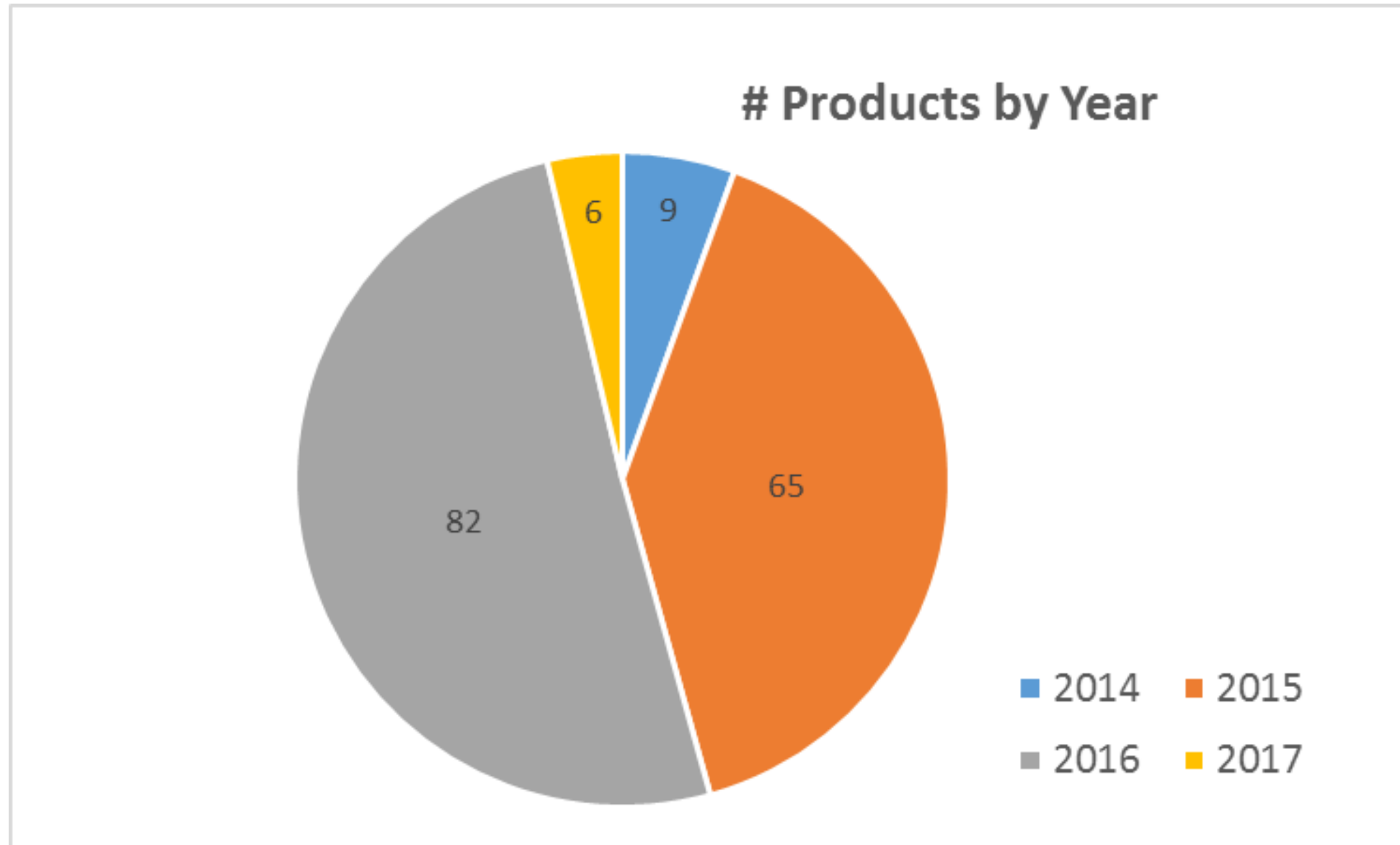


GIC-AIT Report as P-DAN of Sentinel Asia

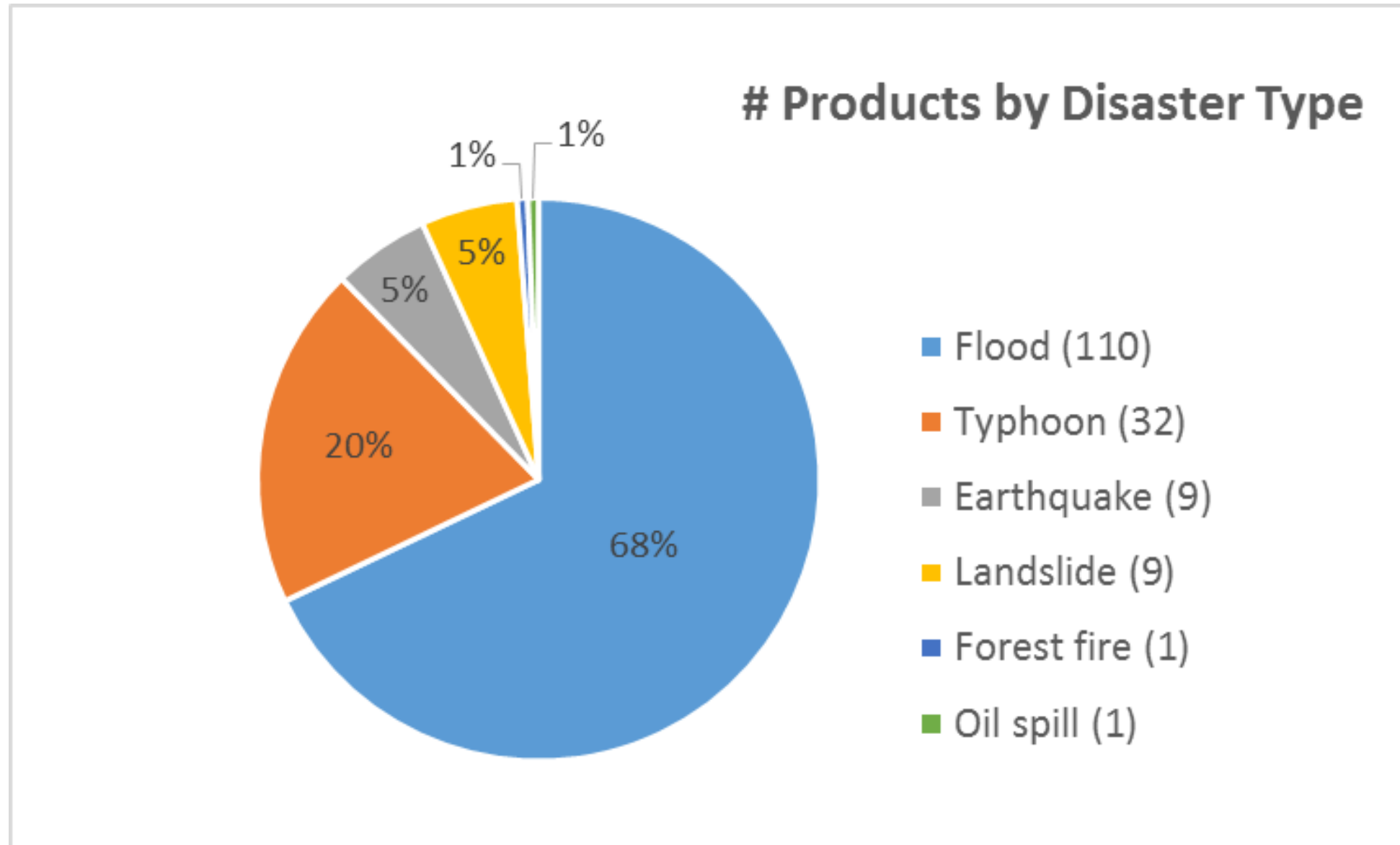
Geoinformatics Center
Asian Institute of Technology



Summary of Emergency Products/VAPs Created by GIC-AIT (1)

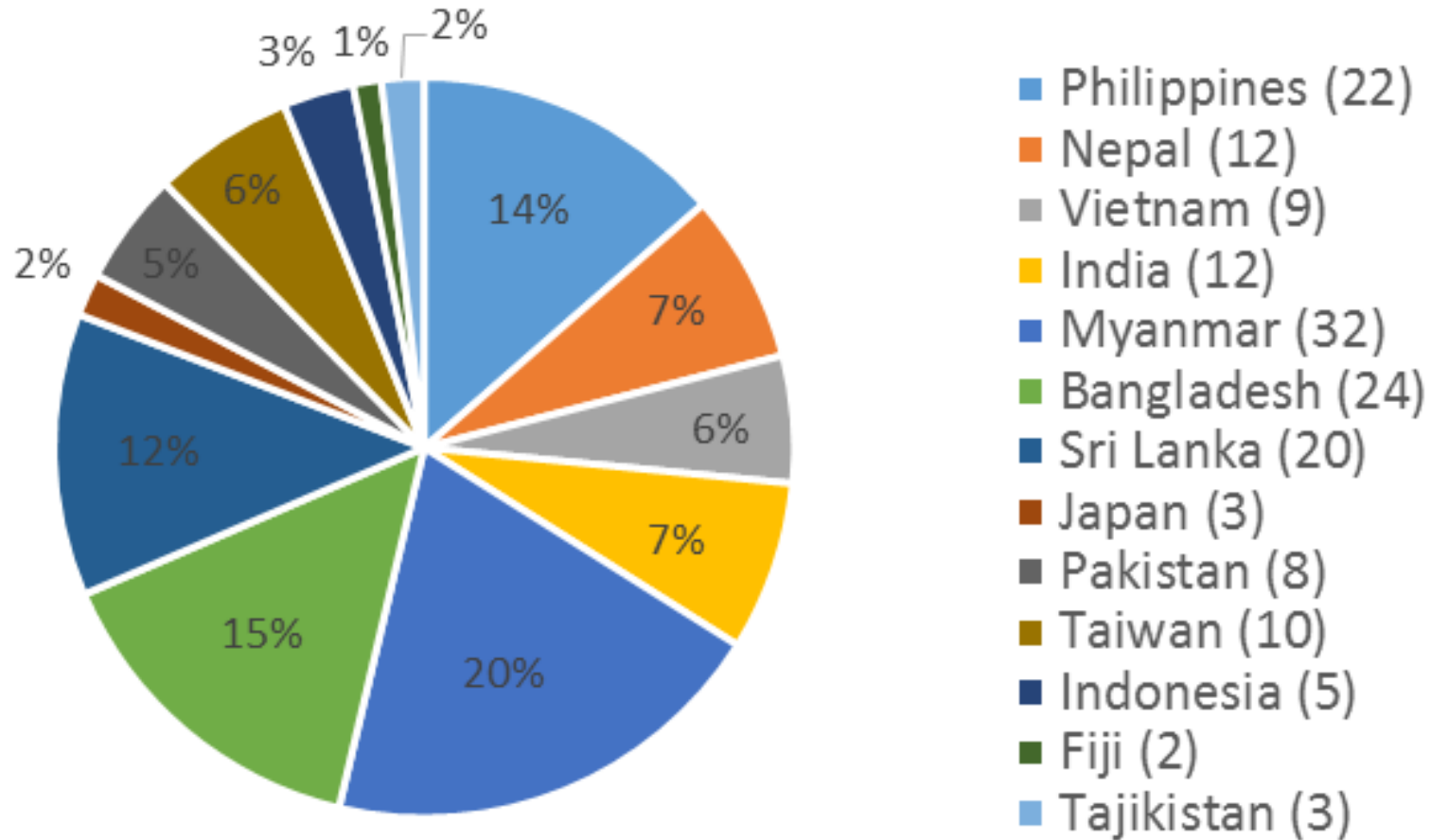


Summary of Emergency Products/VAPs Created by GIC-AIT (2)



Summary of Emergency Products/VAPs Created by GIC-AIT (3)

Products by Country



Example: Flood in Mindanao island of the Philippines (January 2017)

24 Jan 2017: EOR from PAGASA received by SA Secretariat



24 Jan 2017: SA Secretariat requested satellite observation to DPN member



25 Jan 2017: ALOS-2 data of 24 Jan 2017 were provided by JAXA (5 scenes of SAR data)



26 Jan 2017: First two products from ALOS-2 data were made by AIT.
Uploaded to SA website and shared with PAGASA.



27 Jan 2017: Another product from ALOS-2 data was made by AIT.
Uploaded to SA website and shared with PAGASA

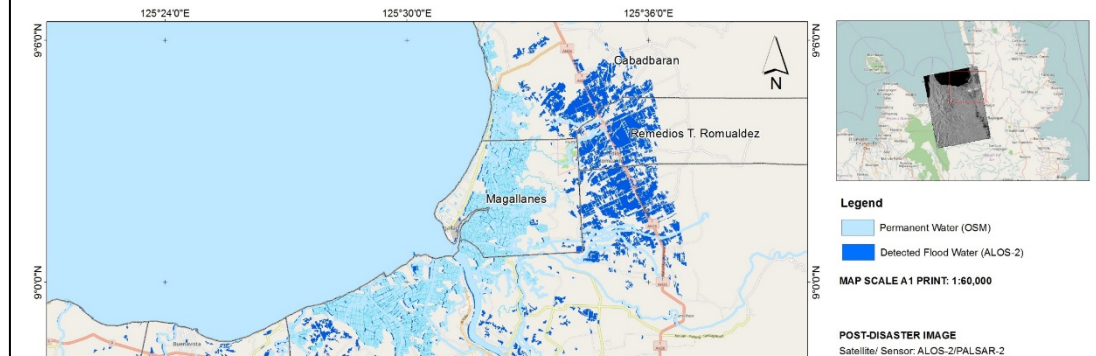


31 Jan 2017: THEOS data of 30 Jan 2017 were provided by GISTDA
(2 scenes of multispectral data and 5 scenes of panchromatic data)

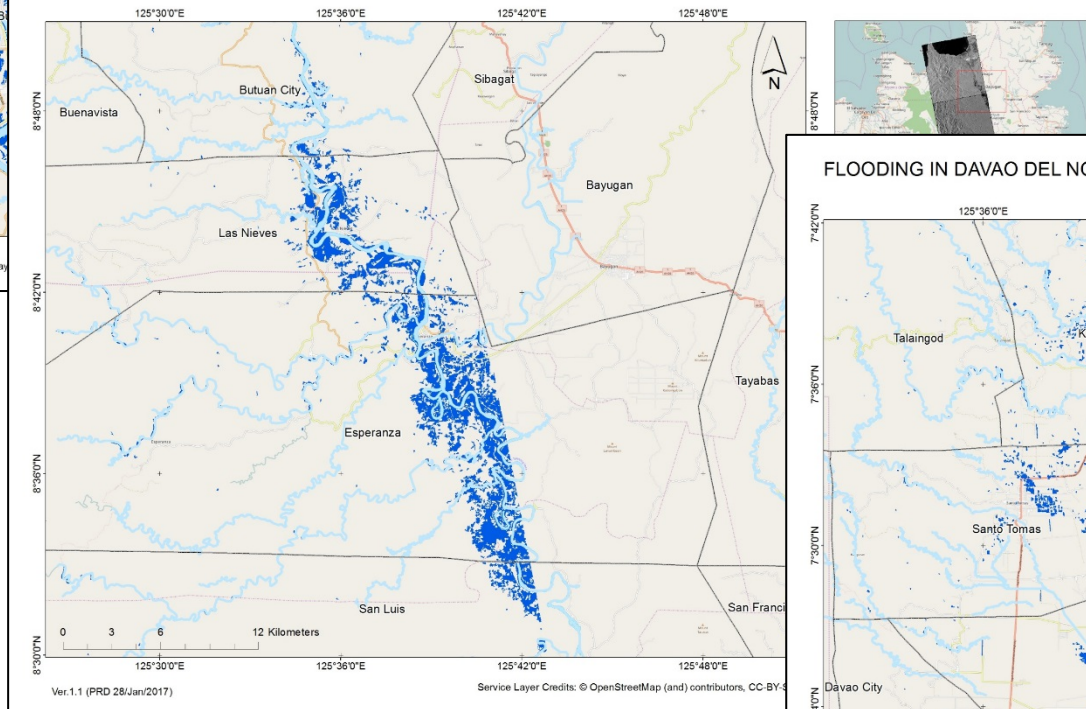


1 Feb 2017: A product from THEOS data was made by AIT

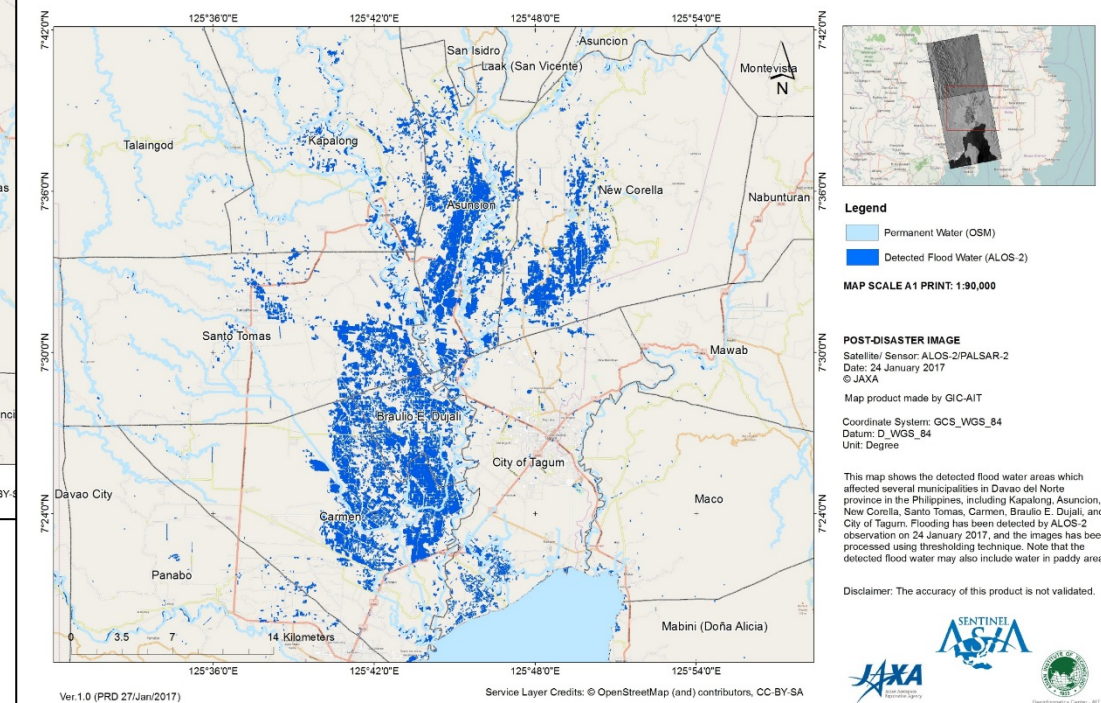
FLOODING IN AGUSAN DEL NORTE PROVINCE IN THE PHILIPPINES



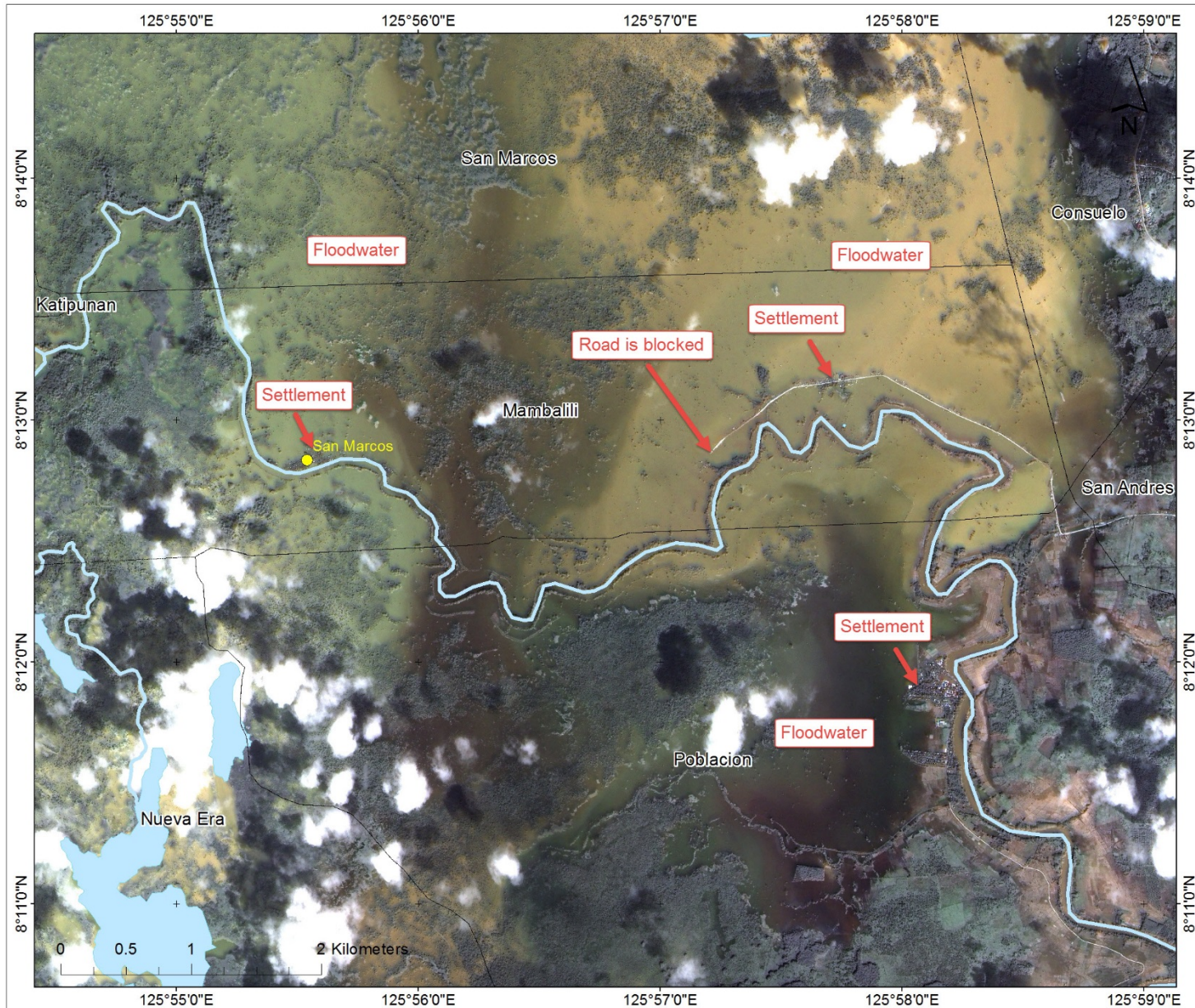
FLOODING IN AGUSAN DEL NORTE & AGUSAN DEL SUR PROVINCES IN THE PHILIPPINES



FLOODING IN DAVAO DEL NORTE PROVINCE IN THE PHILIPPINES



FLOODING IN MUNICIPALITY OF BUNAWAN, AGUSAN DEL SUR PROVINCE IN THE PHILIPPINES



Legend

- Village
- River
- Water bodies
- Barangay boundary

POST-DISASTER IMAGE

Satellite/ Sensor: THEOS Pansharpening
 Date: 30 January 2017
 © GISTDA

GIS DATA

River, Water bodies, Villages © OpenStreetMap 2017
 Admin boundary © GADM

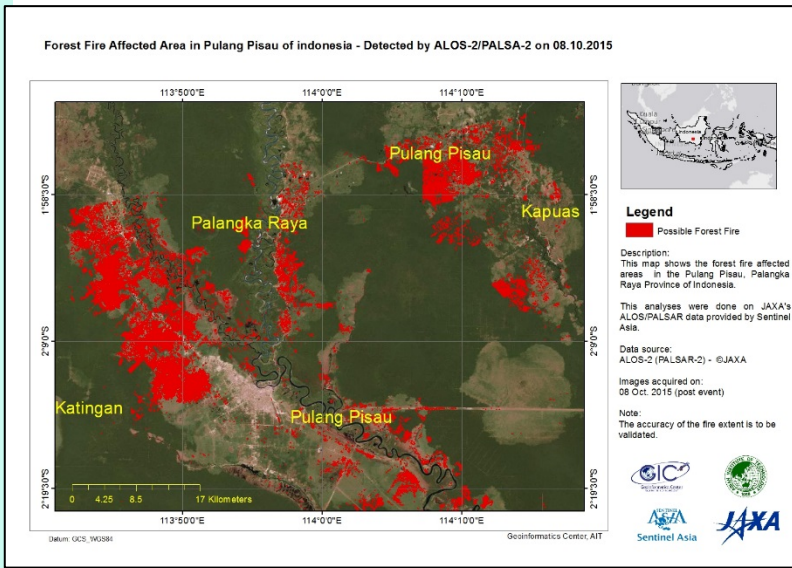
MAP SCALE A1 PRINT: 1:15,000

Coordinate System: GCS_WGS_84
 Datum: D_WGS_84
 Unit: Degree

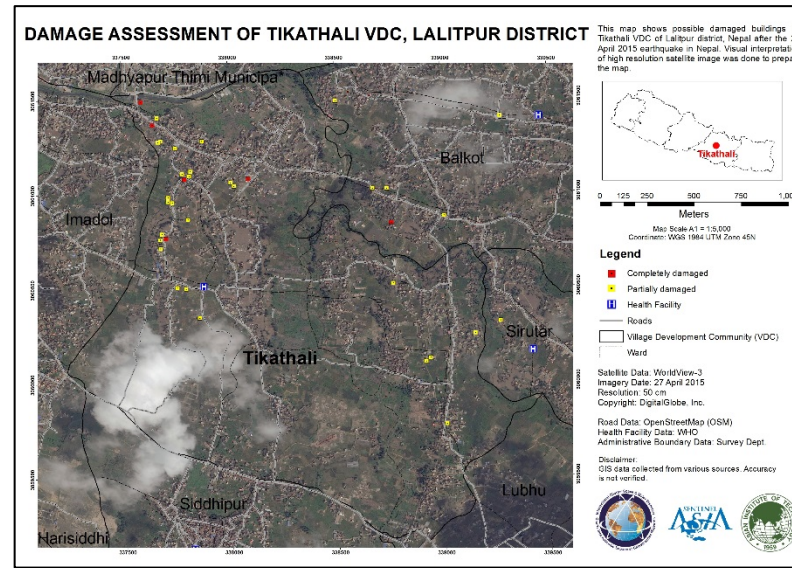
This map shows flooded areas as observed by THEOS satellite data on 30 January 2017. Floods have been seriously affected several barangays in the municipality of Bunawan, including Poblacion, Mambalili, San Marcos, Consuelo, and San Andres. Due to the floodwater, road access to some villages and settlement area is blocked.



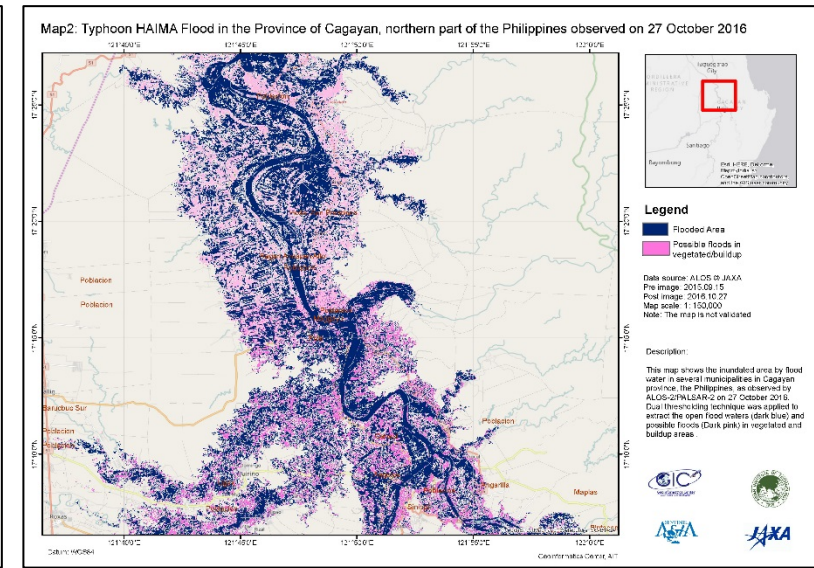
Forest fire in Indonesia on 02.01.2015



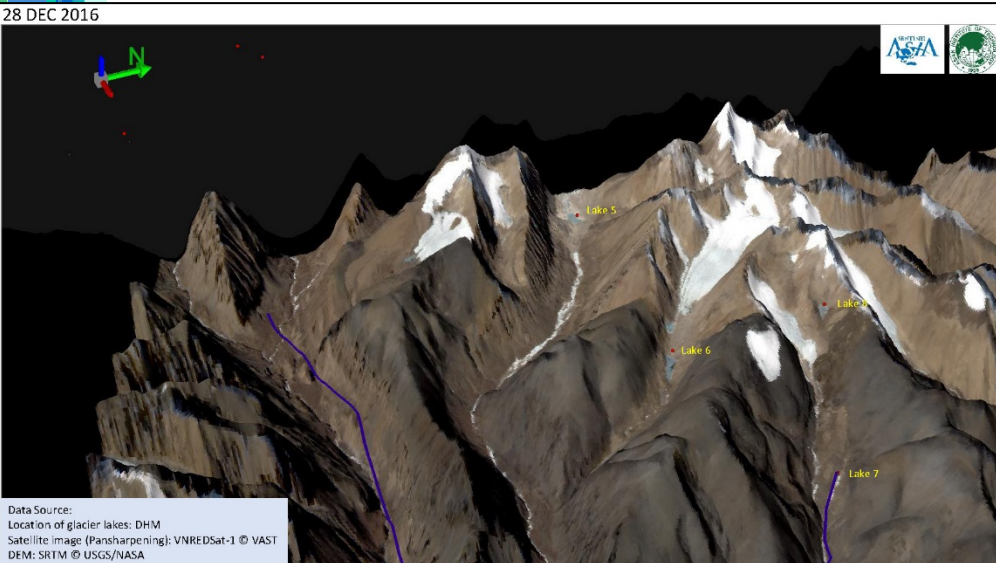
Earthquake in Nepal on 25.04.2015



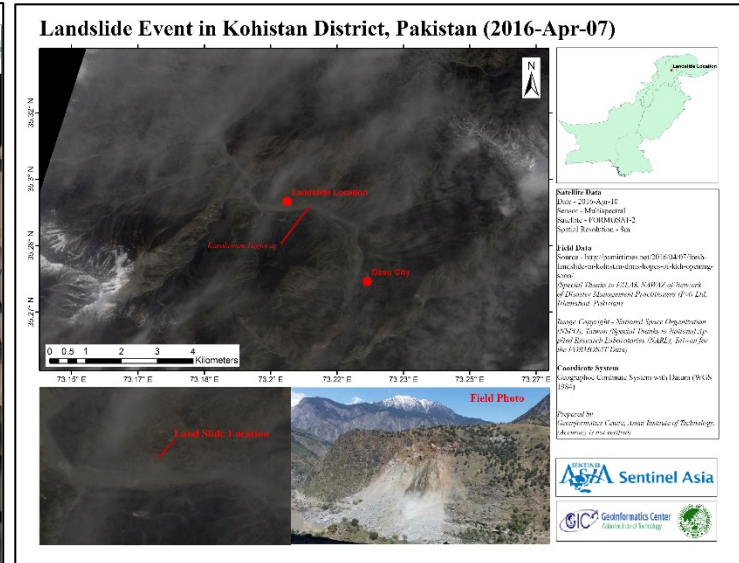
Typhoon in Philippines on 20.10.2016



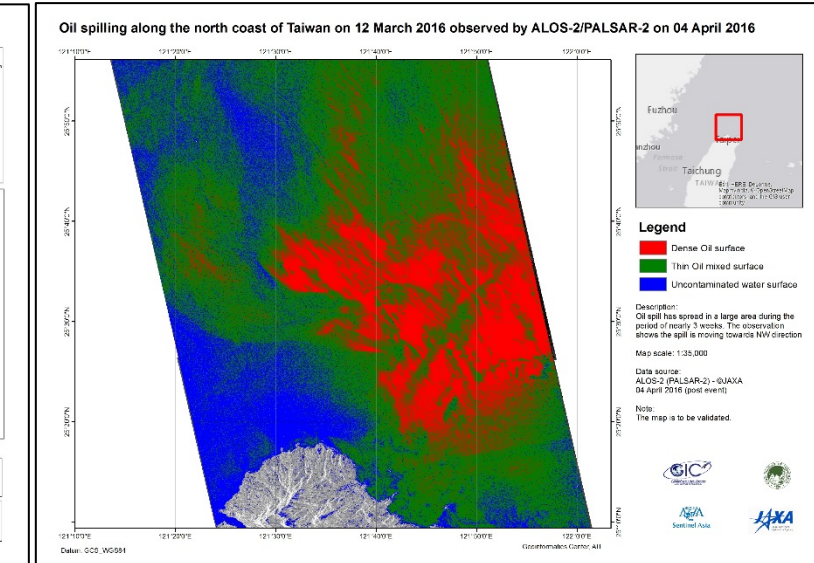
Flash flood (GLOF) in Nepal on 18.12.2016



Landslide in Pakistan on 04.04.2016



Oil spill in Taiwan on 12.03.2016

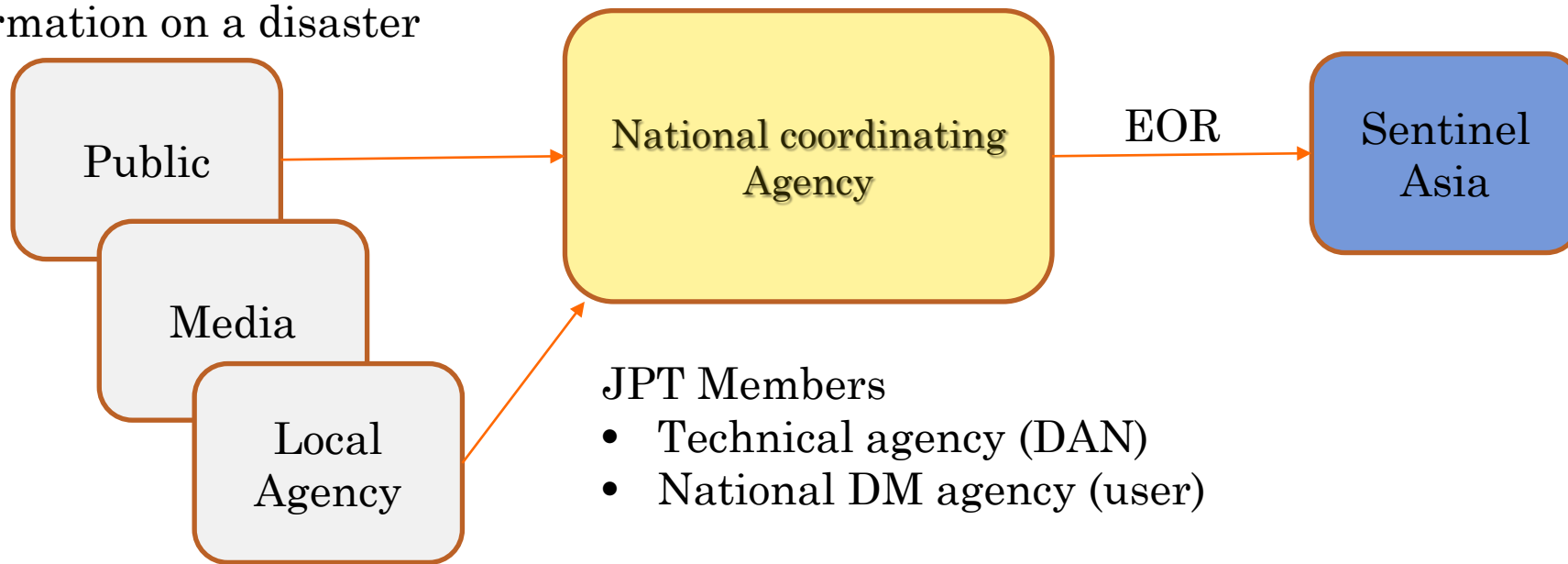


Lesson Learned and Challenges

- 1) SA activation
- 2) Generation and validation of VAPs
- 3) DANs' collaboration to create VAPs
- 4) VAPs sharing and usage at local level

1) SA Activation

Information on a disaster



- Who response when a disaster occur?
- Where to get information about specific location of a disaster event?
- Is there any gaps on communication between technical and user agencies?



Needs of a national coordination framework to improve or shorten the activation time

Organize multi-agency meetings to discuss and stimulate in establishing a national coordination framework

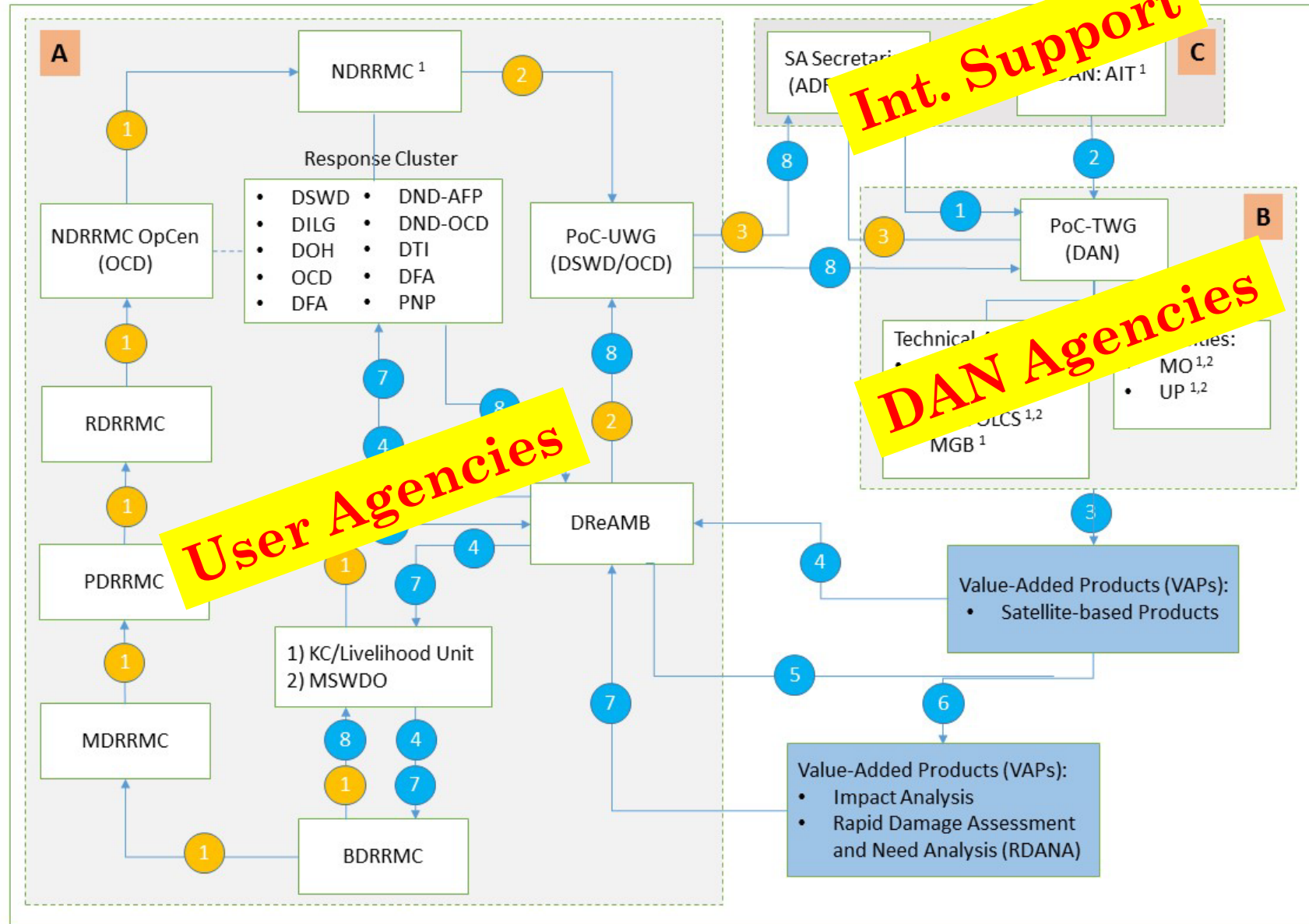
- Identify agencies related to DRR activities
- Understand the existing DM framework in the country, at national and local level, and how the Sentinel Asia can contribute to the country framework
- The coordination framework also contribute to the overall framework of Sentinel Asia workflow, including **activation, VAPs creation, data sharing and usage at local level.**

Coordination meeting in 2016-2017

- ✓ Coordination Meeting in Vietnam – Done
- ✓ Coordination Meeting in Indonesia – Done
- ✓ Coordination Meeting in Sri Lanka – Plan on this month
- ✓ Coordination Meeting in Philippines – Preliminary meeting

.....

Example: National Coordination Framework



Preparation for Emergency Response

- 1 - Situational reports
- Information Sharing System (geoBingAn)
- 2 Request for satellite-based Disaster Info.(RDI)
- 3 Earth Observation Request (EOR)

Emergency Response (SA Activation)

- 1 Satellite Data Provision
- 2 Technical Support
- 3 VAPs (Initial) Generation
- 4 VAPs (Initial) Sharing
- 5 Information Sharing (In-situ and GIS Data)
- 6 VAPs Generation and Validation
- 7 VAPs Sharing
- 8 User Feedback

¹ Joint Project Team (JPT) Member
² Data Analysis Node (DAN)

A: User Working Group (UWG)
 B: Technical Working Group (TWG)
 C: International Support

2) Generation and validation of VAPs

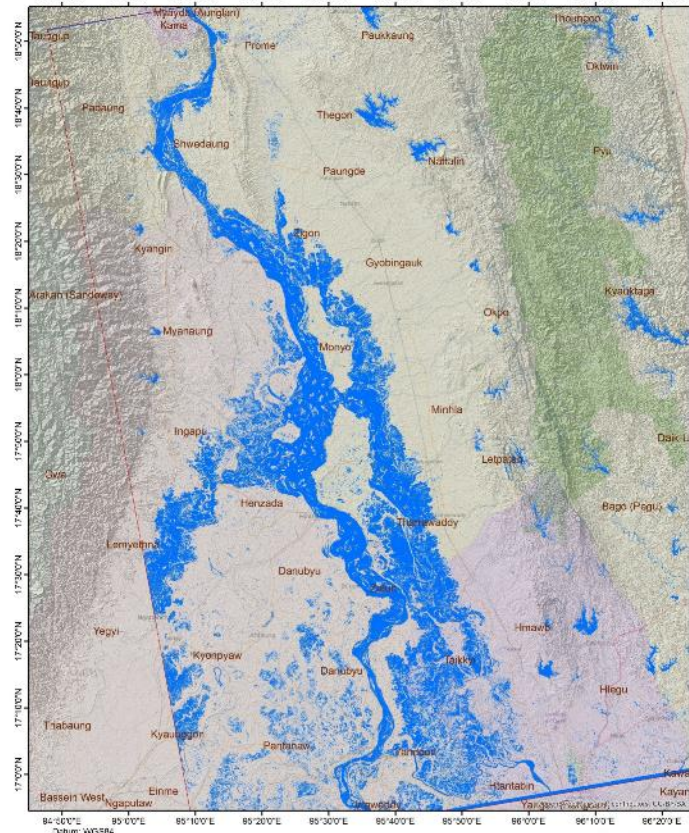
Accuracy problem due to data availability

- Post image
 - Single band thresholding
 - Less accuracy
- Pre and post image
 - Change detection and thresholding
 - Better accuracy

→ Use of globally free satellite data

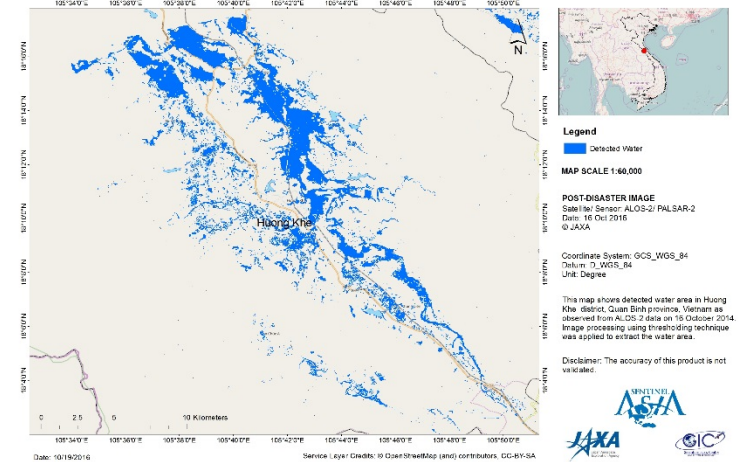
Myanmar floods (07 Aug 2016)
Post event image: RISAT HH-band

Flood Detected by RISAT in Ayeyawady and Bago areas on 07 August 2016

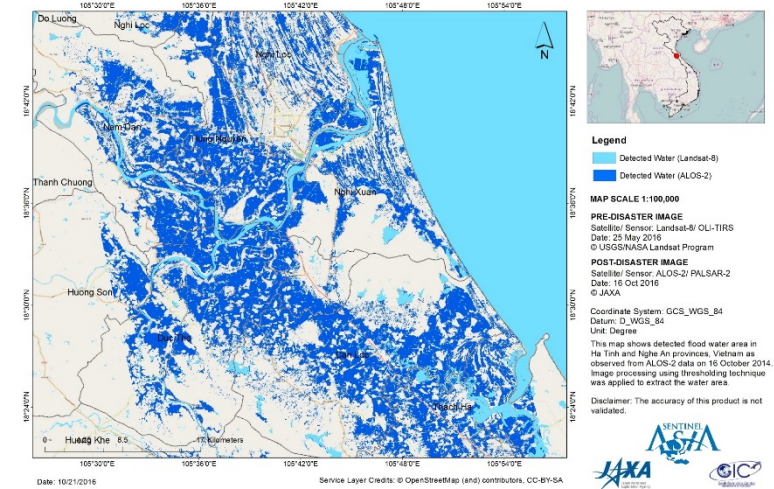


Vietnam floods (14 Oct 2016)
Post event image: ALOS-2 HH-band

DETECTED WATER IN HUONG KHE DISTRICT, HA TINH PROVINCE, VIETNAM (16 OCT 2016)

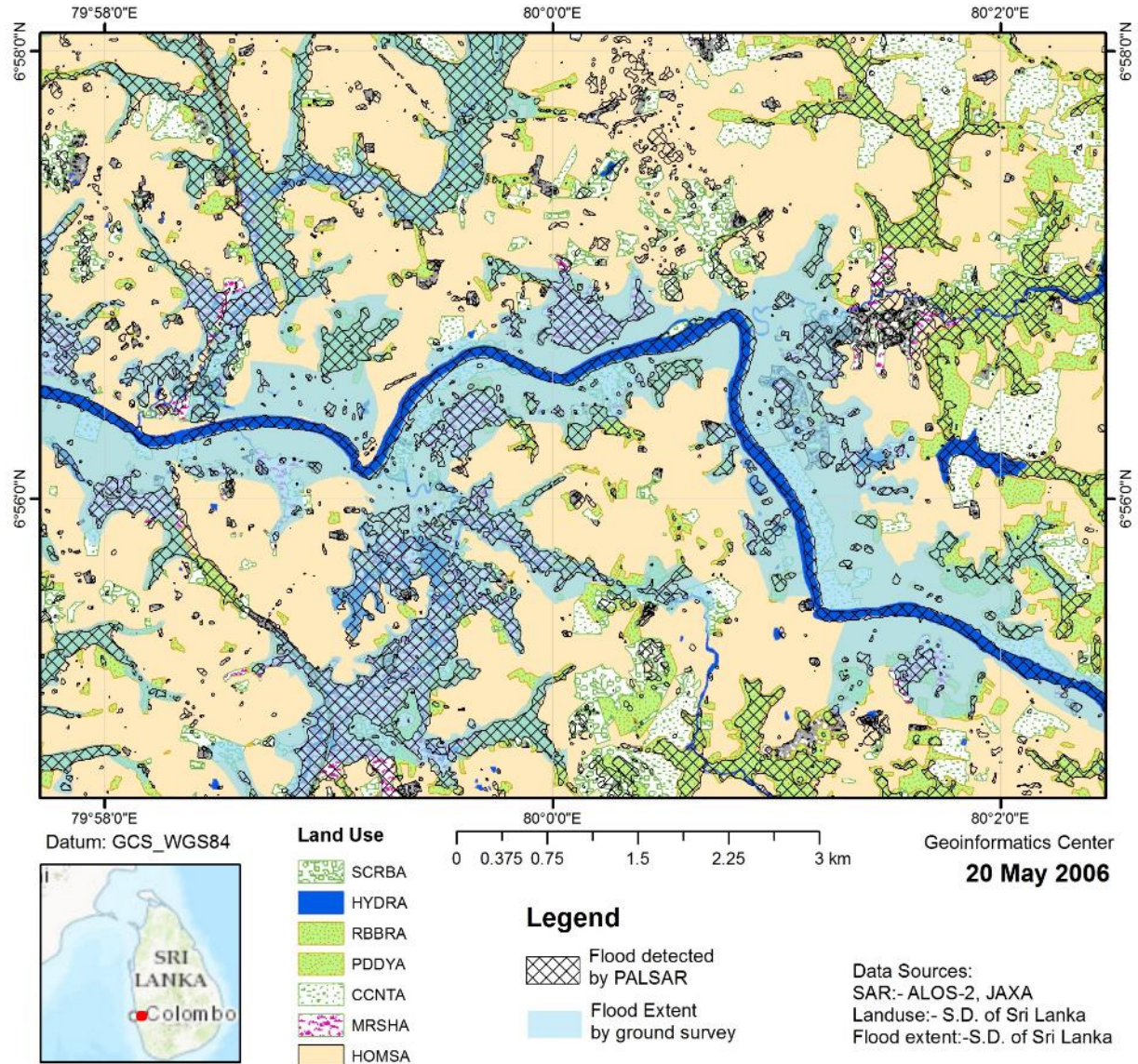


DETECTED WATER IN HA TINH AND NGHE AN PROVINCES, VIETNAM (16 OCT 2016)

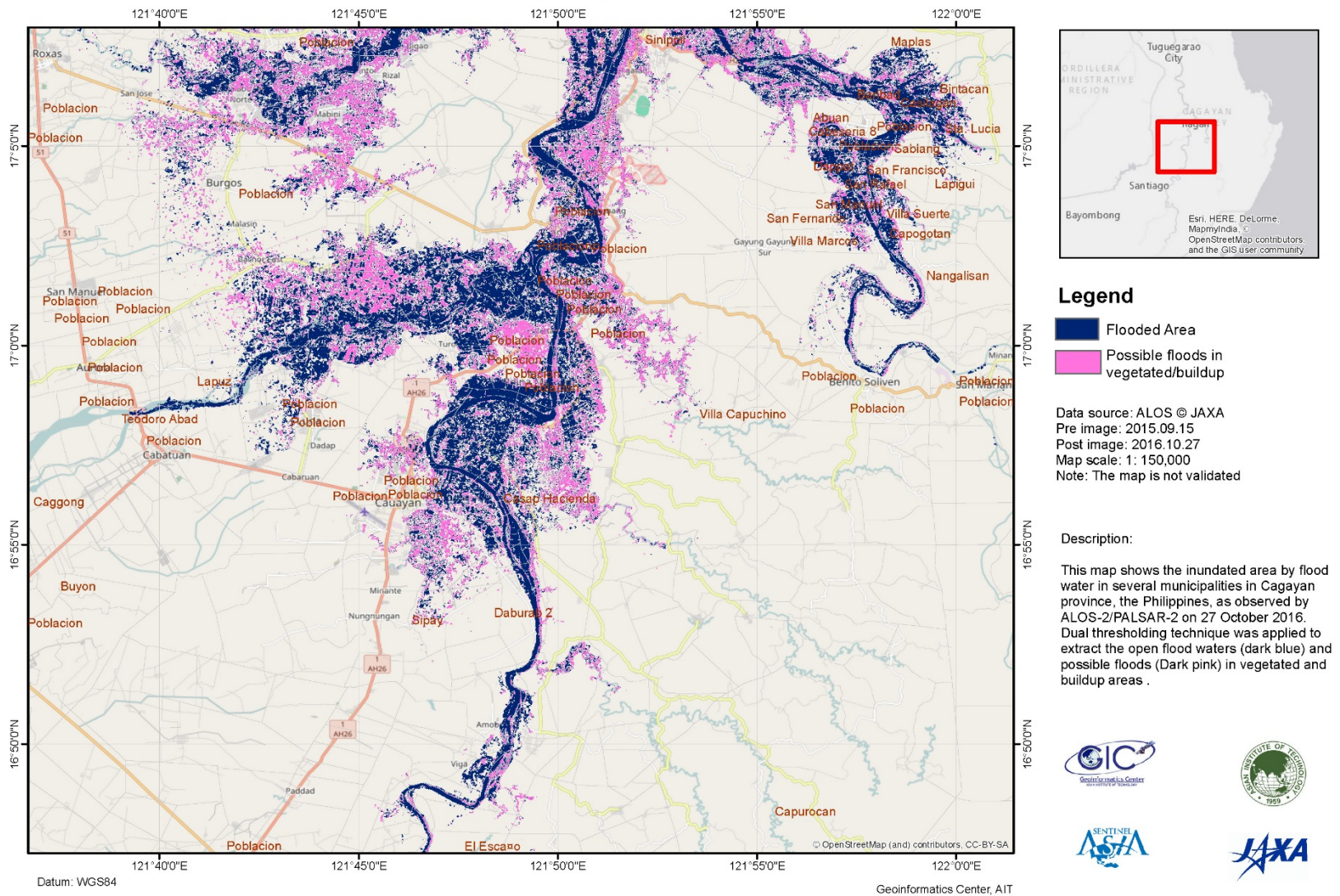


Difficulties on detecting floods in urban areas

- Accuracy is comparatively good in open areas
 - Marshes
 - Paddy
 - Bare lands
- Accuracy is less or not detected in land covered
 - Buildups and
 - Vegetated



Map1: Typhoon HAIMA Flood in the Province of Cagayan, northern part of the Philippines observed on 27 October 2016



Dual thresholding method:

- Using ancillary data
 - DEM (flood plane)
- Image change
 - Histogram of difference
 - Fuzzy function (negative & positive)
- Fuzzy rule base
 - Multi criteria decision making

Flood in the Philippines on Oct 2016

Images: Pre (ALOS-2/PALSAR-2), Post (ALOS-2/PALSAR-2)



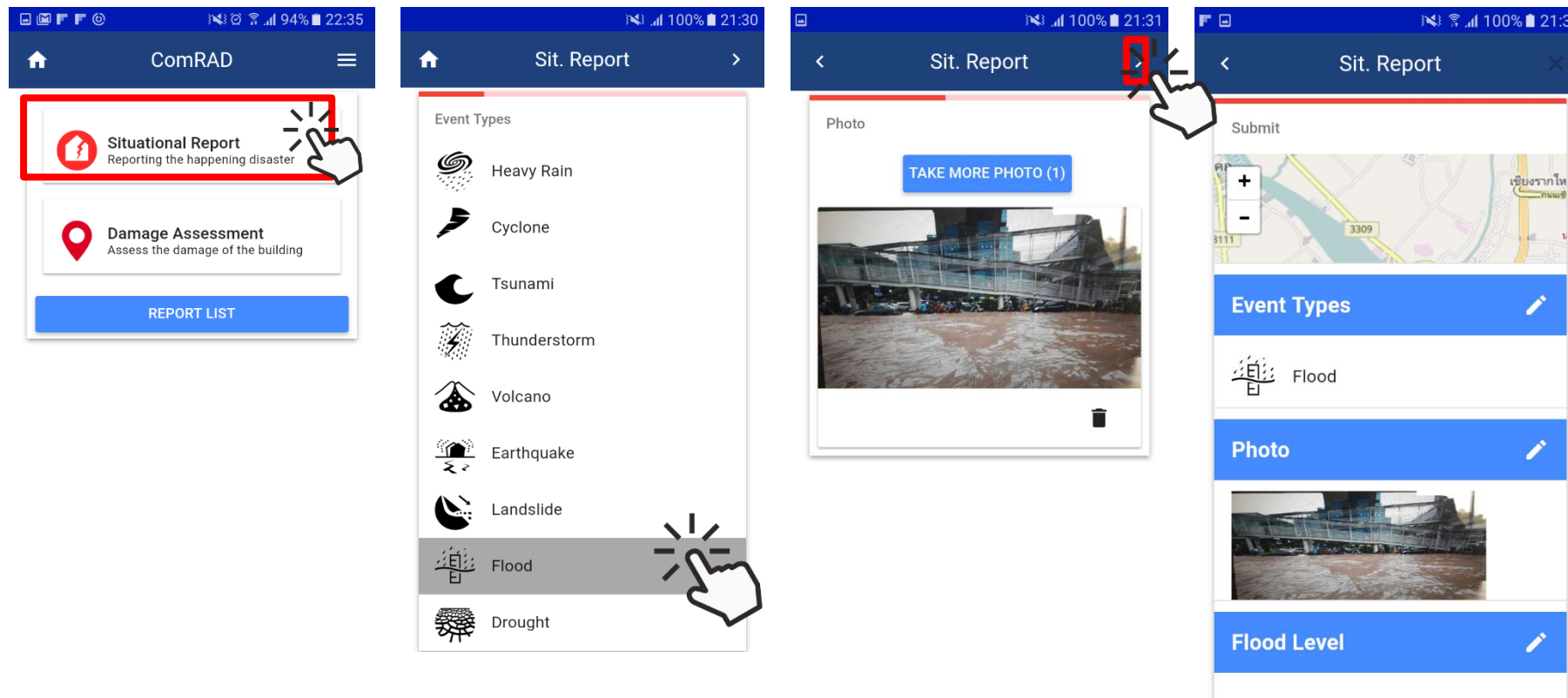
Other technical challenges

- Detection on flash flood
- Derive information on flood depth
- Landslide detection using SAR data
- Damage assessment using SAR data
- etc.

→ SA Technical Working Group may able to provide suggestion/recommendation/
best practices

Ground data for validation

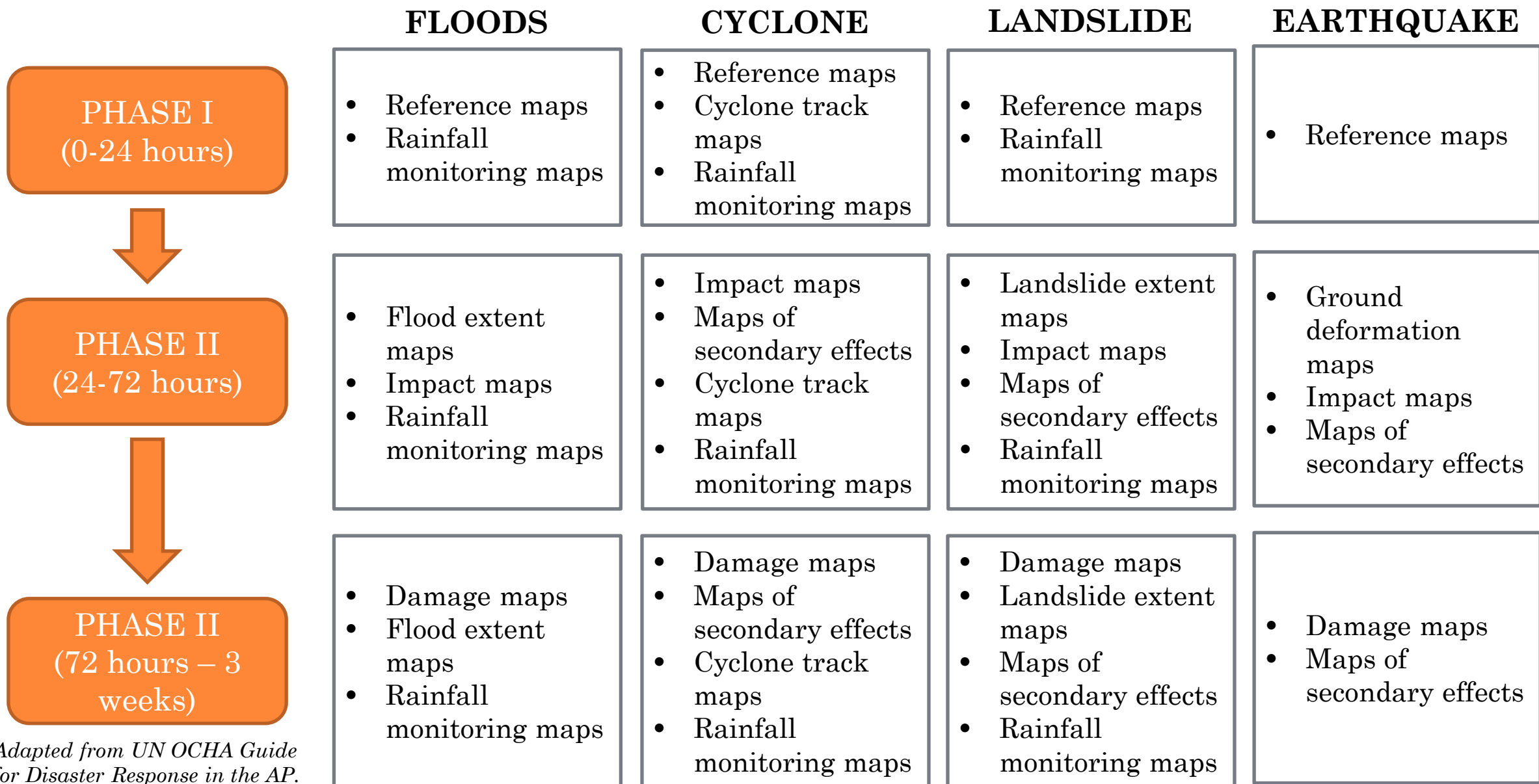
- Collaboration with national DANs and DM agencies
- Social media
- Data collection using mobile app (community)



3) DANs' collaboration to create VAPs

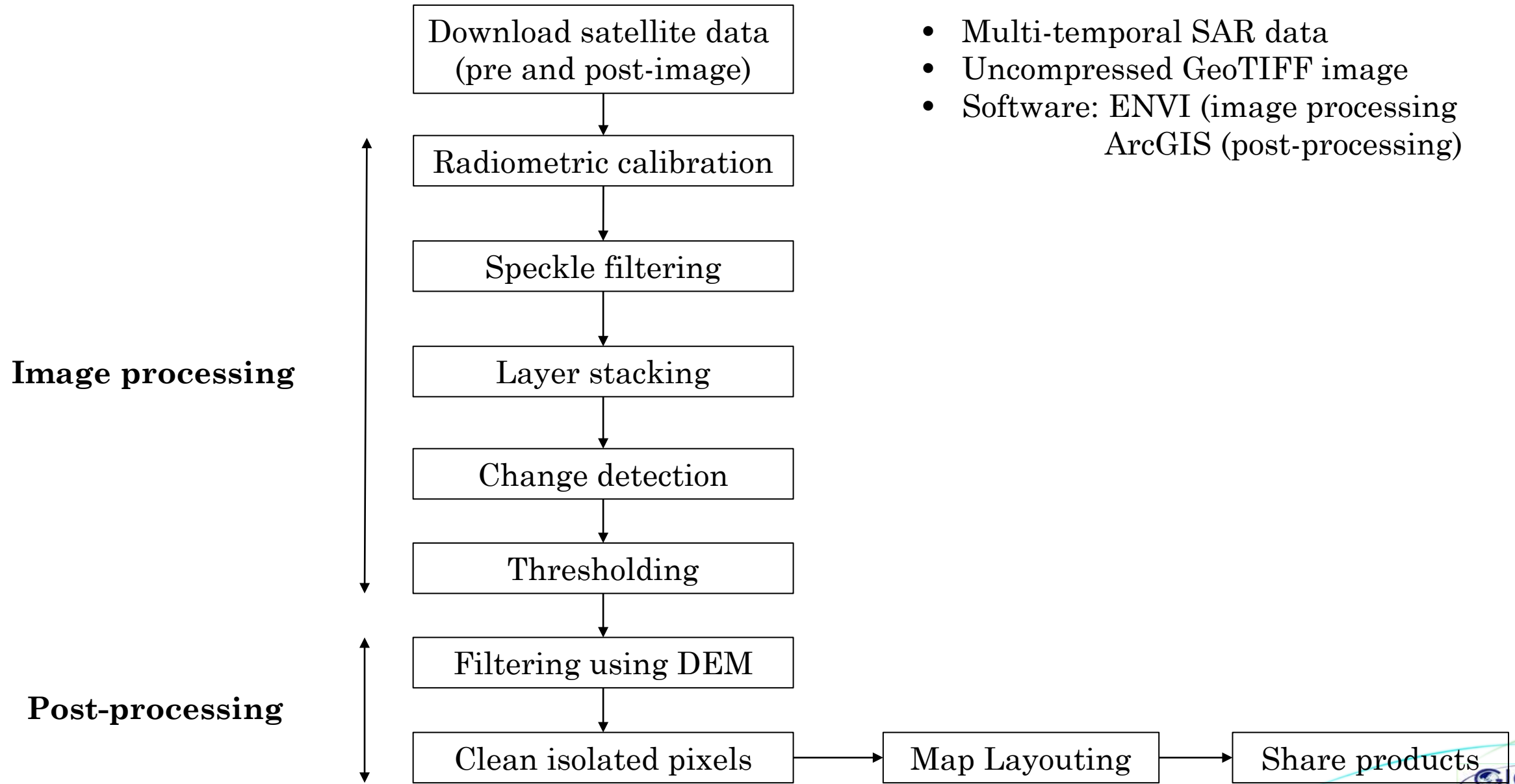
No map standard and guidelines for data processing

- Prepare SOP for data processing customized for local system
 - Based on hazard type
 - Based on availability of multi-temporal data
 - Based on data format and sources
 - Based on software

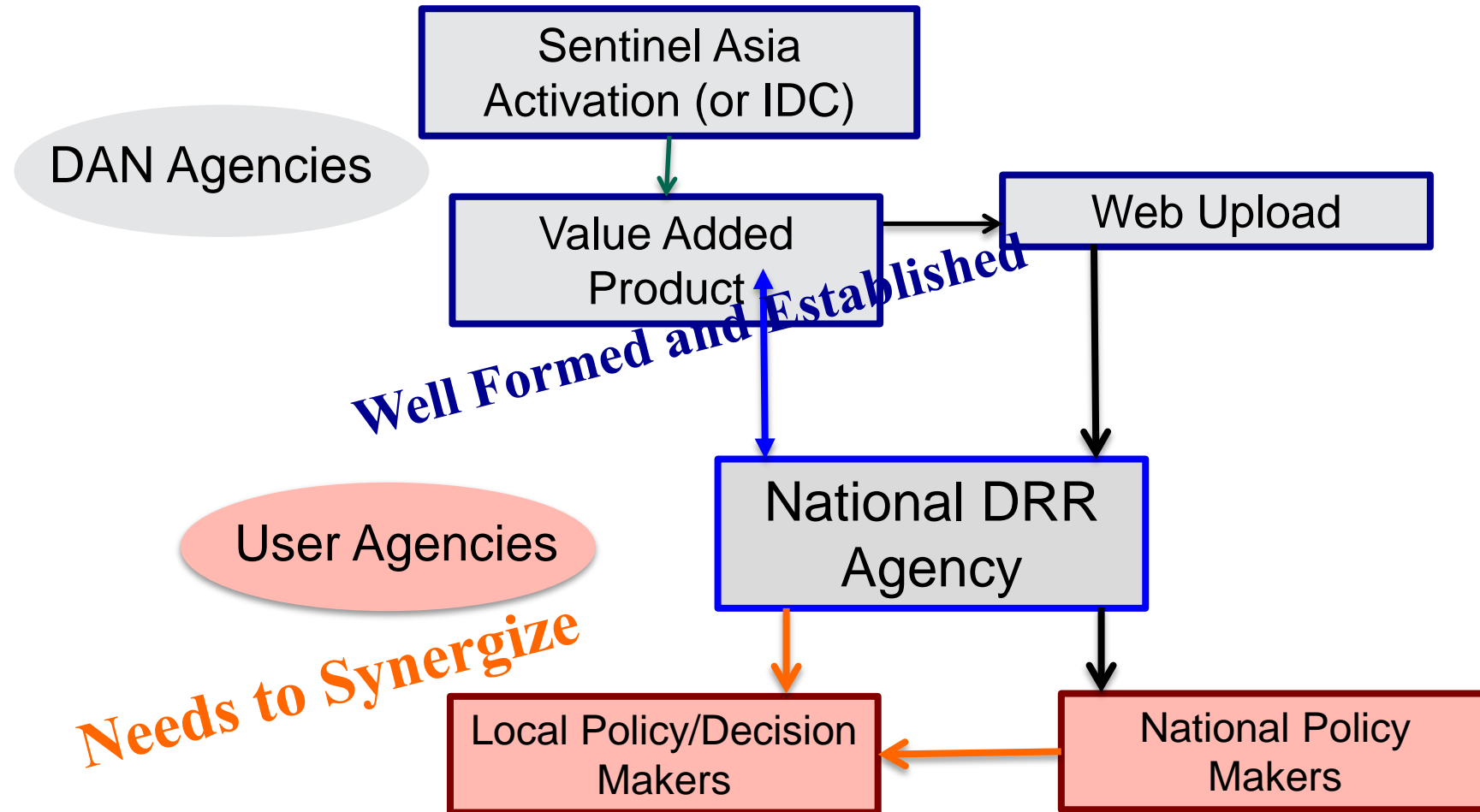


Adapted from UN OCHA Guide for Disaster Response in the AP.

Example: GIC standard workflow for flood mapping using SAR data



4) VAPs Sharing and Usage at Local Level



Policy Guidelines, Need of local data, Technical know-how

Web platform to share products

Emergency Obs. Request Information

Emergency Obs. ID:

Disaster Type: Country:


Occurrence Date (UTC): Date Time GLIDE Number:

ADRC URL:


Escalation to the Charter, Space and Major Disasters

Request to escalate this EO to the Charter


Product-AIT(Jpeg)




Flooding in Agu...
06/Feb/2017 22:30




Flooding in Agu...
06/Feb/2017 22:30




Flooding in Mun...
01/Feb/2017 17:00



Flooding in Dav...
27/Jan/2017 17:00




Flooding in Agu...
26/Jan/2017 15:15



Flooding in Agu...
26/Jan/2017 15:15

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<https://sentinel.tksk.jaxa.jp/>




Principle Data Analyses Node of Sentinel Asia

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Flood in Philippines

Philippines - / 2017-01-16 00:00:00+07


PAGASA has 4 AOI as follow

- 1) 8d 26m 29.09 s N 125d 49m 35.99 s E Radius 30 km
- 2) 7d 18m 23.87 s N 125d 40m 51.29 s E Radius 30 km
- 3) 7d 12m 50.66 s N 124d 14m 57.28 s E Radius 30 km
- 4) 8d 27m 53.15 s N 124d 36m 47.70 s E Radius 30 km

Please go to this link to see our product in interactive map

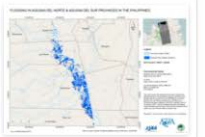
http://www.geoinfo.ait.ac.th/pdan/map.php?id=229&ext_map=PossiblefloodextentinRosario

[Interactive Map](#)
[Forum](#)




Flood in Agusan Del Norte Province in the Philippines

[Download](#)




Flooding in Agusan Del Norte and Agusan Del Bur Provinces in the Philippines

[Download](#)



Flooding in Davao Del Norte Province in the Philippines

[Download](#)



Firman Hadi
Event Manager
firmanhadi@ait.asia

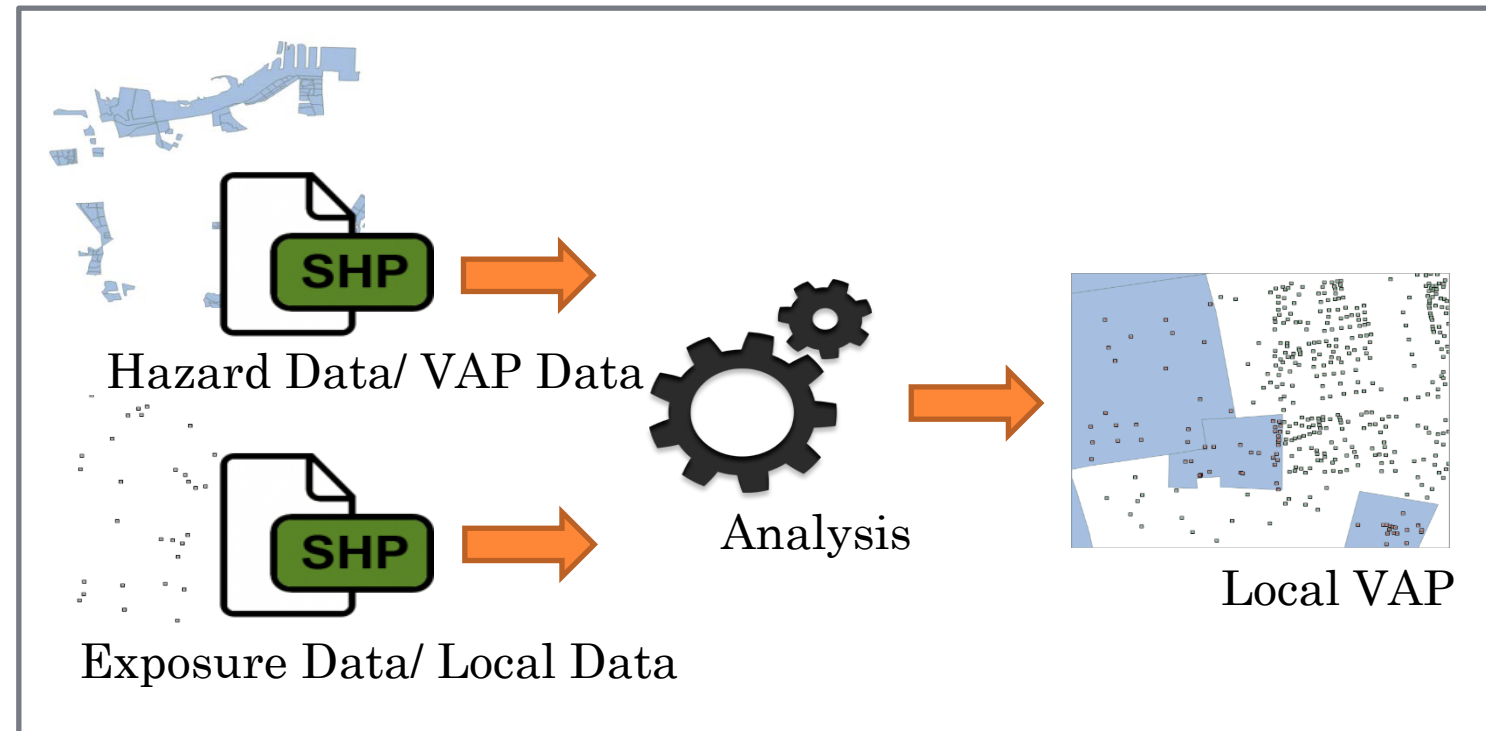
[Contact Event Manager](#)

[Spatial Data Download](#)

<http://www.geoinfo.ait.ac.th/pdan/>

Develop a National information system

- Data sharing and management system among stakeholders
- Simple analysis functions for emergency response and needs assessment
- All in one app to generate local VAP, integrating SA standard VAP with local data using **QGIS Plugin**
 - Data integration
 - Import local data
 - Overlay and spatial analysis
 - Generate quick map
 - Export and share map
- SA 'branding'



Remarks

- AIT has been actively contributing to Sentinel Asia activities and we would like continue to do so in future.
- To improve the effectiveness of Sentinel Asia activities, our recommendation are:
 - Organize country's meetings to stimulate the development of a SA national coordination framework
 - Develop a national information system using open-source platform such as QGIS
 - Develop SOP customized for local system
 - Capacity building for both technical and user agencies