

A satellite view of the Earth from space, showing the Asian continent in the center, surrounded by the Indian and Pacific Oceans. The landmasses are shown in shades of green and brown, while the oceans are a deep blue. The curvature of the Earth is visible against the blackness of space.

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'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.

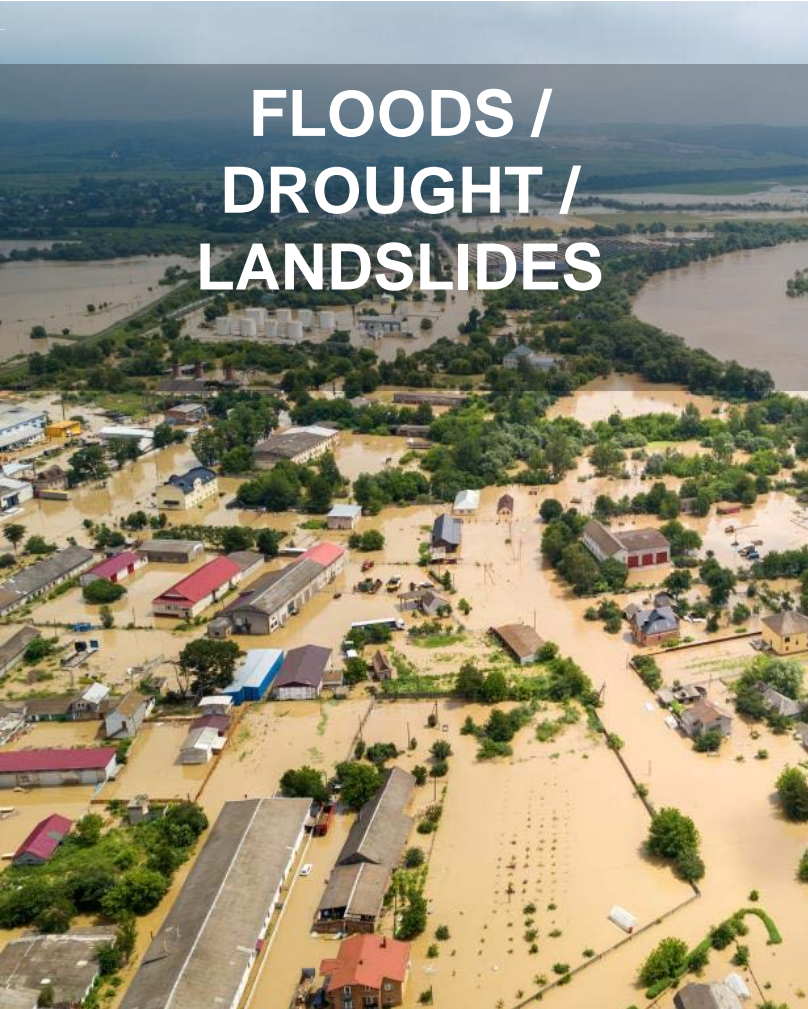
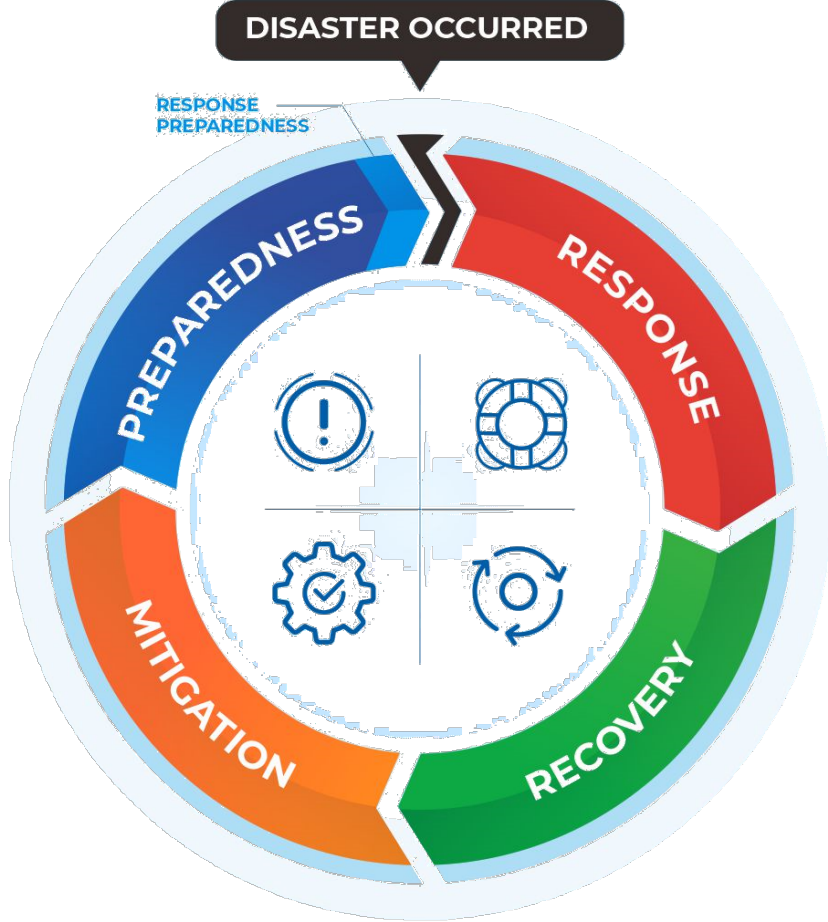
Extreme Hydrological Events

- 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.

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)



WEATHER AND CLIMATE



WATER RESOURCES AND DISASTERS



AGRICULTURE AND FOOD SECURITY



LAND COVER / LAND USE AND ECOSYSTEMS

Supporting Preparedness to Respond



Flash Flood Guidance

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



Drought forecasting & monitoring

Provide various drought indices through SEA Drought Watch

Enhance drought risk management

Satellite Data for Disaster Preparedness



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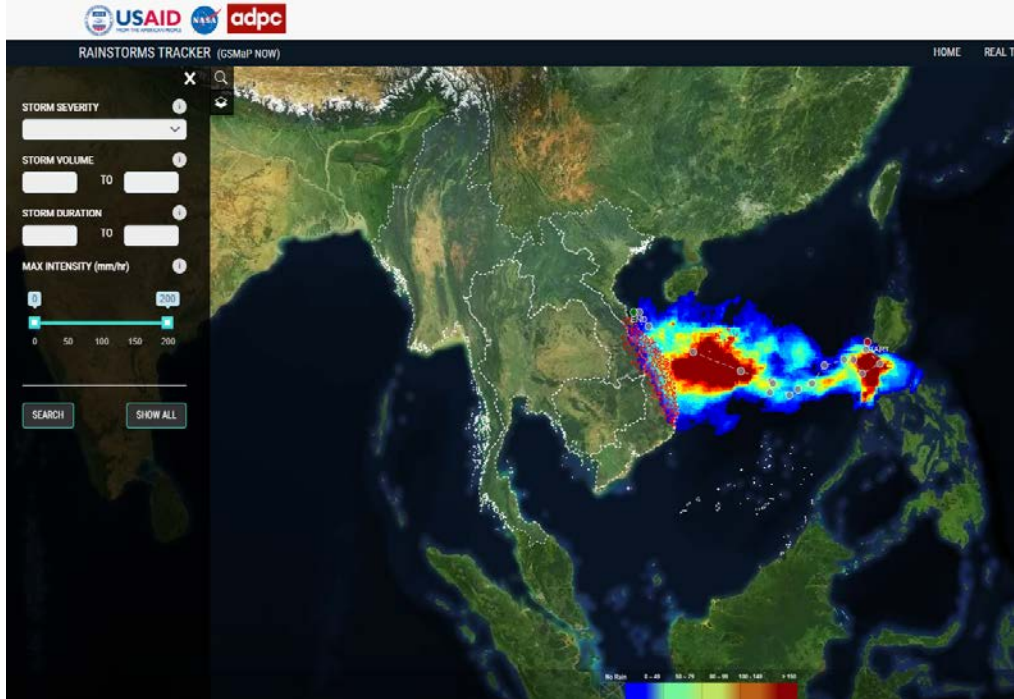


AGRICULTURE AND FOOD SECURITY



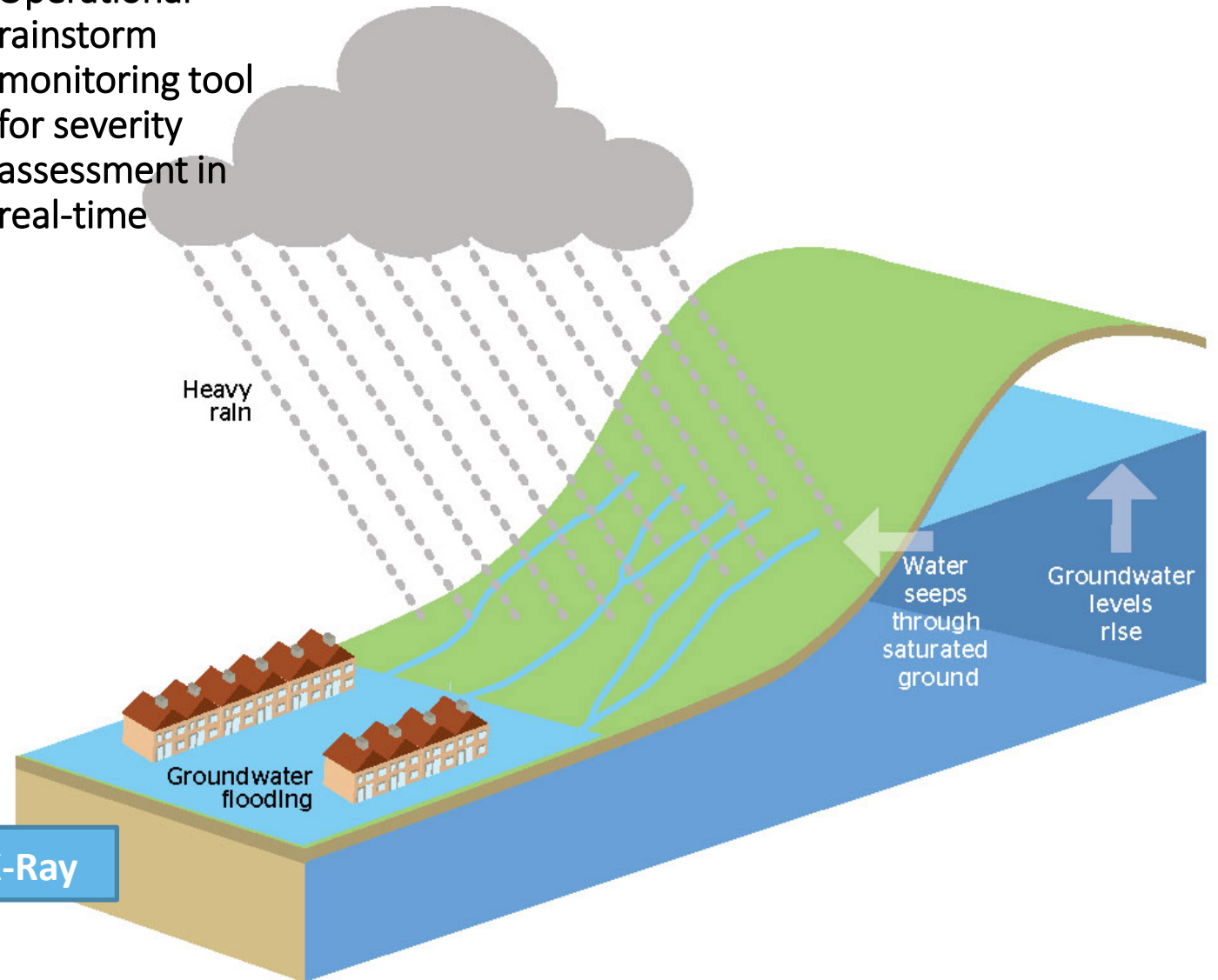
LAND COVER / LAND USE AND ECOSYSTEMS

The Nature of Flash Floods



Rainstorm Tracker

Operational rainstorm monitoring tool for severity assessment in real-time



Mekong X-Ray

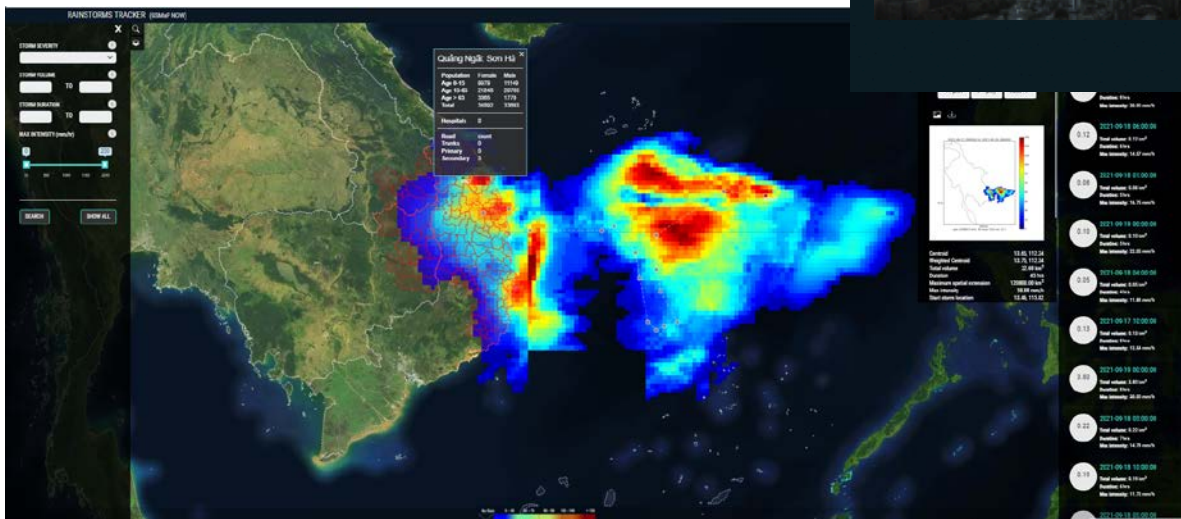
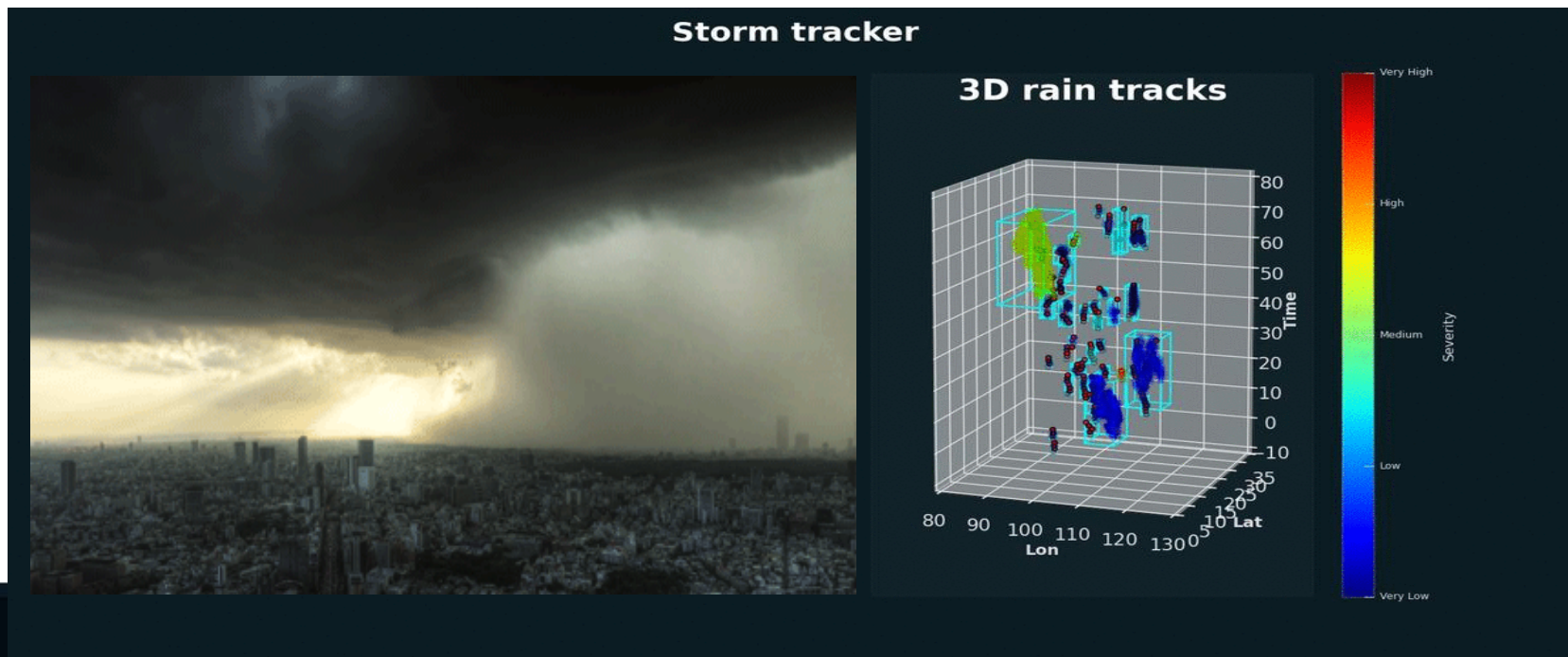
multidimensional vulnerability framework for impact assessment

Prepare to Respond – forecasting flash floods

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

Rainstorm Tracker

Spatiotemporal analysis for rainstorms



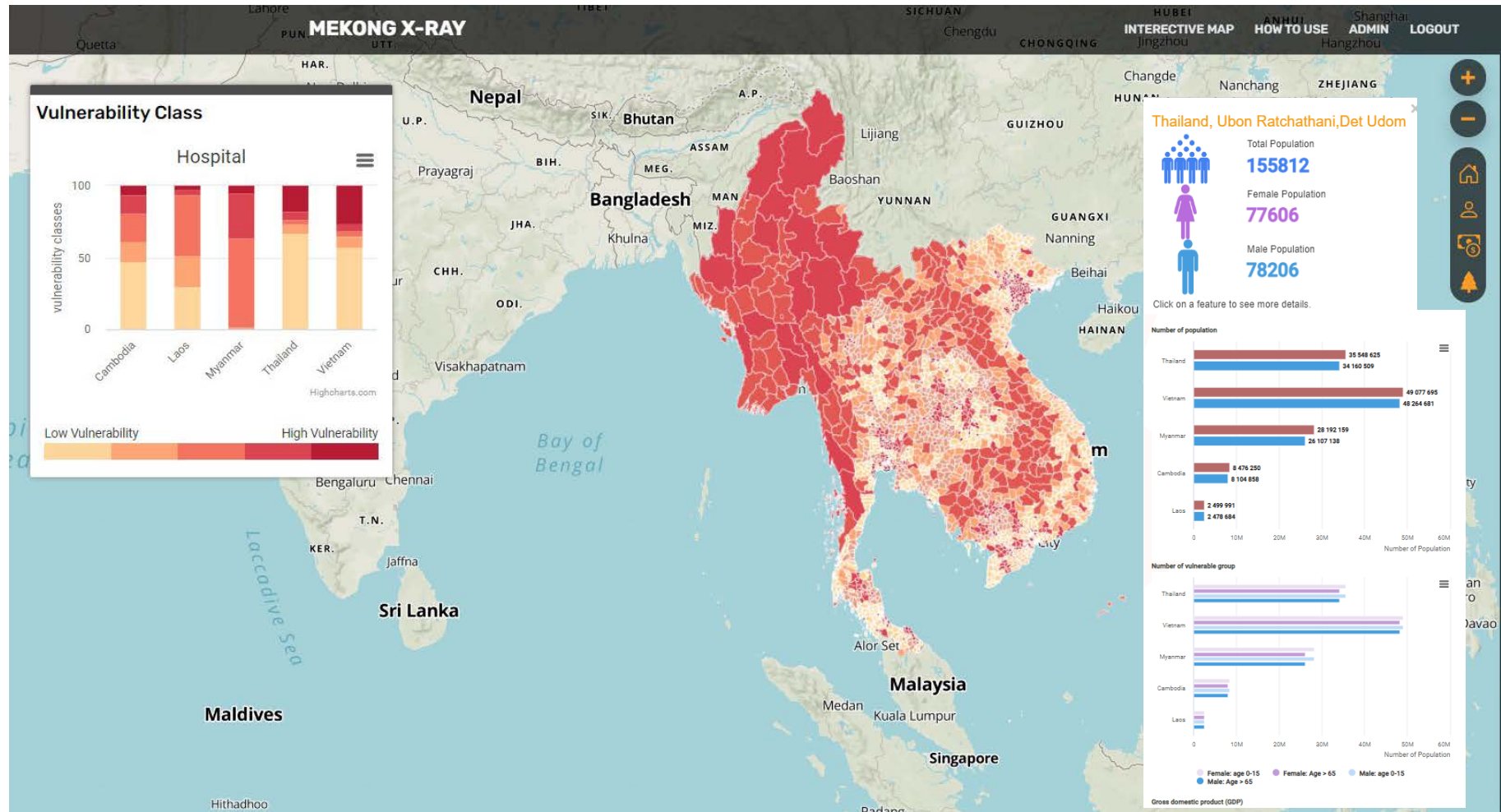
<https://servir.adpc.net/tools/rainstorm-tracker>

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

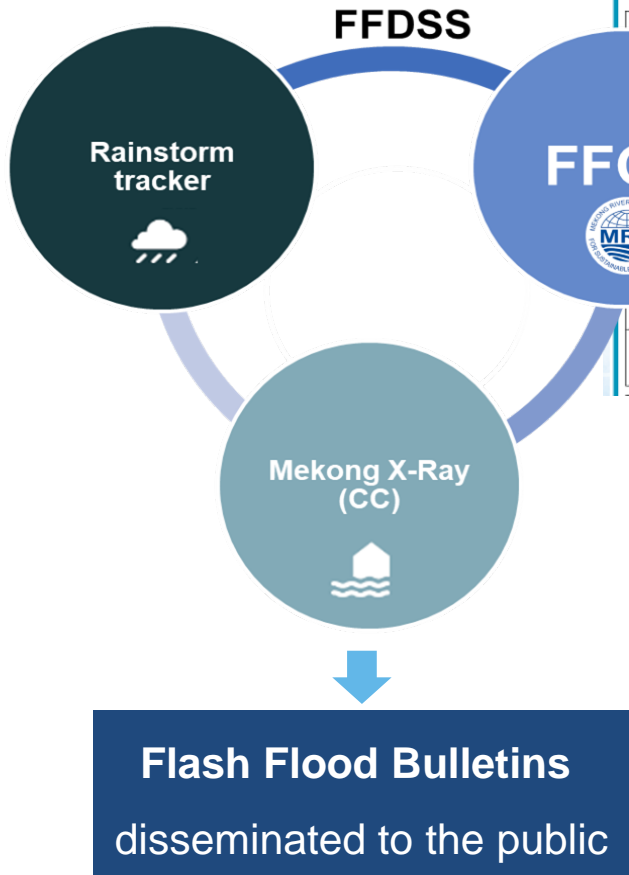
Mekong X-Ray

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



Mekong River Commission

Flood Forecasting

Overview | Upper Mekong | Central Mekong | Lower Mekong | Latest data

Site features | Site details | Features | Model outputs | Export data

About this site | Flash Flood Products | Weather Information | Historical Data | Links

Latest news

This page was last updated on 29 October 2017 08:30

Products of the MRC Flash Flood Guidance System (MRCFFGS)
On 29 October 2017 at 00:00 UTC (07:00 local time)

FFG-01 hr

FFG-03 hr

Figure 1: 01 hourly Flash Flood Guidance (FFG) values on 27 October 2017 at 00:00 UTC (07:00 local time).
01 hourly show high-risk flash flood occurrences in Viet Nam. For more detail information on flash flood risk areas please click on the below.

Figure 2: 03 hourly Flash Flood Guidance (FFG) on 27 October 2017 at 00:00 UTC (07:00 local time).
03 hourly show high-risk flash flood occurrences in Lao PDR and Viet Nam. For more detail information on flash flood risk areas please click on the below.

Mekong River Commission Secretariat (MRCS)
Regional Flood and Drought Management Center (RFDMC)

FLASH FLOODS RISK BY PROVINCE

Province	Households affected	Deaths	Hours affected	Health facilities affected	Schools affected
Pursat	18,365	1,871	3	436	0
Battambang	38,890	1,331	-	2,812	3
Banteay Meanchey	8,538	1,473	6	8,538	6
Stung Treng	923	55	-	851	1
Preah Vihear	237	-	-	-	-
Svay Rieng	26	-	-	-	-
Pailin	742	253	1	620	6
Kandal	4,157	12	1	3,974	-
Kampong Speu	1,697	338	-	626	-
Tako	314	-	-	314	-
Phnom Penh	3,121	45	-	2,855	-

Mekong River Commission Secretariat (MRCS)
Regional Flood and Drought Management Center (RFDMC)

FFGS OUTPUTS

Figure 1: 01 Hourly Flash Flood Guidance (FFG) on 27 October 2017 at 00:00 UTC (07:00 local time).
Figure 2: 03 Hourly Flash Flood Guidance (FFG) on 27 October 2017 at 00:00 UTC (07:00 local time).
Figure 3: 06 Hourly Flash Flood Guidance (FFG) on 27 October 2017 at 00:00 UTC (07:00 local time).

REGIONAL RAINFALL FORECAST

Figure 1: 01 Hourly Regional Rainfall Forecast (RRF) on 27 October 2017 at 00:00 UTC (07:00 local time).
Figure 2: 03 Hourly Regional Rainfall Forecast (RRF) on 27 October 2017 at 00:00 UTC (07:00 local time).
Figure 3: 06 Hourly Regional Rainfall Forecast (RRF) on 27 October 2017 at 00:00 UTC (07:00 local time).

Head of RFDMC
(For official use only)

Prepared by
Lan Hing, Tel: [redacted]

Approved by
Nguyen Quoc Anh, Tel: [redacted]

Mekong River Commission Secretariat (MRCS)
Regional Flood and Drought Management Center (RFDMC)

Flash Flood Mekong Bulletin

On 13 October 2021 at 06:00 UTC (01:00 PM Local time)

Main conclusion and guidance for flash flood in the Lower Mekong Basin (LMB)

- In the next 1, 3 and 6 hours there has been detected that flash floods may occur in some areas in the LMB. Details on the location of the flash flood risk areas in the LMB are in the attached excel file and on the webpage: <http://ffw.mrcmekong.org/ffg.php>
- In the next 24-hour, flash flood has been detected may occur at some areas in north and north-central parts in Viet Nam and central and northeast parts of Lao PDR (see figure of FFR(24h)).
- The updated flash flood information will be provided at 8:00 am on 14 October 2021, and available on the webpage

Rainstorms (24-48 hours)

Country	Number
THAILAND	11
LAOS	0
MYANMAR	2
CAMBODIA	1
Vietnam	0
Other	12

Critical Infraestructure

POPULATION EXPOSED

23% 9,429,254
70% 26,525,763
7% 2,543,902

CRITICAL INFRASTRUCTURE

Hospitals 5
Roads: Trunks 0, Primary 1, Secondary 5

Regional Flood and Drought Management Center (RFDMC)
Box 623 #576, National Road #2, Chak Angre Krom, Meanchey, Phnom Penh, Cambodia
(855-23) 425353, Fax: (855-23) 425363, Email: floodforecast@mrcmekong.org

Mekong River Commission Secretariat (MRCS)
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FLASH FLOOD RISK

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WATER RESOURCES AND DISASTERS



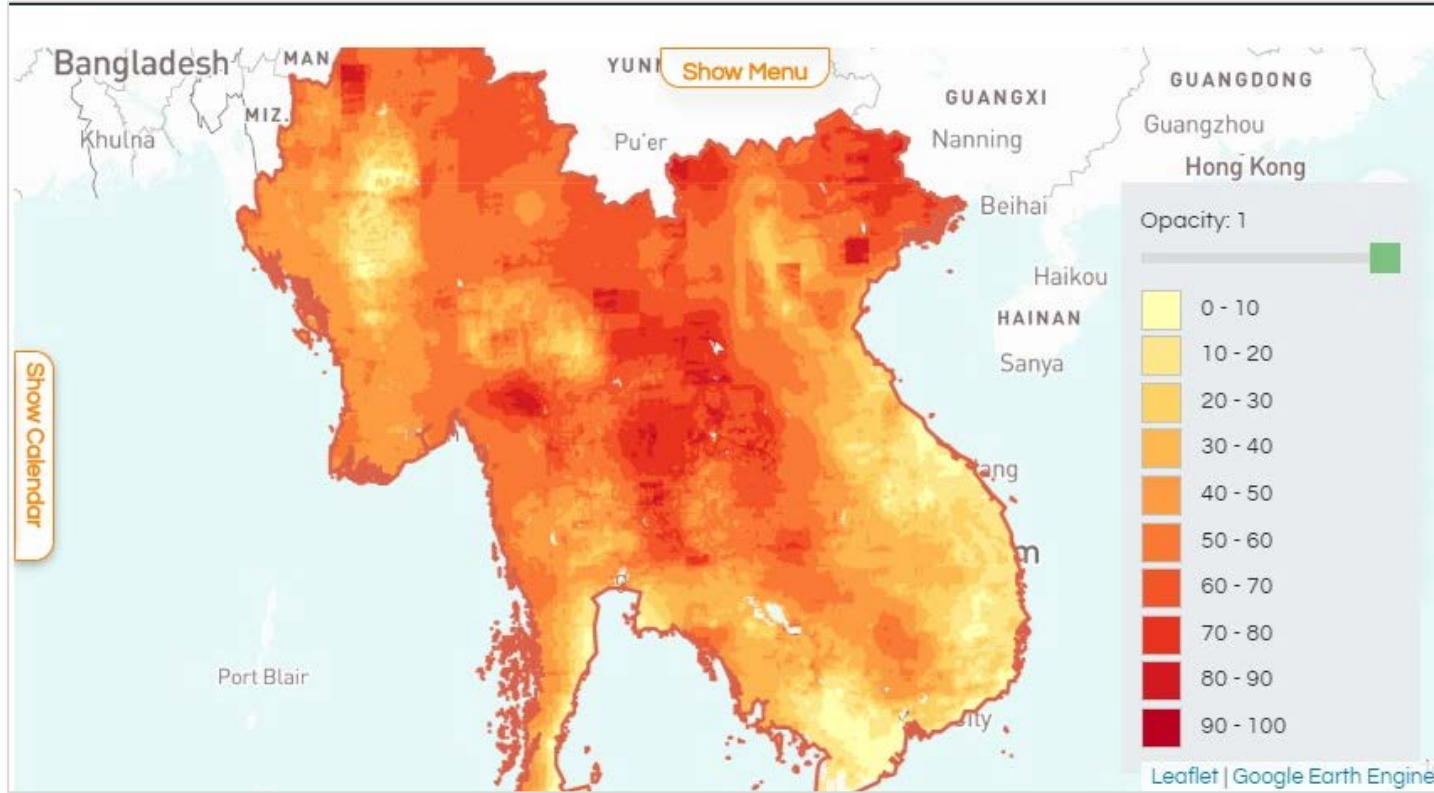
AGRICULTURE AND FOOD SECURITY



LAND COVER / LAND USE AND ECOSYSTEMS



Drought and Asia's Livelihoods



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

Southeast Asia Drought Watch

INFORMATION PRODUCTS

 Drought Indices

 Weather Condition

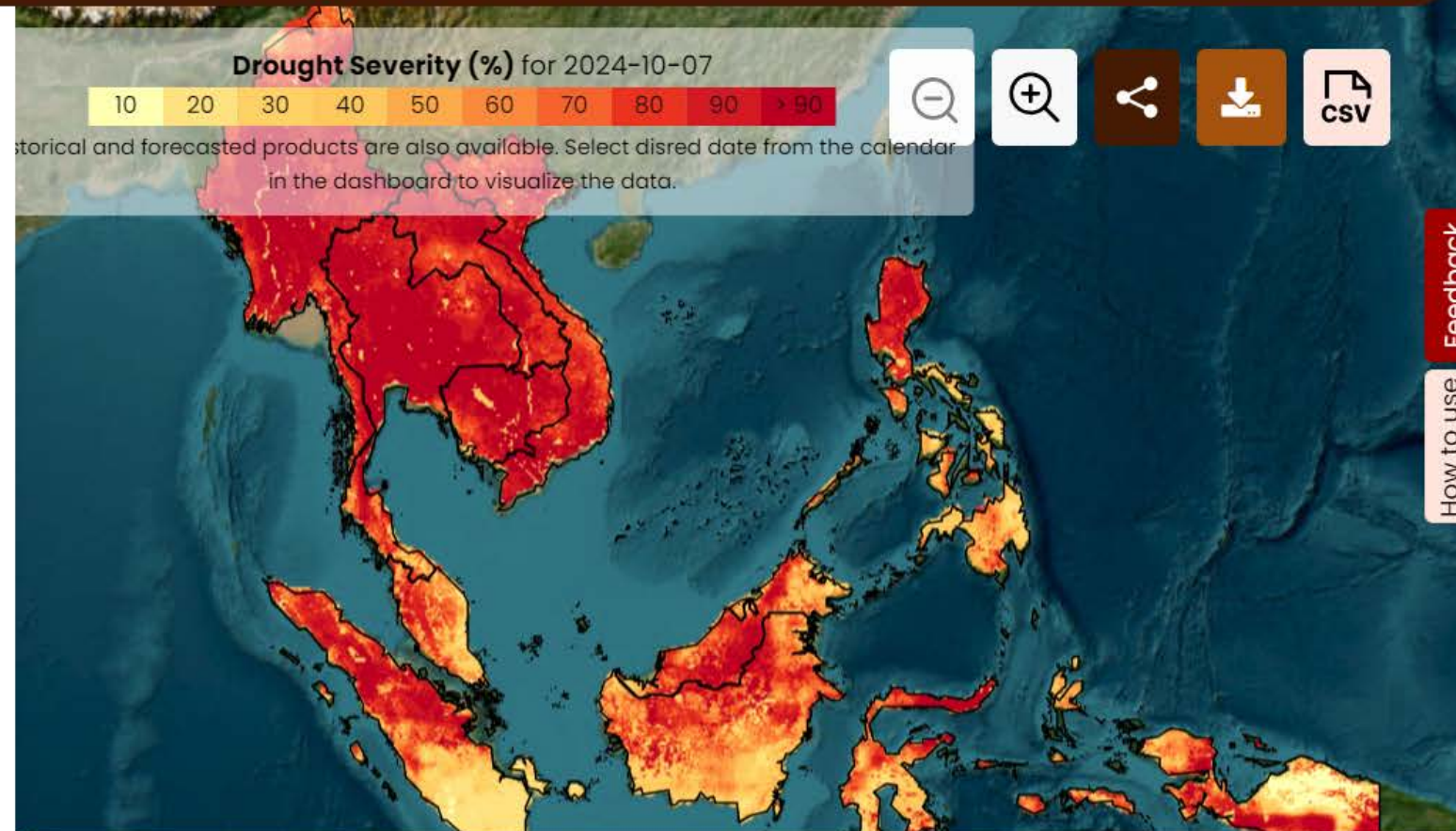
 Climate Impact

MAP SETTINGS

 Basemap Style

INFORMATION

 Information



 **Dashboard**

Southeast Asia ▶

All

All

Feedback

How to use

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

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

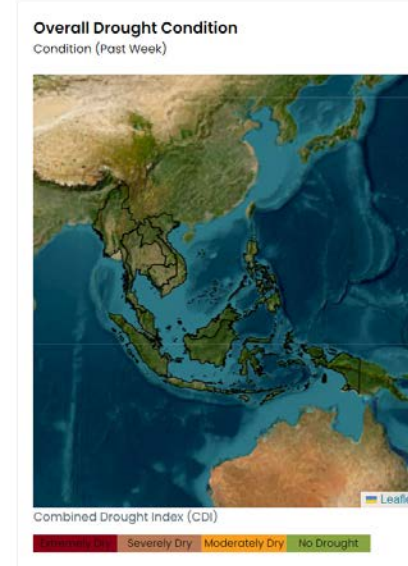
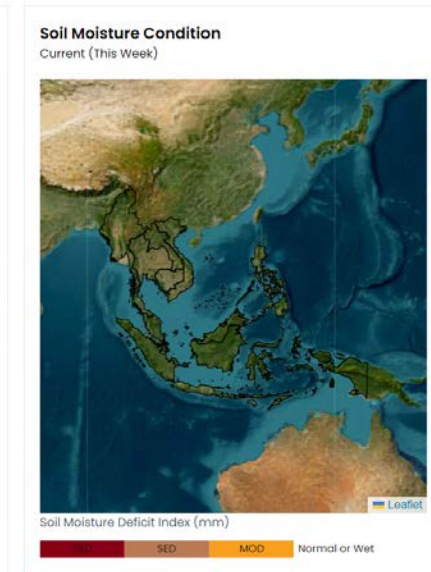


Updated on 2024-09-29

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

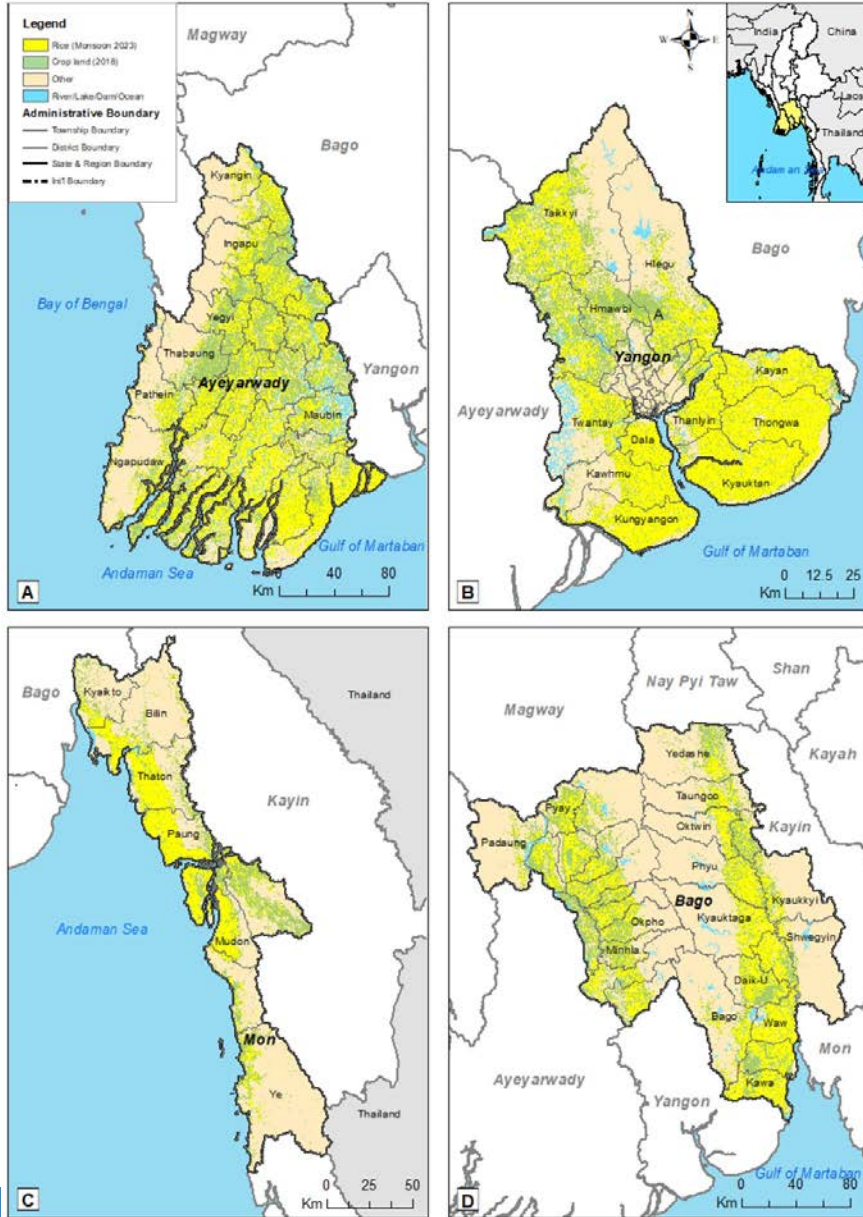
- **Rainfall Variation:** The regions may show diverse rainfall levels, ranging from a low of 2.27 mm in **Timor-Leste** to a high of 116.64 mm in **Brunei** during this week. This indicates significant variation in precipitation across different areas.
- **Soil moisture:** **Brunei** is likely to have 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 show 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)

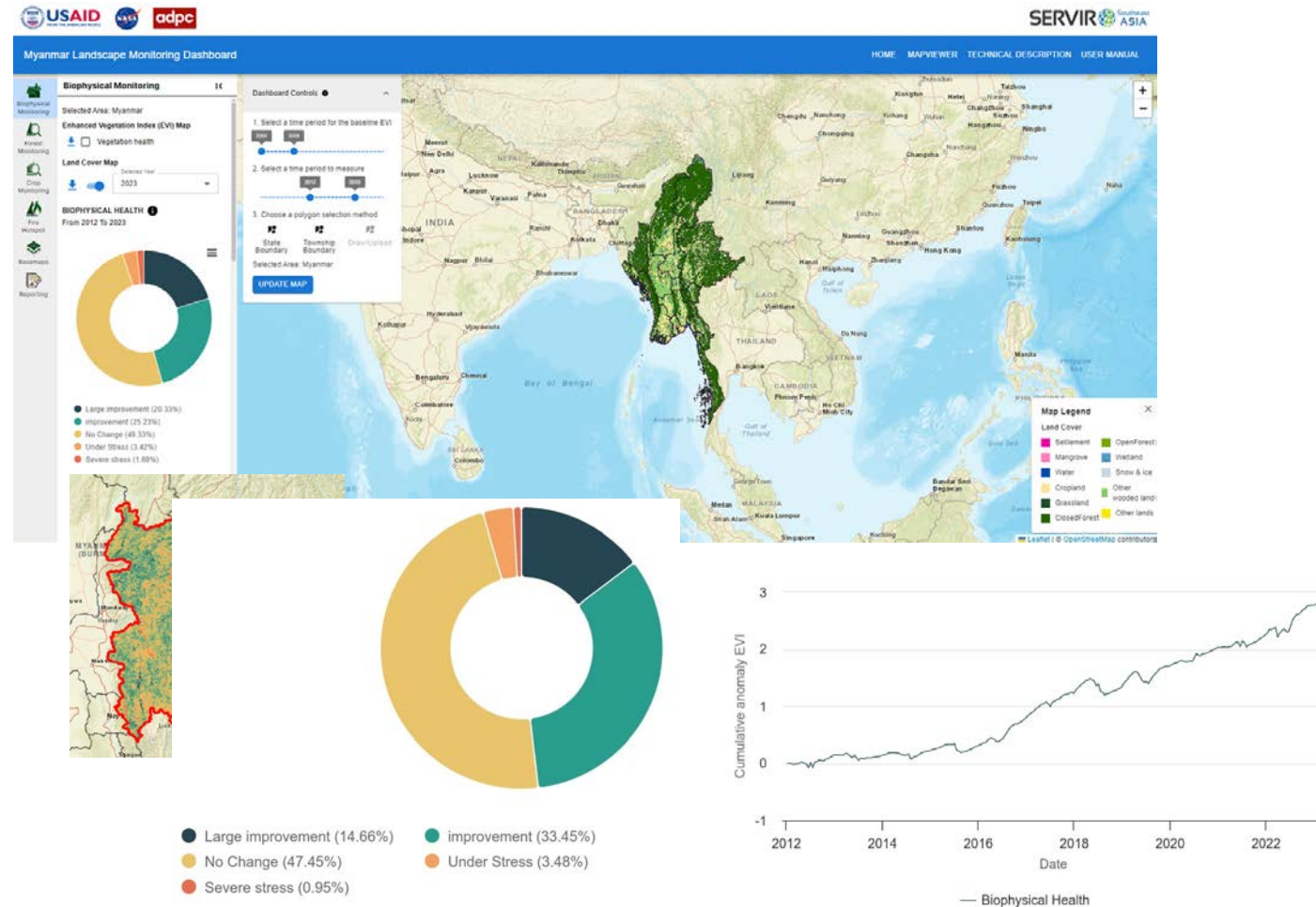


Disaster Preparedness – forecasting the impacts on crops

Crop Areas



Biophysical and Crop Conditions



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

New Technology

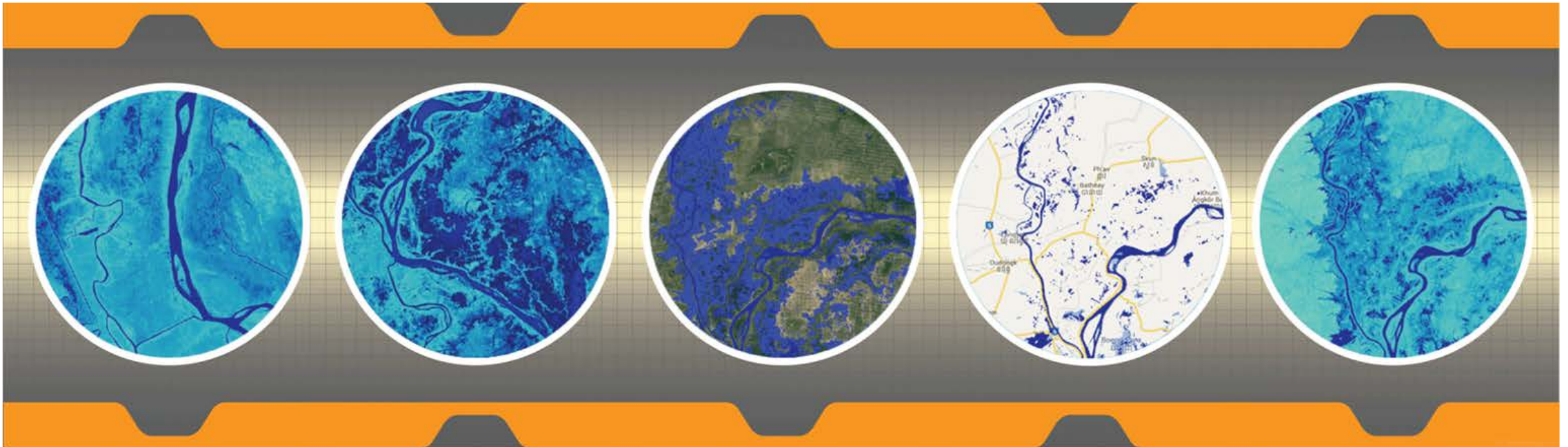
Satellite imagery and other technology is becoming more widely available faster than the community level can comprehend.

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

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