpc.net