



DIGITAL TECHNOLOGY FOR DEVELOPMENT

Sustainable Development and Climate Change Department

Using Earth Observation Tools in Monitoring Economies in Southeast Asia

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Promoting use geo-data and in Intl. Dev.



Since the start of the
ESA collaboration
with IFIs we worked
with **more than 100**
service providers
from **more than 20**
different countries

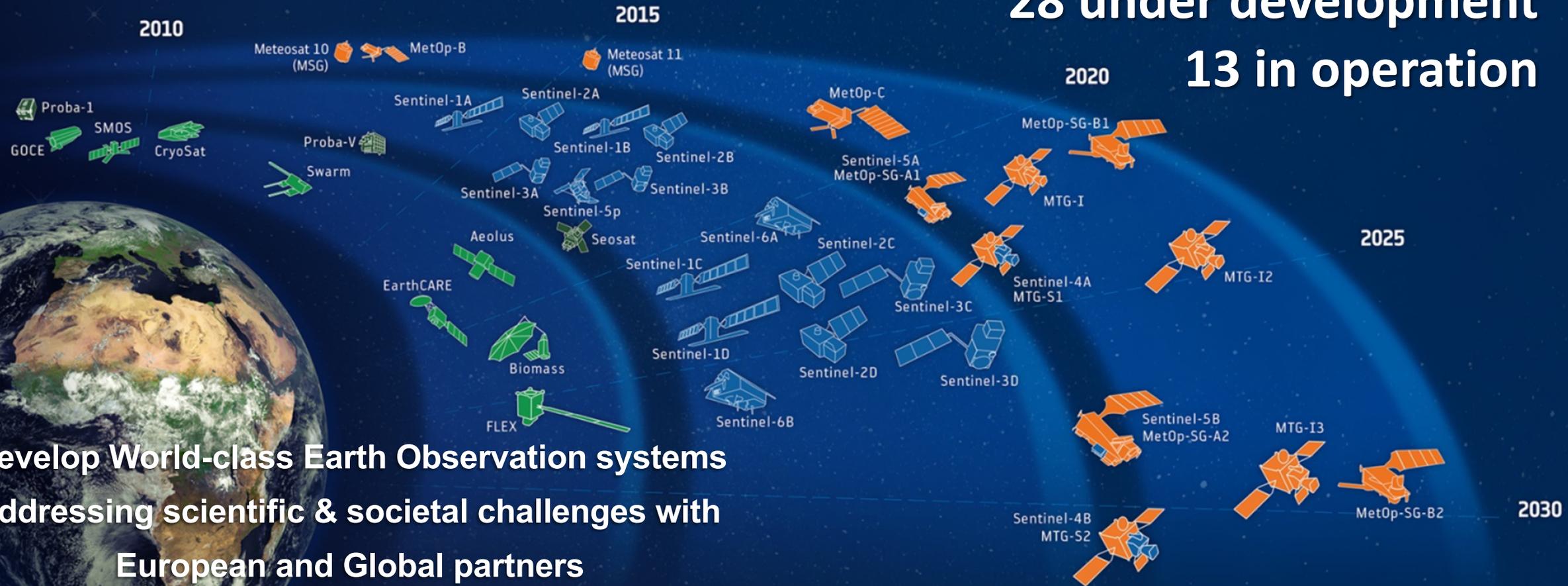


ESA-DEVELOPED EARTH OBSERVATION MISSIONS

Satellites

28 under development

13 in operation



Develop World-class Earth Observation systems
addressing scientific & societal challenges with
European and Global partners

Science

Copernicus

Meteorology

Background

- ❖ Earth observation (EO) is crucial for ADB to understand the economic impact of the crisis in the region– indicators needs to be developed and scalable
- ❖ Several ongoing initiatives outside ADB - The [Earth Observing dashboard](#) from ESA, NASA and JAXA currently tracks about 32 economic indicators across countries while ESA's [RACE dashboard](#) monitors about 66 economic indicators in Europe, including emissions, coal pile monitoring and various economic activities related indicators
- ❖ Several ongoing initiatives in ADB - Earth Observation Data Challenge winner EARTHLAB.AI and further opportunities to engage with EarthPulse and Hatfield

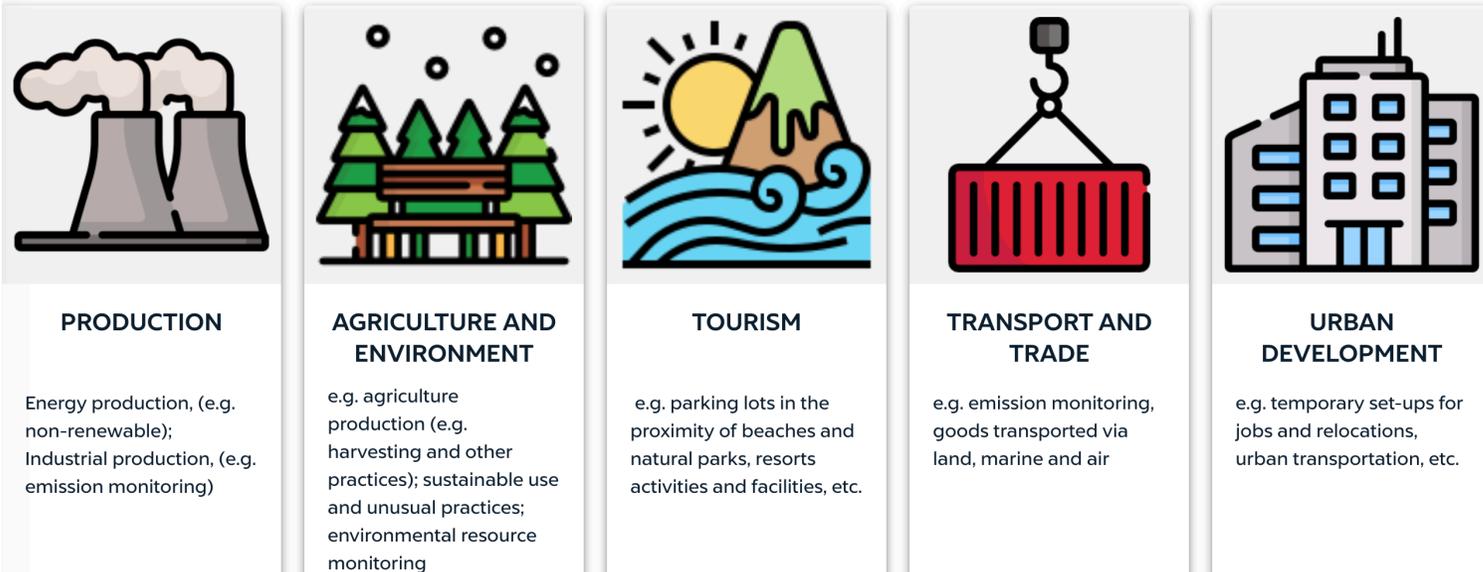


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Challenge Overview

- ❖ Economic research has started using EO data to draw patterns and key insights into the economic impacts of COVID-19 crisis.
- ❖ ADB is calling for solutions to measure the short-term changes in economic activities brought about by COVID-19. This specific challenge will make use of EO data of any applicable satellite images or any processing infrastructures.





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Earthlab (Started)

EconEO, a data-driven dashboard that allows monitoring up to 5 different economic indicators across countries



Production

- Emissions Monitoring (1)
- Coal Pile Monitoring (2)



Transport & Trade

- Container Monitoring (4)
- Vessel Monitoring (4)



Urban Development

- Construction Site Monitoring (3)
- Emissions Monitoring



Tourism

- Parking Lot Monitoring (5)
- Emissions Monitoring

- | | |
|----------------|----------------|
| 1. Philippines | 2. South Korea |
| Bangladesh | 3. |
| Georgia | + More ADB MS |
| 4. Fiji | 5. |

- Supporting GDP Nowcasting
- Imports/Exports Consolidation
- Industrial Production Output



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EarthPulse (Proposed)

Step 1. Target detection

The screenshot displays the EarthPulse web application interface. The main area shows an aerial satellite view of an airport tarmac with numerous airplanes. Blue bounding boxes are drawn around several of the airplanes, indicating target detection. The interface includes a search bar in the top left, a browser address bar showing 'earthpulse.now.sh', and a sidebar on the right with the following elements:

- Choose your label:** A section with four label options: 'airplane' (with an airplane icon), 'car' (with a car icon), 'tree' (with a tree icon), and 'pool' (with a pool icon).
- Buttons:** 'LOAD' and 'SAVE' buttons.
- Instructions:**
 - Choose a label and click **LOAD** to load existing annotations.
 - From the drawing tool, select the type of annotation and start labelling on the map.
 - Save the new annotations clicking **SAVE**.
 - You can also edit the annotations.
 - Use the search bar to go to a specific location.

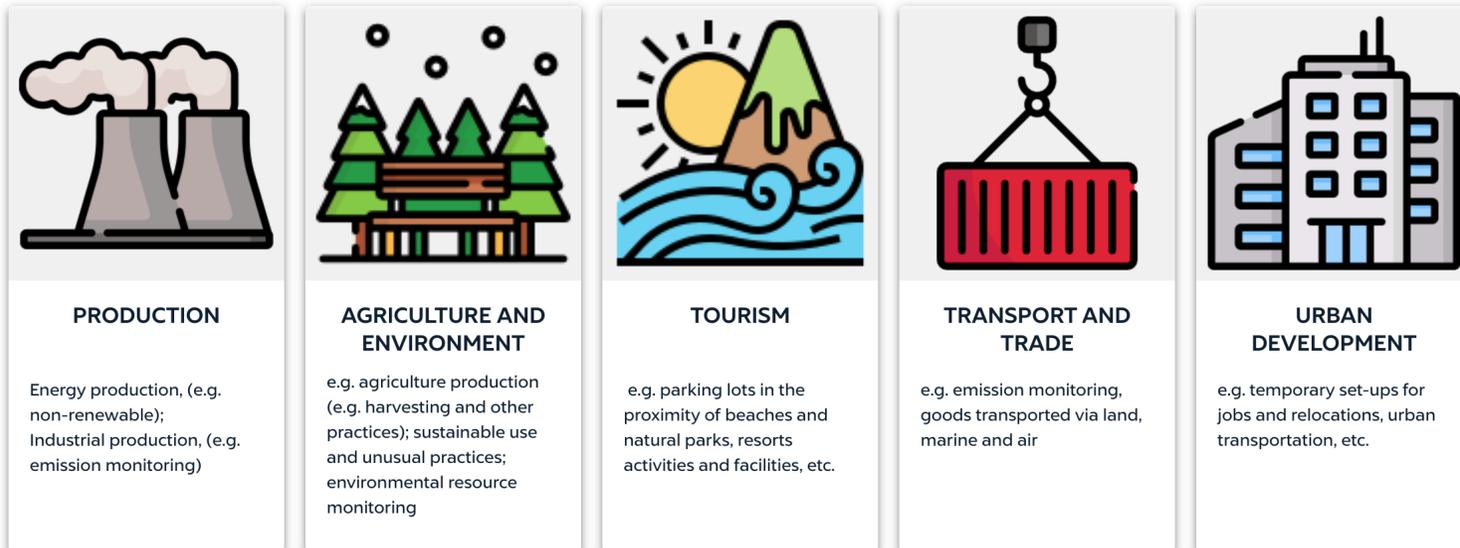
At the bottom of the map, there are zoom controls (+, -, and a slider) and a drawing tool icon.



EarthPulse (Proposed)

Step 2. Turning detection into indices

- ▶ A solution for the tourism area, in particular monitoring the international & national airport throughput, the parking lots near touristic attractions and the bays with touristic activity
- ▶ Possibility to change the AOI, and build indices for transport, trade and production

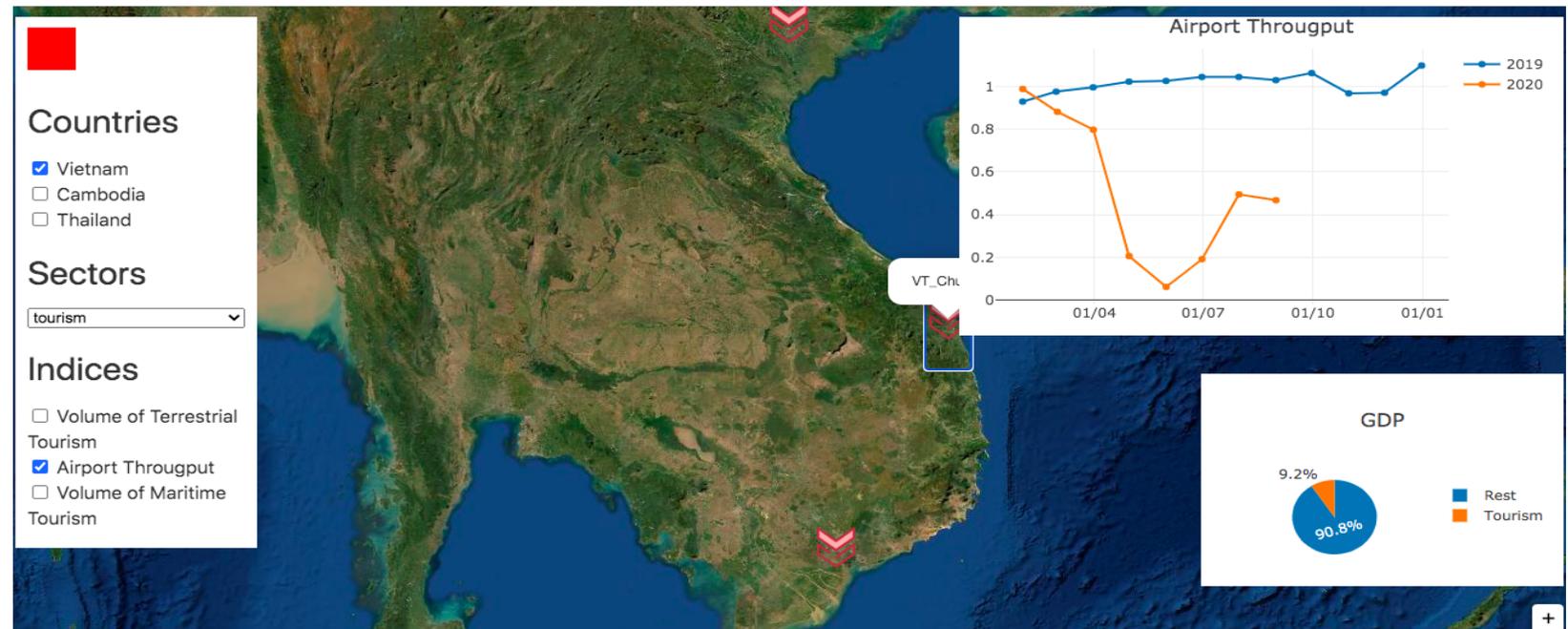




EarthPulse (Proposed)

Step 3. Dashboard & data gathering

- ▶ Automated, pulling new images as they are available and notification to users of latest analytics.
- ▶ Easy-to-use, no-knowledge of EO data or AI analytics is required. Users only subscribe to the indexes they are interested in, setup AOI and notification interval and receive the information via email.





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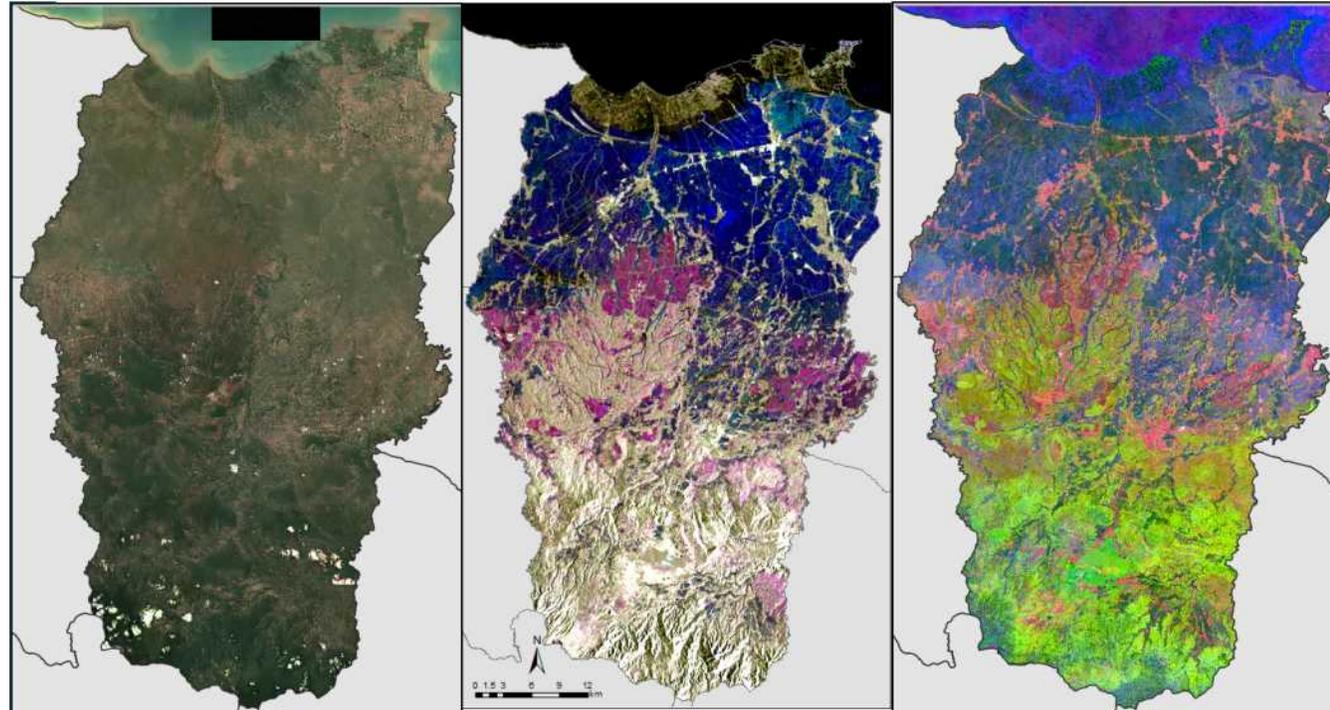
Hatfield (Proposed)

PADDY PRODUCTION INTELLIGENCE USING BIG EO DATA MINING

Upscaling novel Sentinel-1 time-series analytics

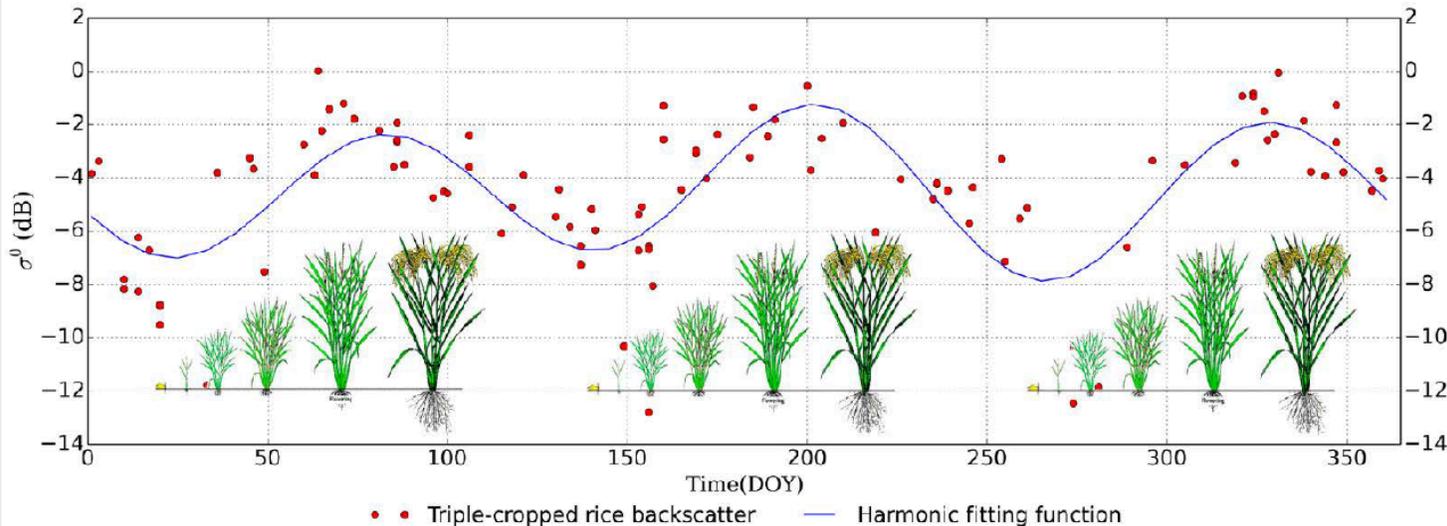
Asian Development Bank Earth Observation
Data Challenge

Hatfield Indonesia Environment + Earth Observation
+ Data Science



Radar Time Series for Rice Mapping

- Rice production shows a “classic” radar backscatter profile with growth stage
- Challenge to use the profile to accurately identify rice production and stage
- South East Asia has variable timing of rice production, which makes mapping more complex



Concluding Remarks

- ❖ Earth observation (EO) shows trends in countries with very few data and if relevant information can be obtained in Near Real Time (+24/48 hours)
- ❖ AI based models can generate index faster – algorithm training and results validation always recommended
- ❖ Free and open data is an opportunity, information extraction in large volumes optimized on cloud-based platforms (e.g. European Data Cube, among others)



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Thank you

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