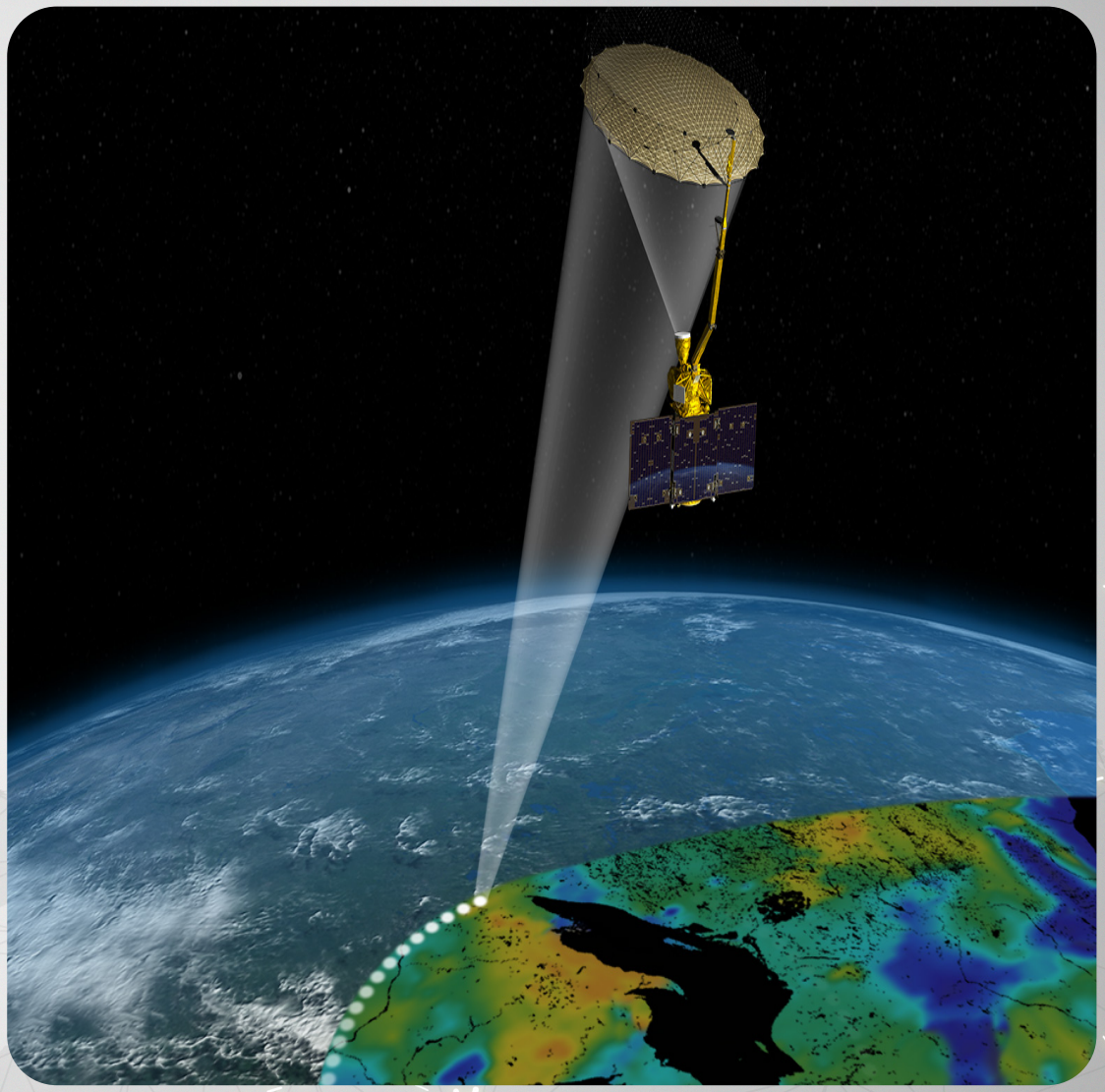
THAICOM

Applying Geospatial Data Analysis to Agriculture in Thailand



THAICOM PLC. Proprietary & Confidential

Oct 3, 2022

Applying Geospatial Data Analysis to Agriculture in Thailand :

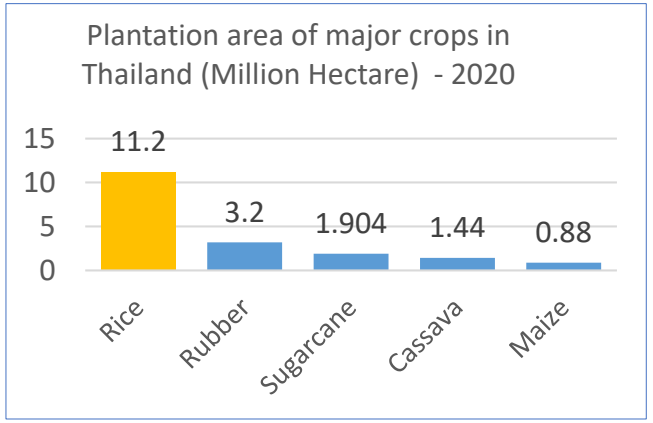
Drought Monitoring in rice fields

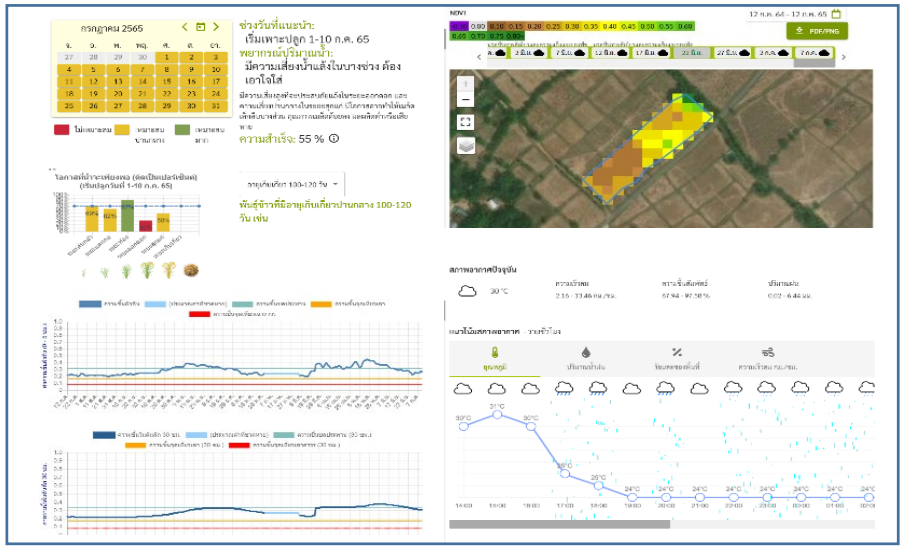
Rice department

Total planting area

18.62

Million Hectare





- Drought monitoring and warning
- Recommend planting date
- Crop health monitoring
- Farm log book
- Weather forecast

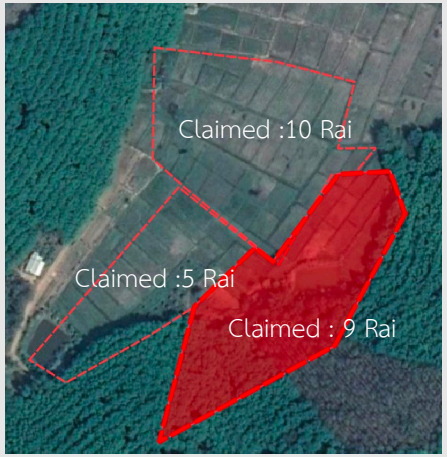
สมาคมประกันวินาศภัยไทย
Thai General Insurance Association

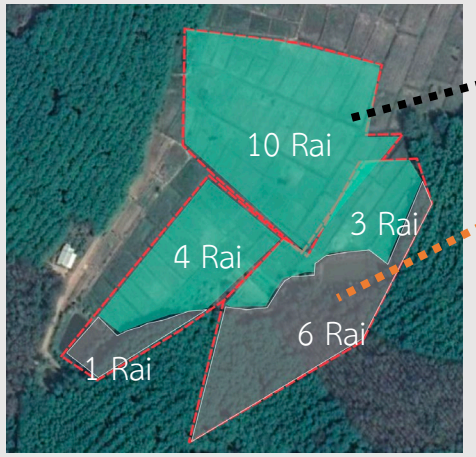
Crop Insurance

Total insured area

7.2

Million Hectare



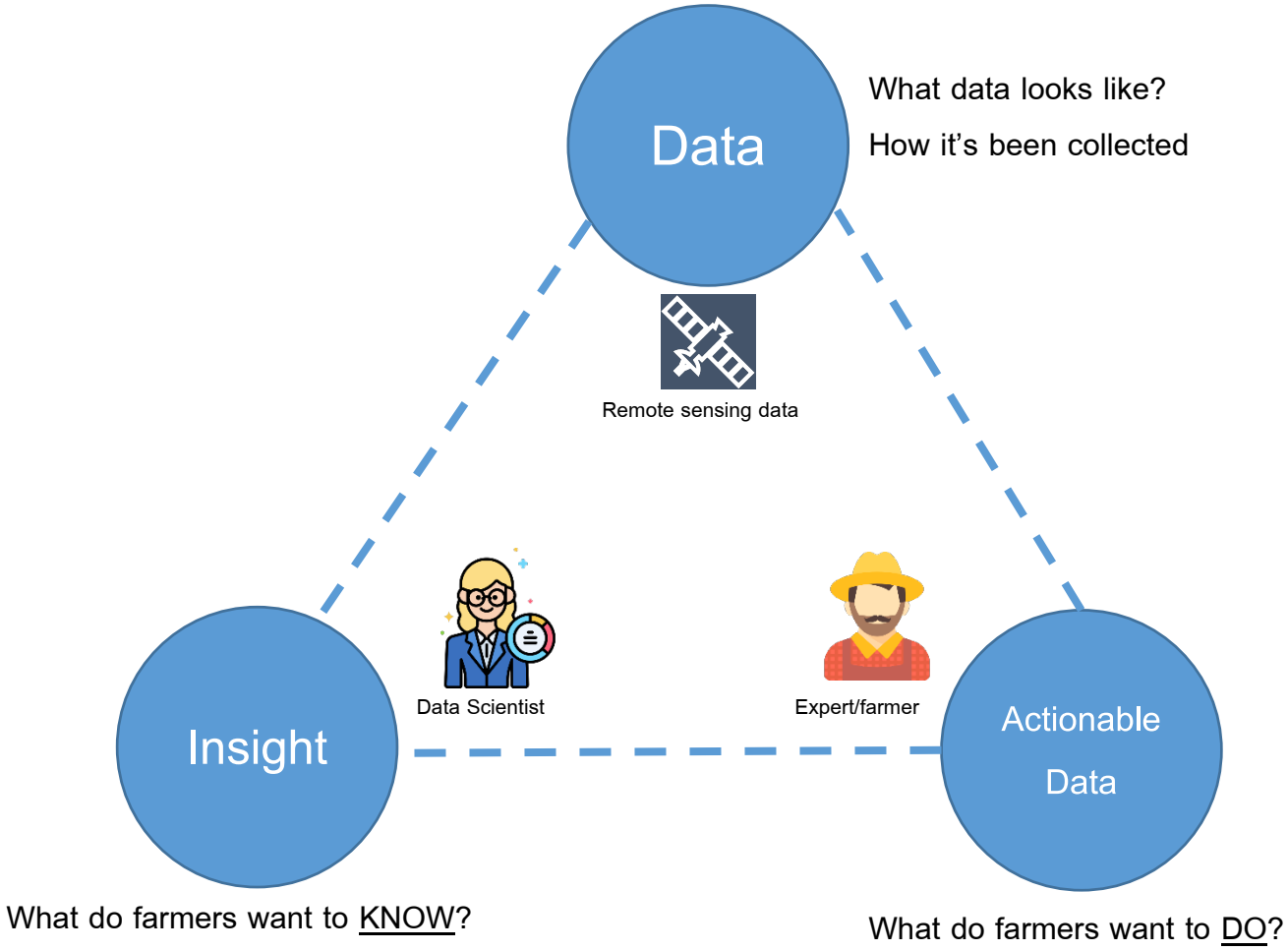


Rice Planting Area

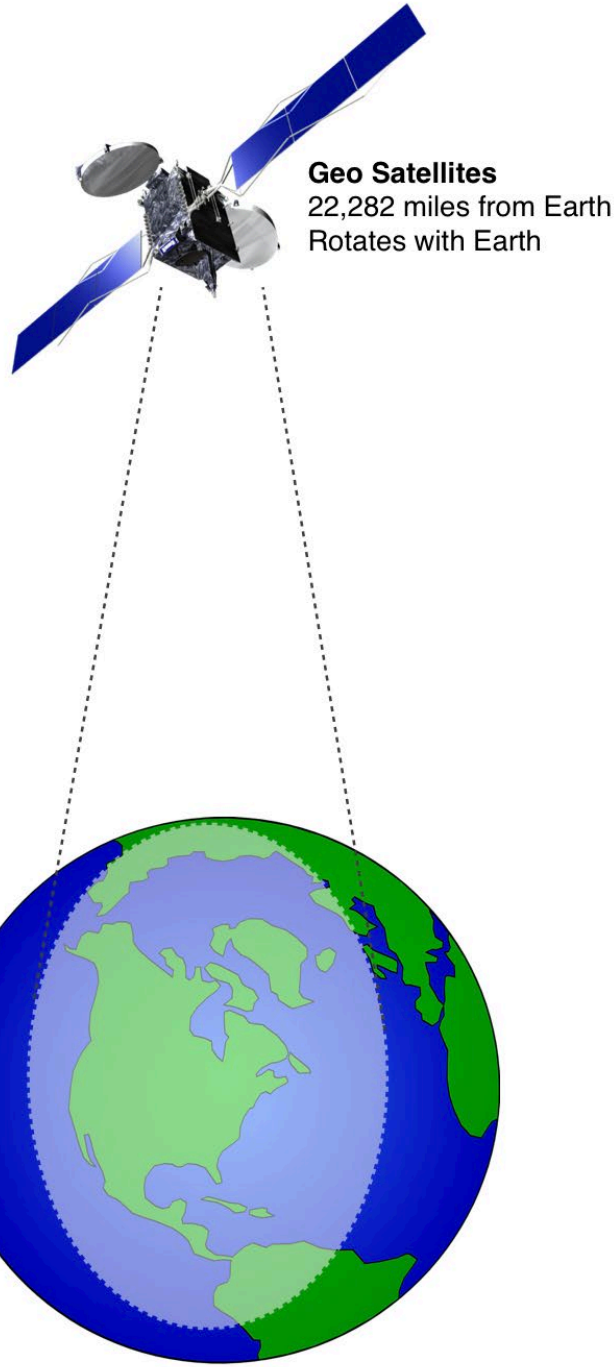
Non-rice Planting Area

- Rice/Non-rice planting area
- Damage assessment
  - Flood
  - Drought
  - Dry Spell

3 Components for Applying Geospatial Data Analysis to Agriculture

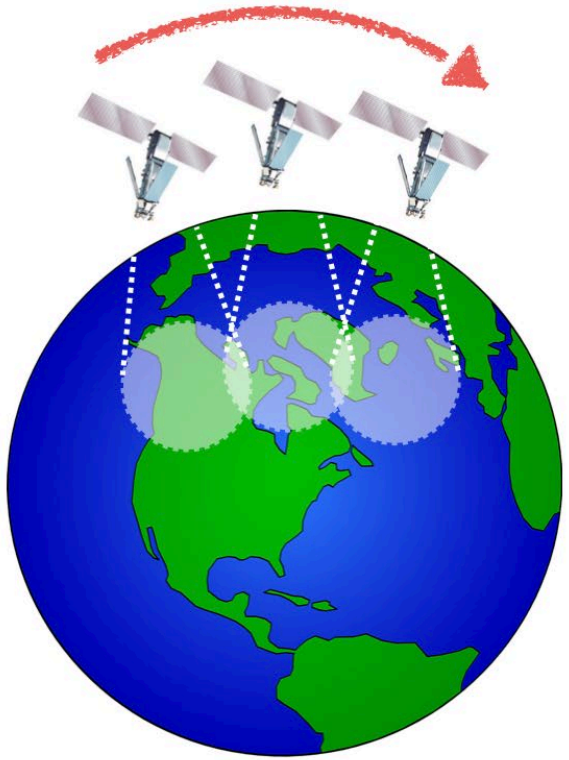


Earth Observation Satellite Orbit

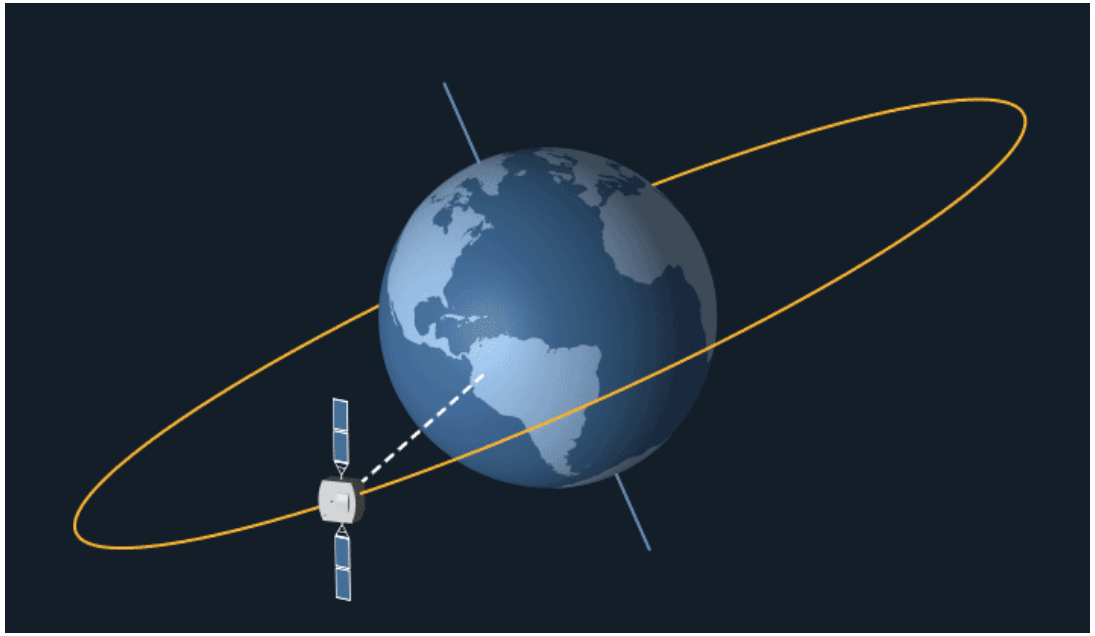


Geo Satellites
22,282 miles from Earth
Rotates with Earth

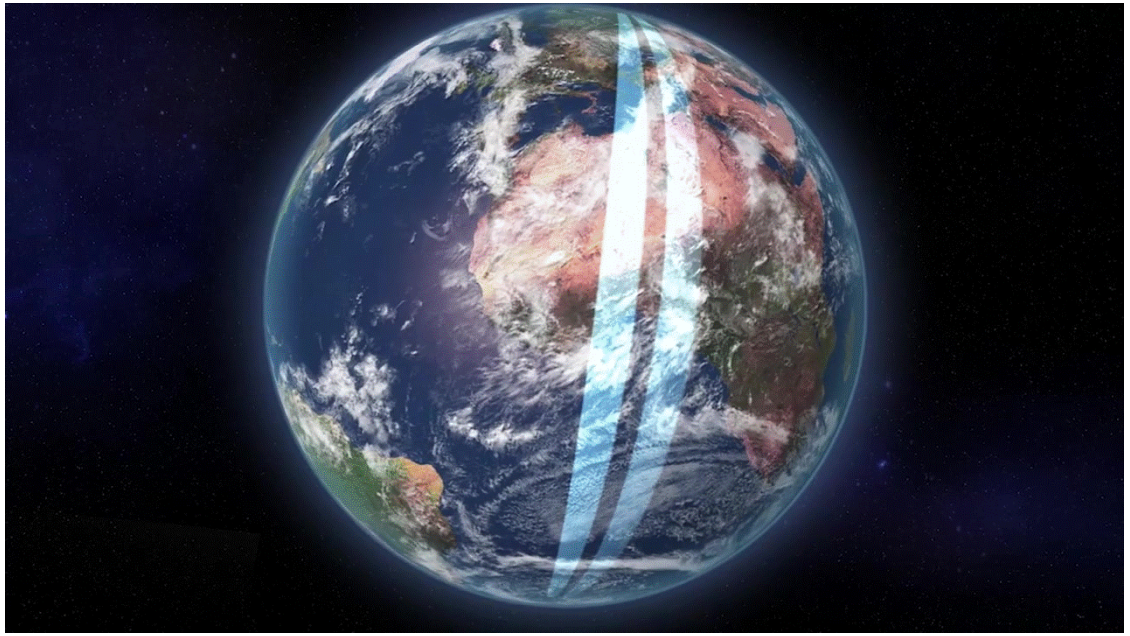
Leo Satellites
400-1600 miles from Earth
Rotate around Earth



Satellite Orbit



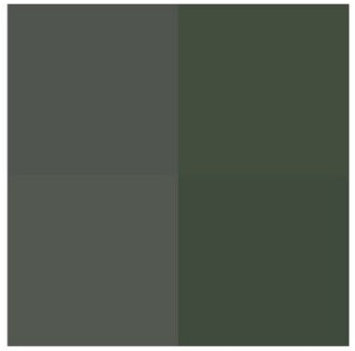
Geo Satellite Orbit



Leo Satellite Orbit

PARAMETERS RELATED TO EO IMAGERY

SPATIAL RESOLUTION



Aqua (MODIS)
250m Resolution



Landsat-8
30m Resolution



Sentinel-2
10m Resolution



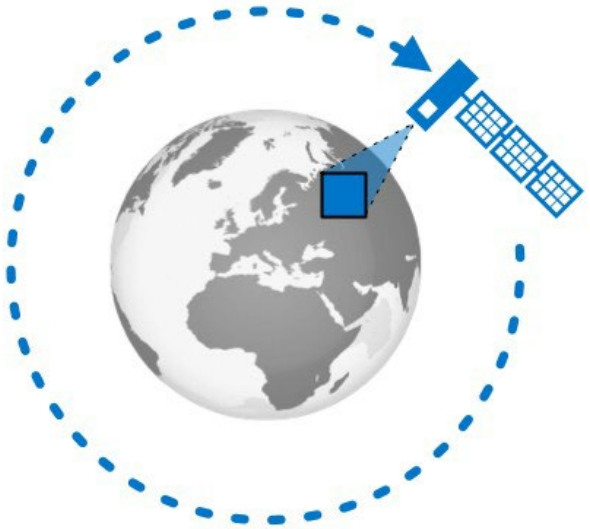
PlanetScope (Dove)
3m Resolution



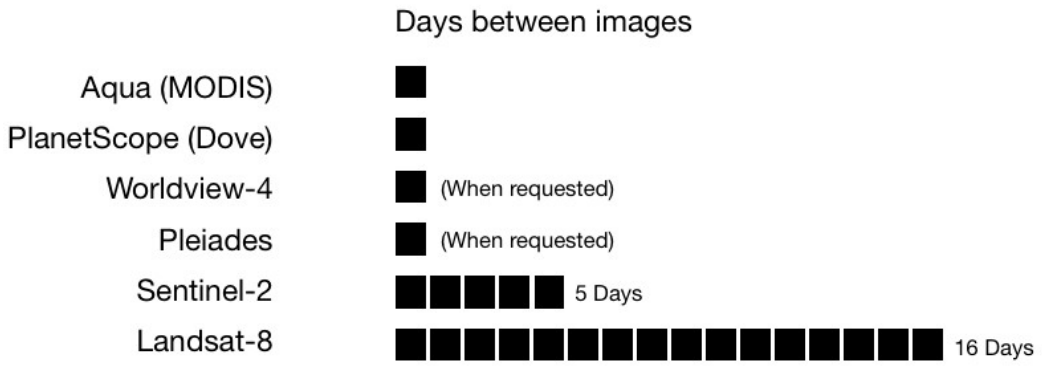
Pleiades
0.5m Resolution



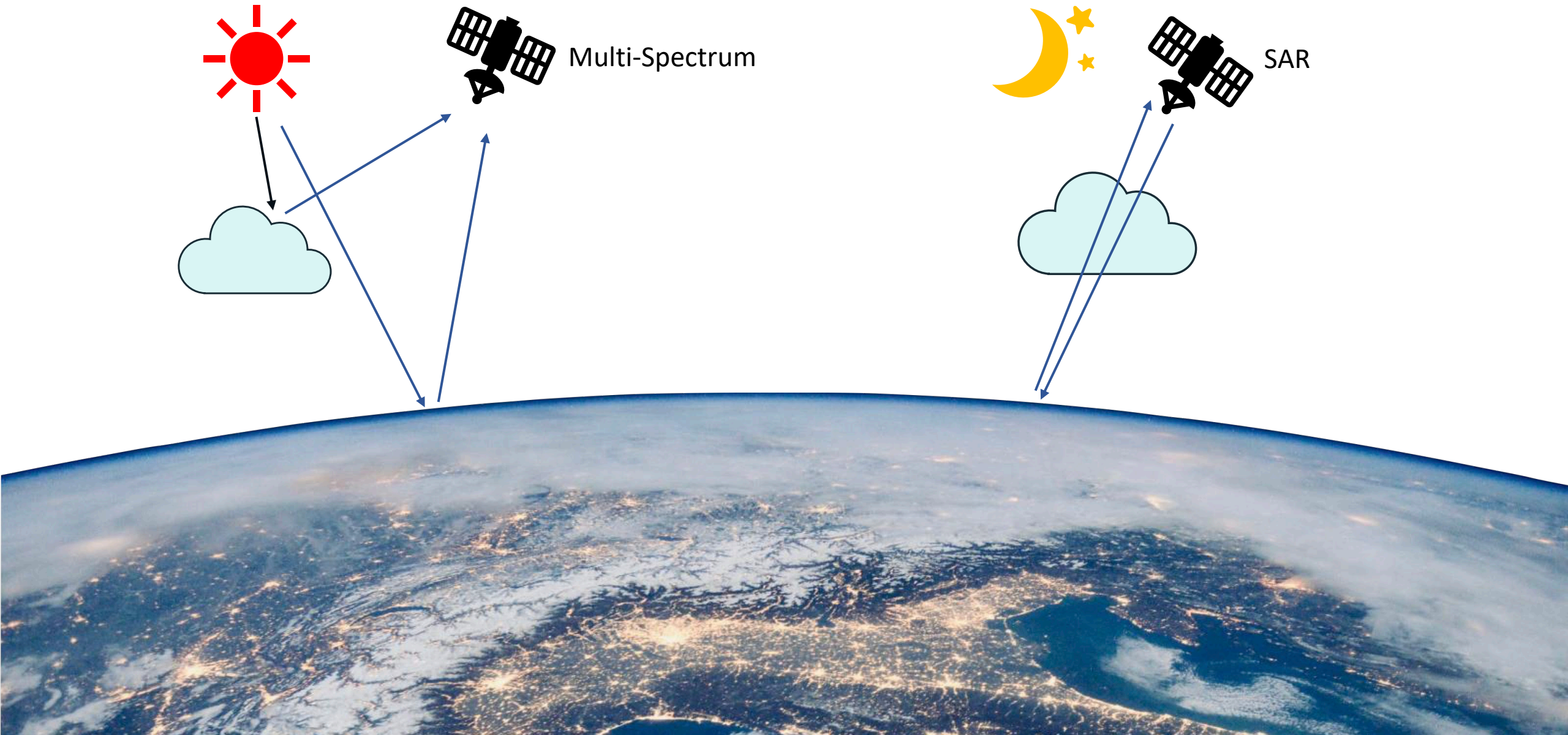
Worldview-4
0.3m Resolution



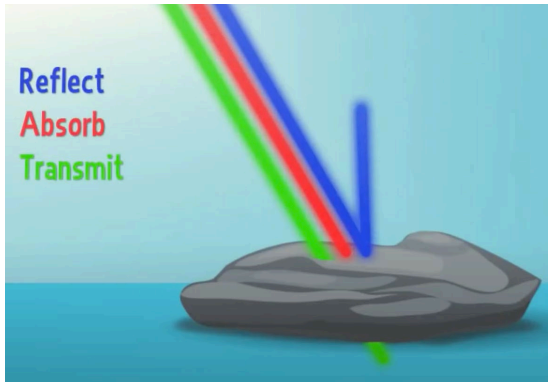
REVISIT TIME



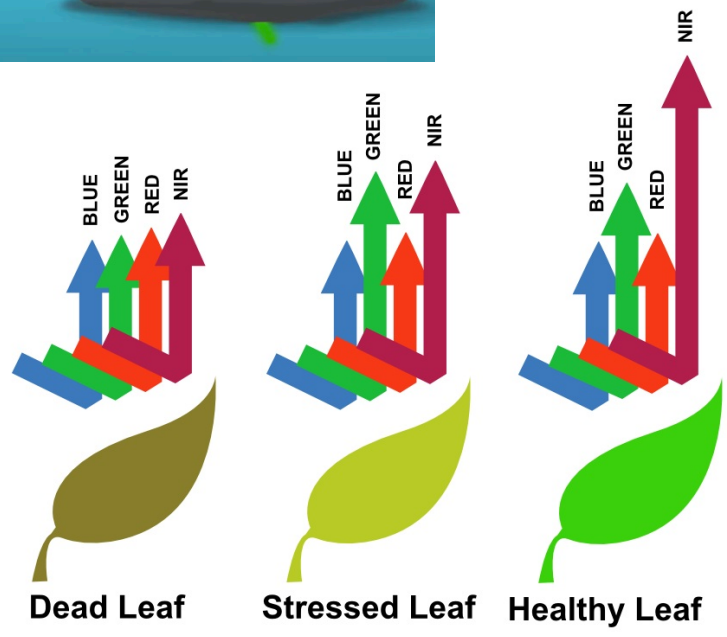
Earth Observation Satellite Sensors



Spectral Remote Sensing

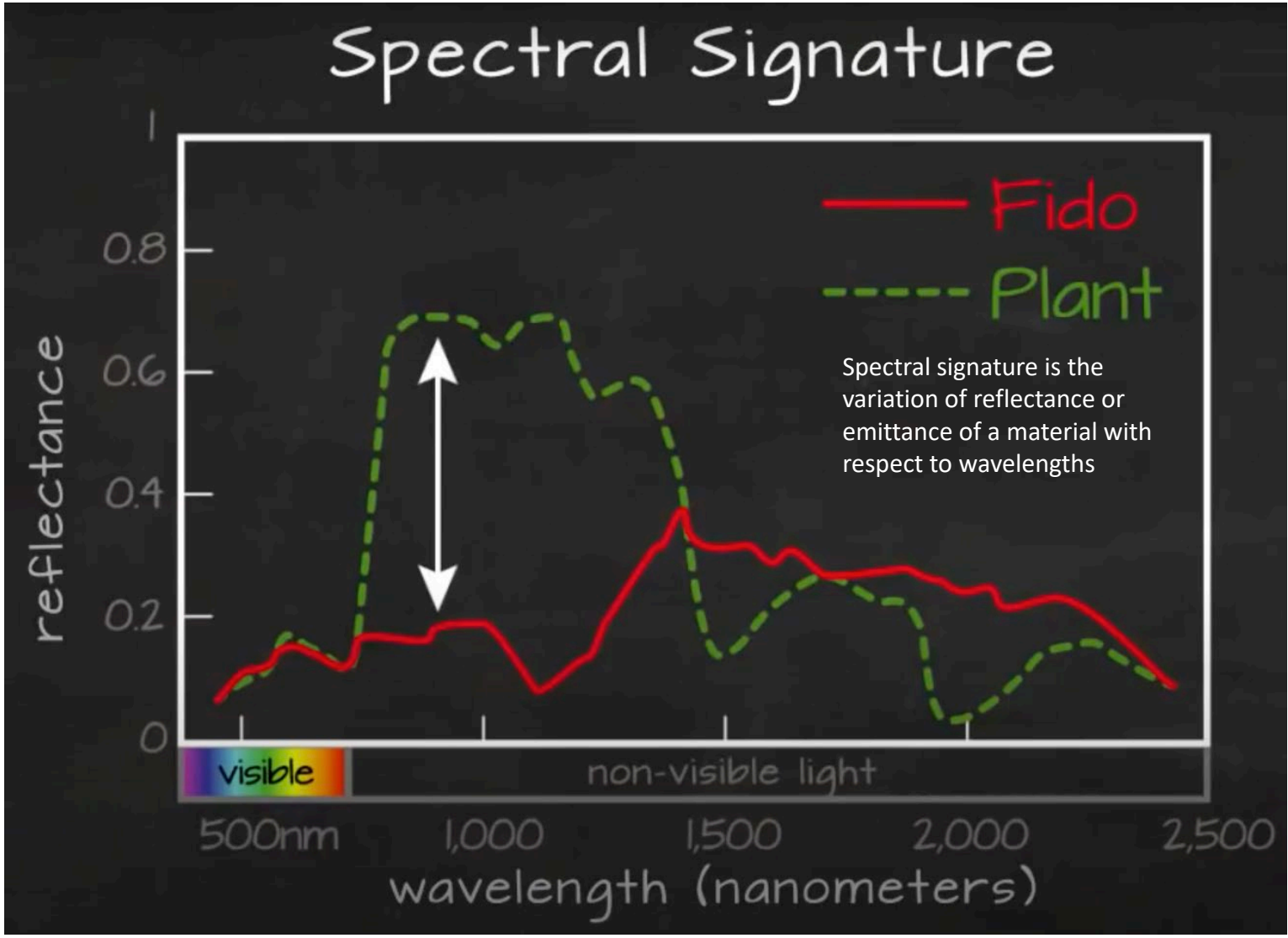


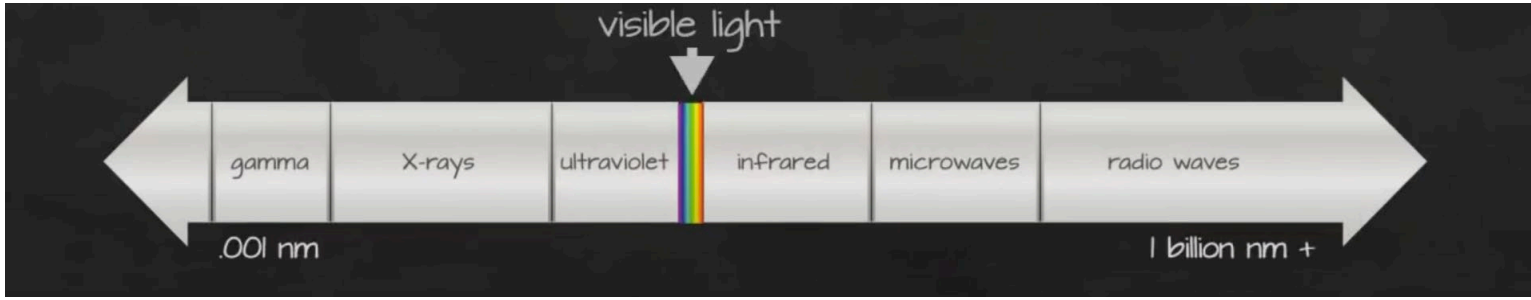
The NDVI quantifies vegetation by measuring the difference between near-infrared (**NIR**) (which the vegetation **strongly reflects**) and red light (which the vegetation absorbs/has a low reflectance)



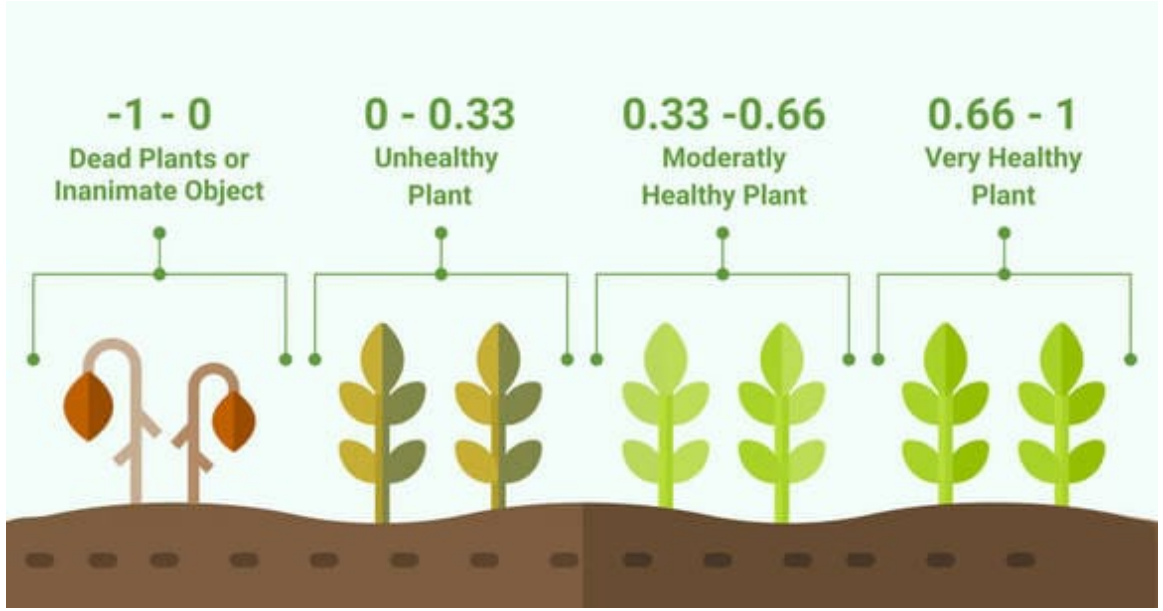
NDVI = (NIR – RED) / (NIR + RED)

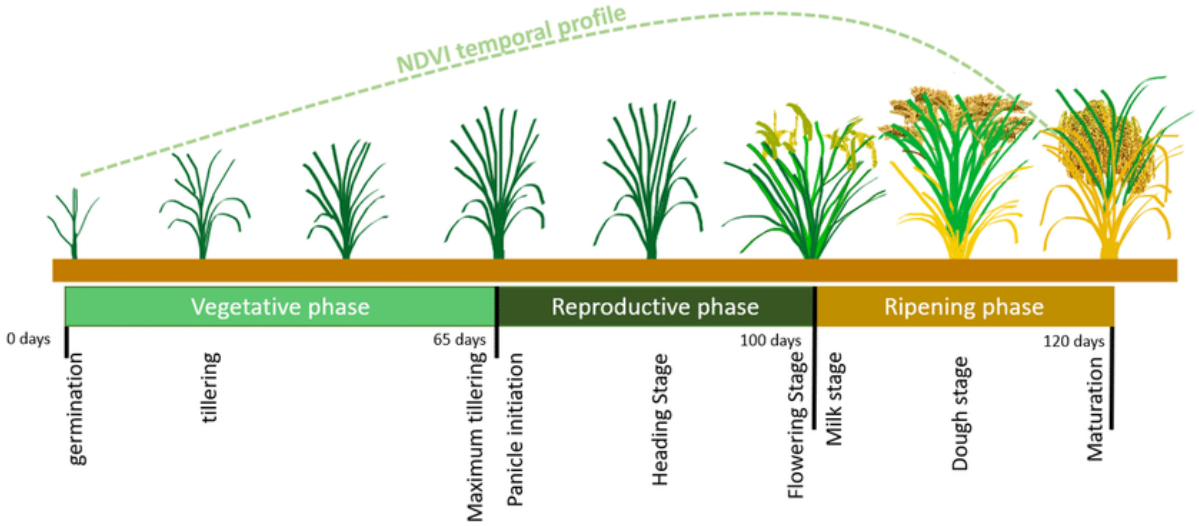
NDVI : Normalize Difference Vegetation Index

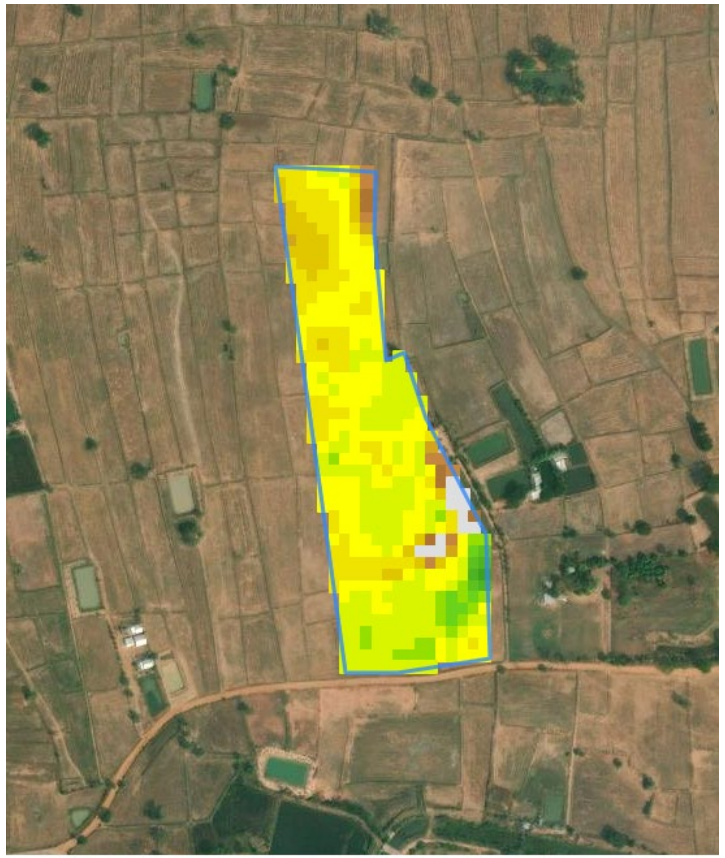




NDVI : **N**ormalized **D**ifference **V**egetation **I**ndex







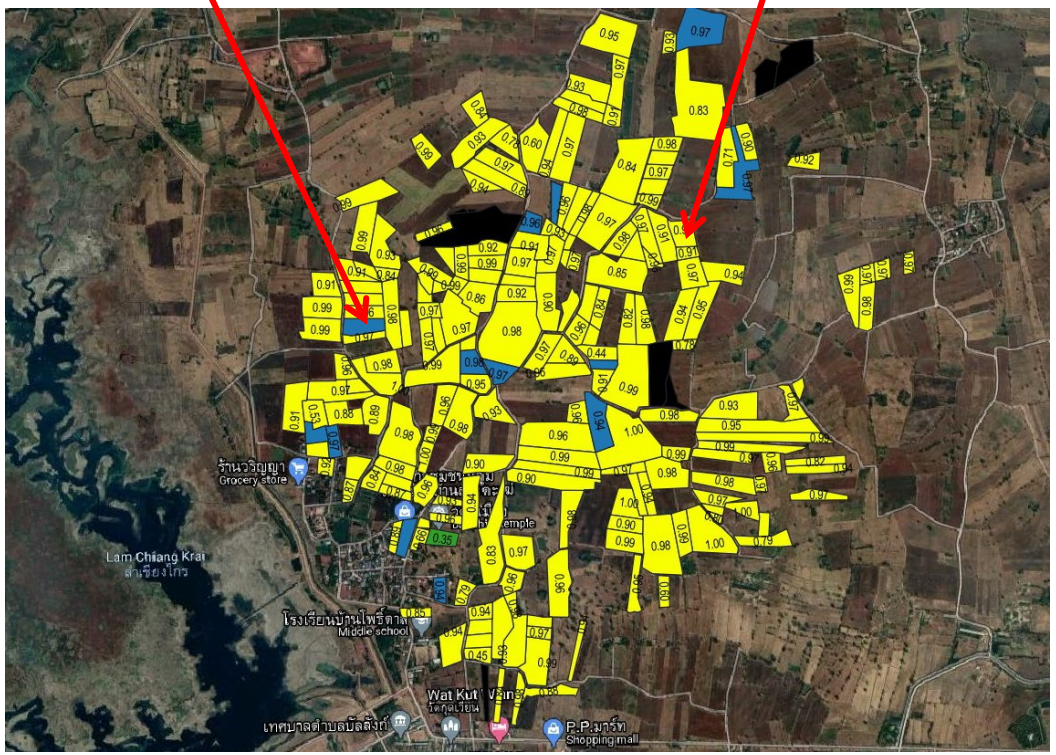
The NDVI quantifies vegetation by measuring the difference between near-infrared (**NIR**) (which the vegetation **strongly reflects**) and red light (which the vegetation absorbs/has a low reflectance)

Example applying Machine Learning for Crop Classification

Satellite Imagery

Satellite Imagery + ML





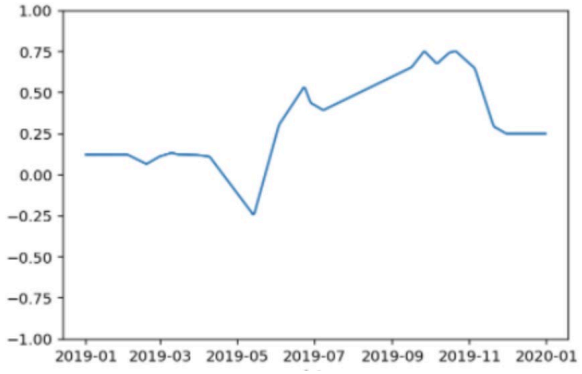
Example Land Classification with Time Series Data

Phenology Characteristics change across time series

we use time series to compensate resolution problem to identify object on earth

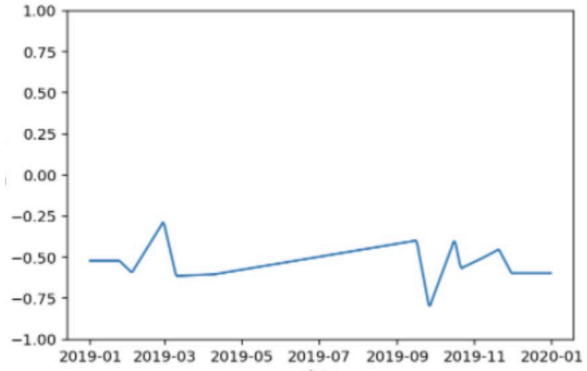
Rice field





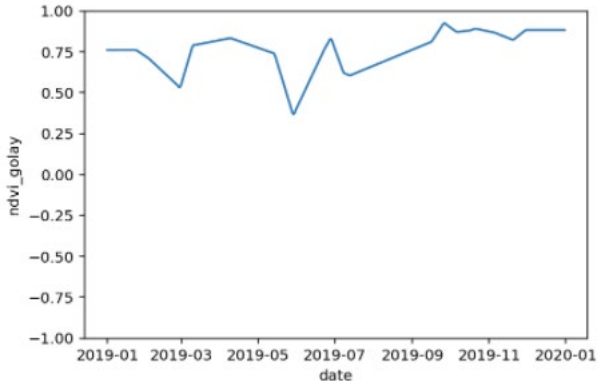
Water





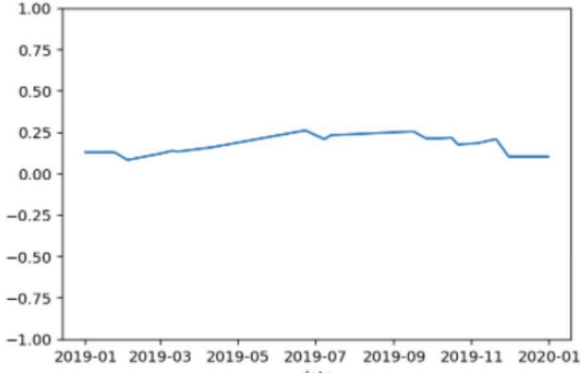
Tree





Building





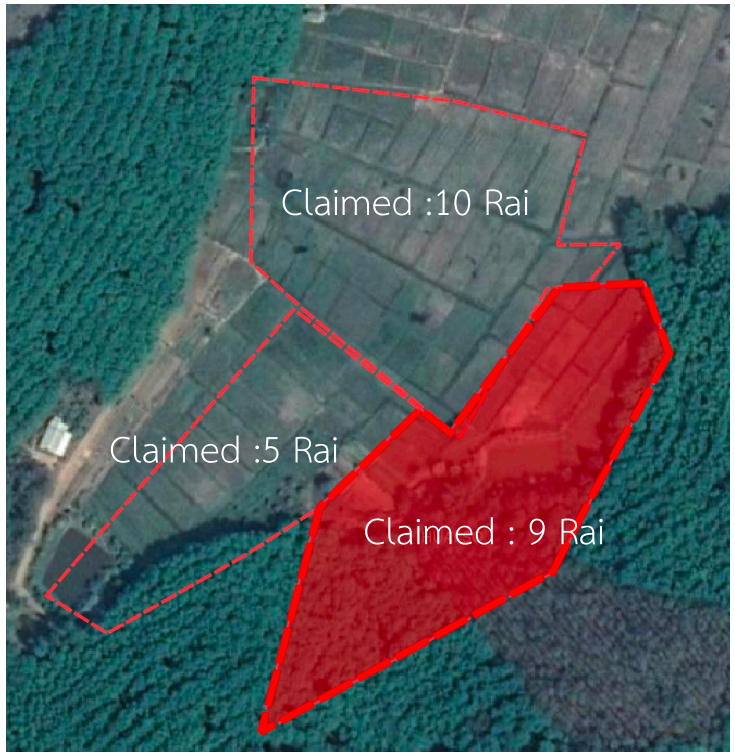
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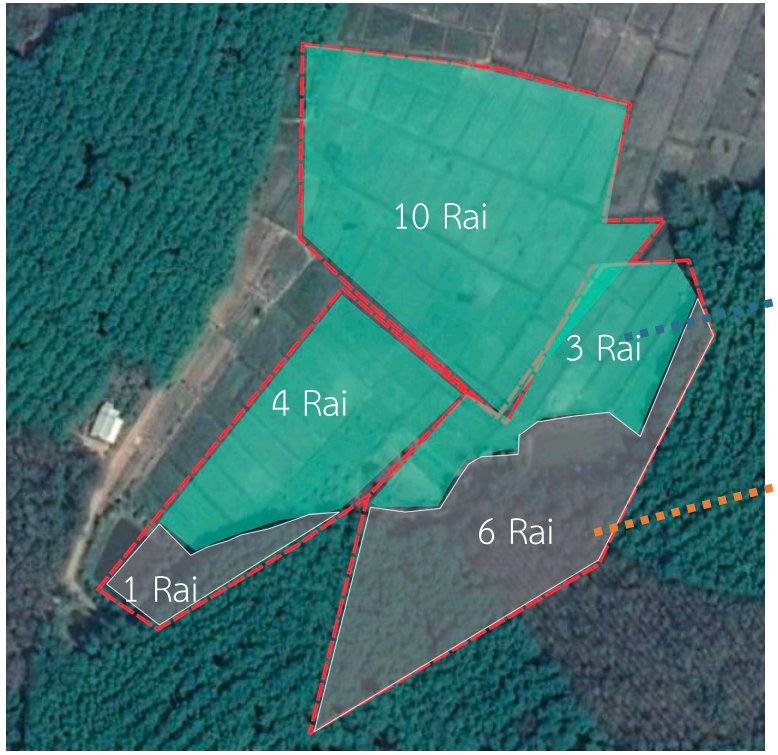
Example of Rice/Non-rice planting

Rice Planting Insured Area

Claimed area



ML for rice planting area



Rice Planting Area

Non-rice Planting Area

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Example of drought monitoring

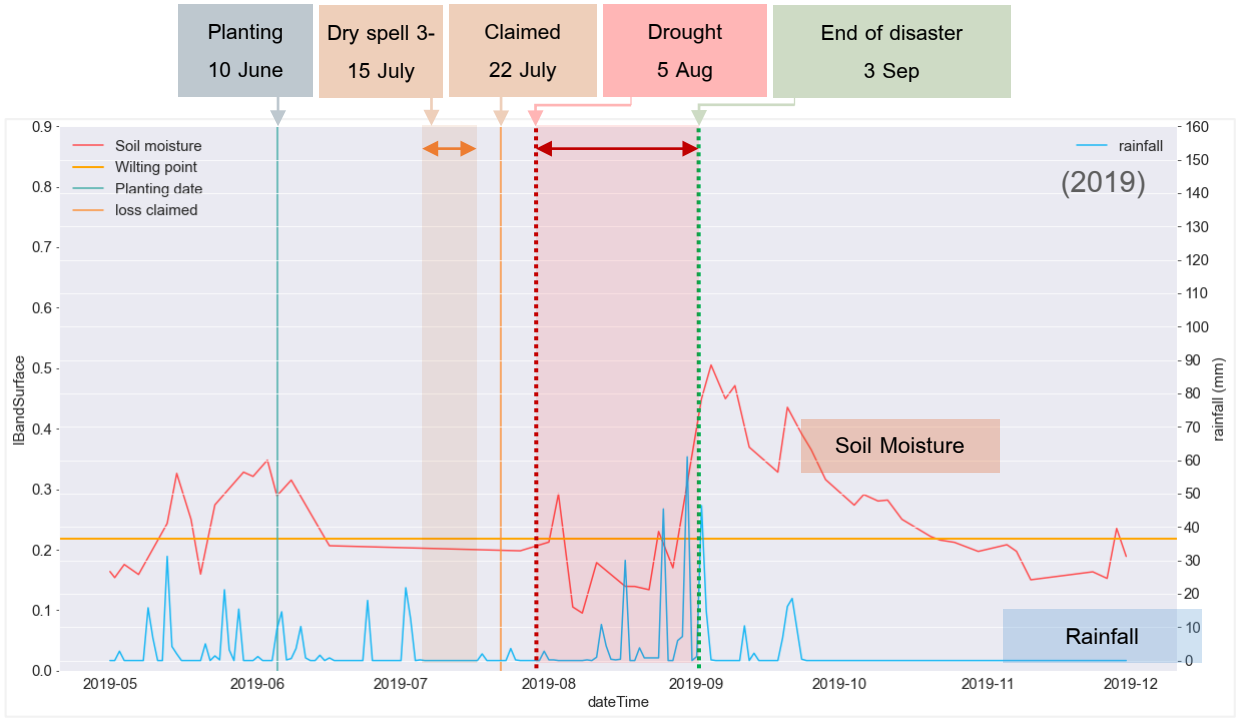


Rice planting area 29 Rai at Nong-bua-sa-ad Nakhonrachasima

Compare Y2019 and 2020 (May – Dec)

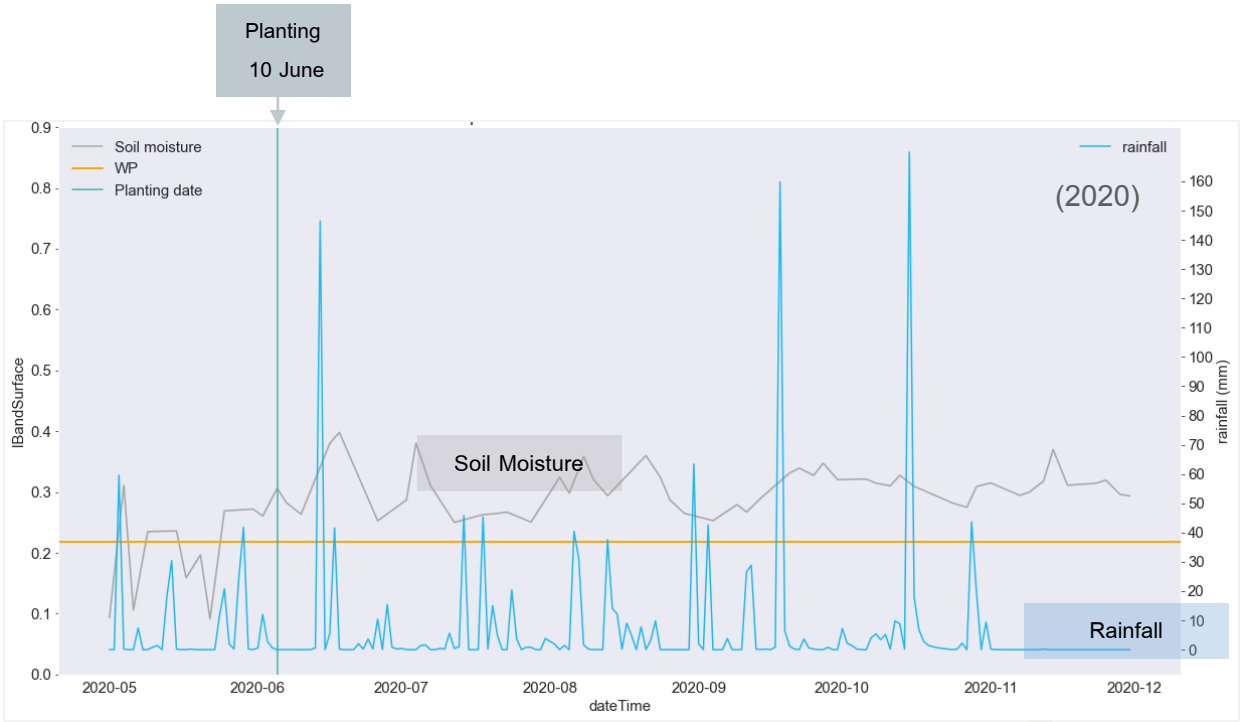
Example : Dry Spell and Drought 2019

- Rainfall < 1mm. for 14-15 consecutive day
- Soil Moisture less than Wilting Point more than 7 days



Example: Normal situation (2020)

- Normal rainfall
- Soil Moisture greater than Wilting Point



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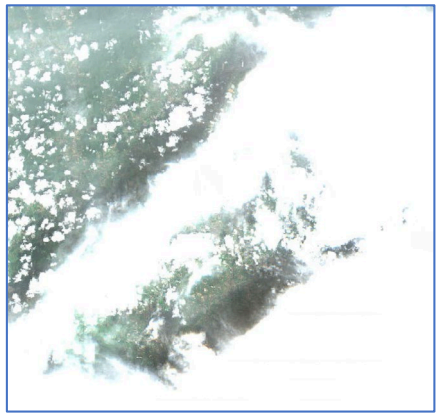
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Example Flood monitoring

Introduction to Flood Detection

- Flood events often happen in bad weather, characterized by heavy clouds and intense rainfall, which hampers the effective use of optical imaging instruments (RGB images) because of the lack of cloud-free, high-quality images.

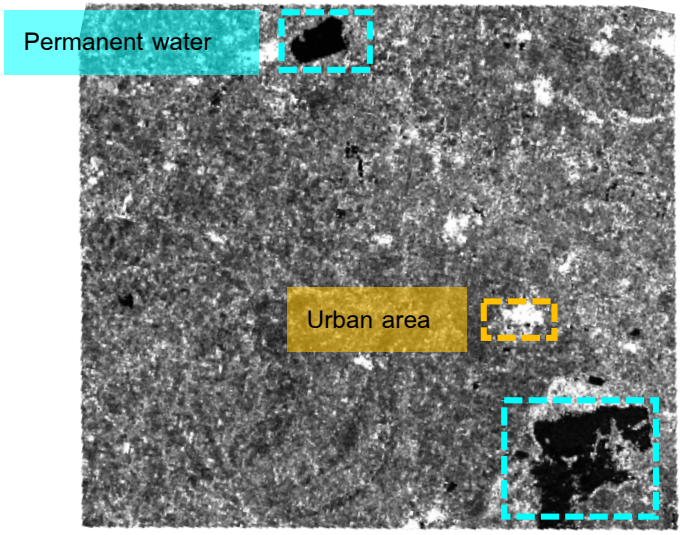
RGB image



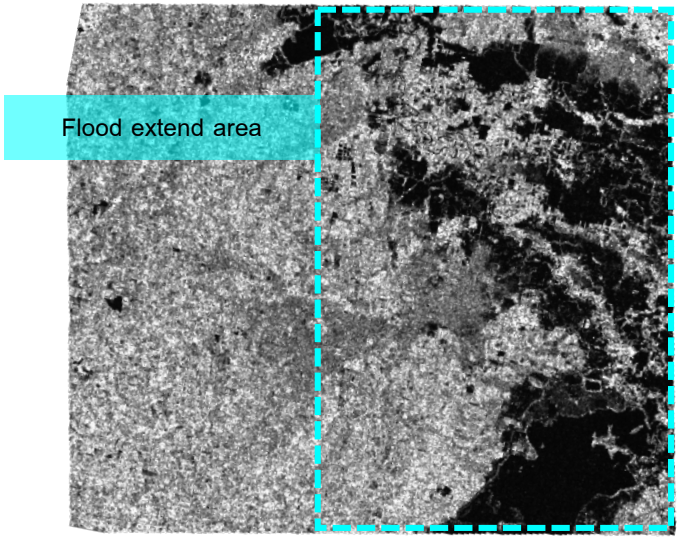
Using Synthetic Aperture Radar (SAR) for flood monitoring

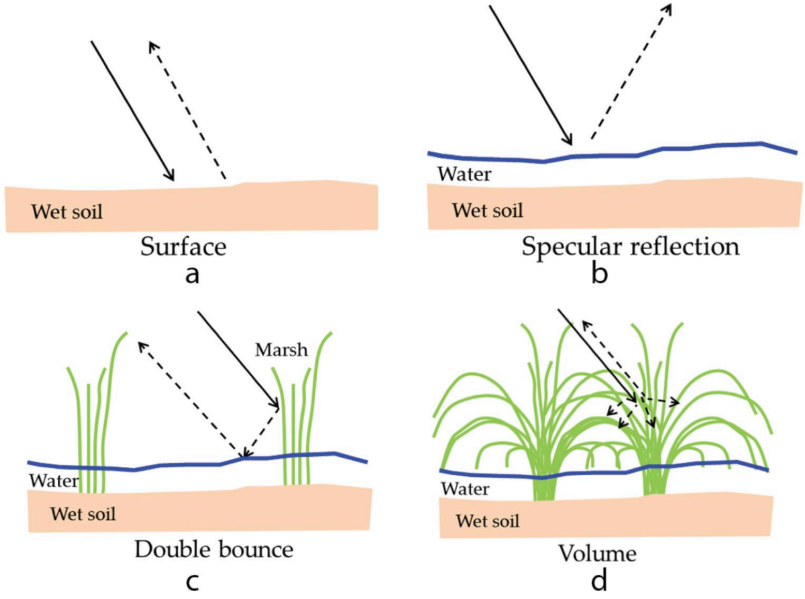
- is of special interest in observing flood situations, it actively emits electromagnetic waves, which are unaffected by the weather and time of day, and can be used to detect flooding in vegetated or urban areas because of its high penetration capability

Observed: 2020-01-02 (No affected by Flood)



Observed: 2021-09-29 (Affected by Flood)



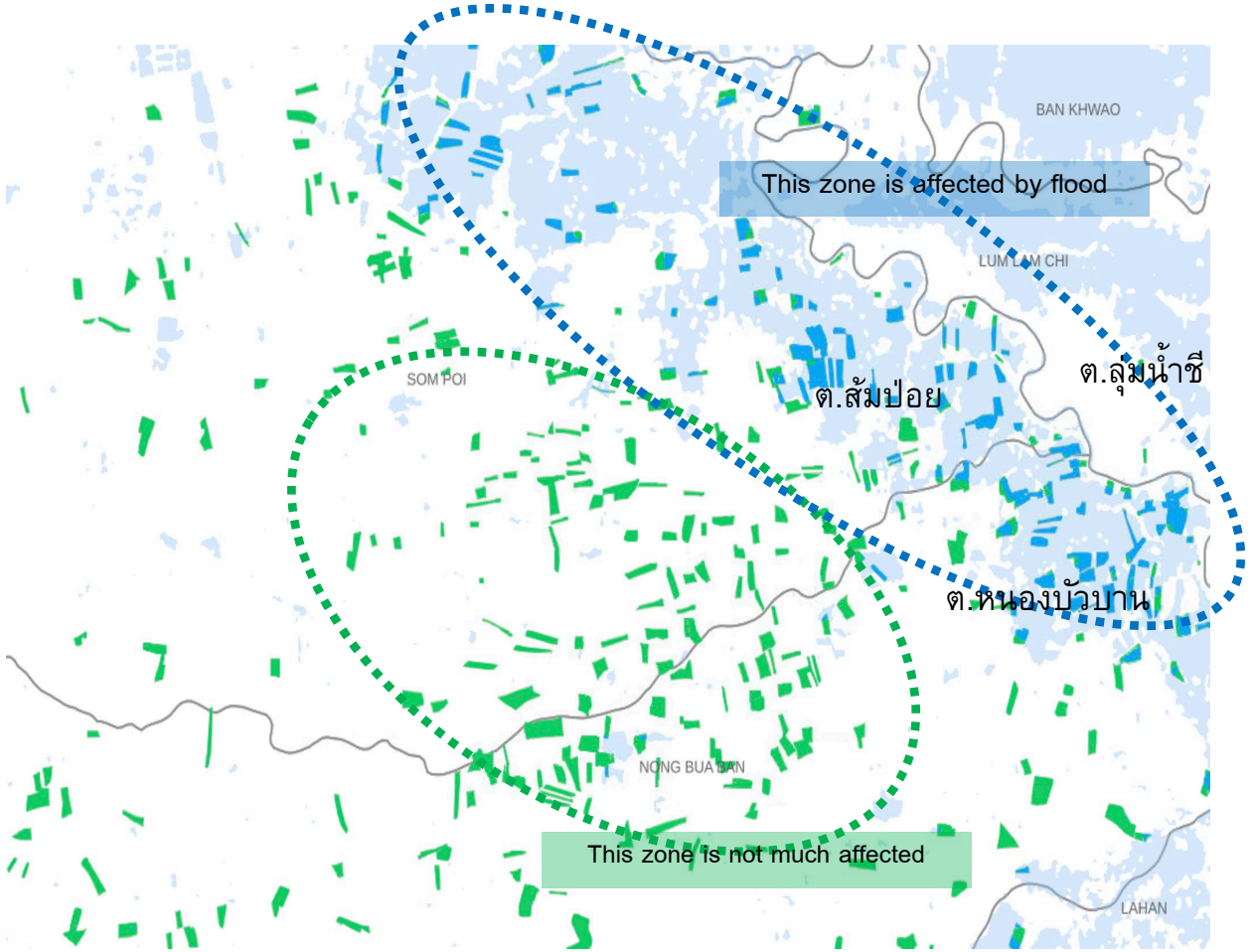


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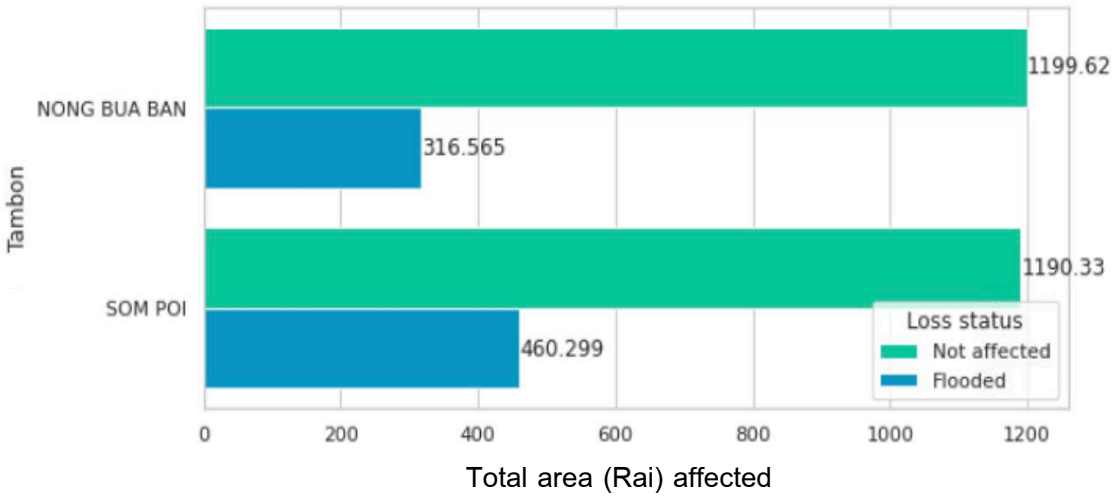
Flood Monitoring

Flood monitoring Chaiyaphum Province

(29 September 2021)





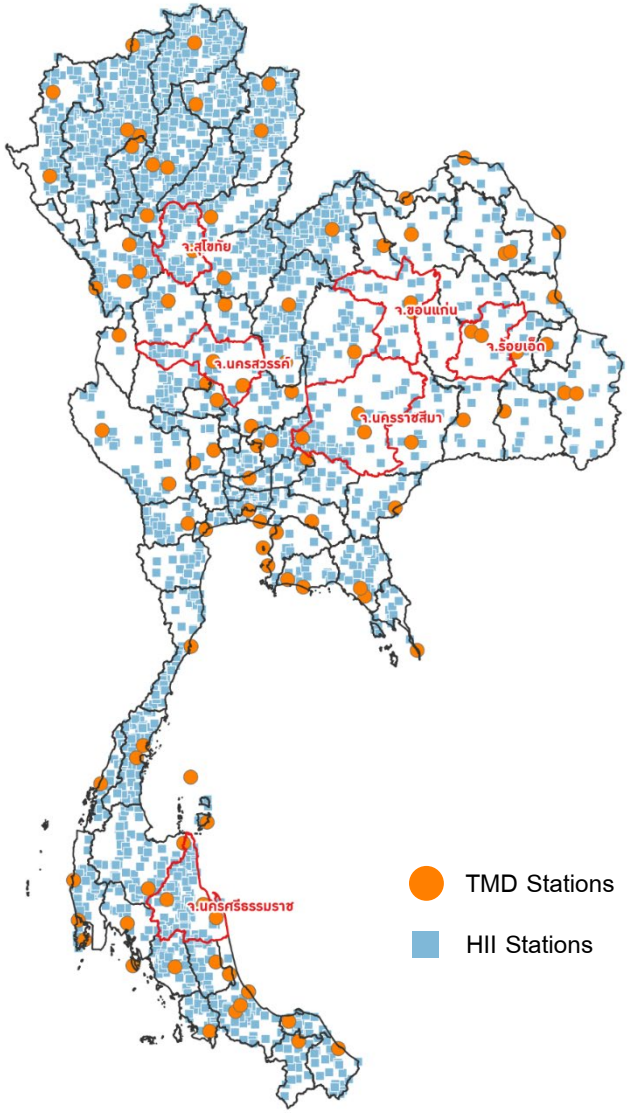


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Rainfall data from ground station and satellite

Weather Stations



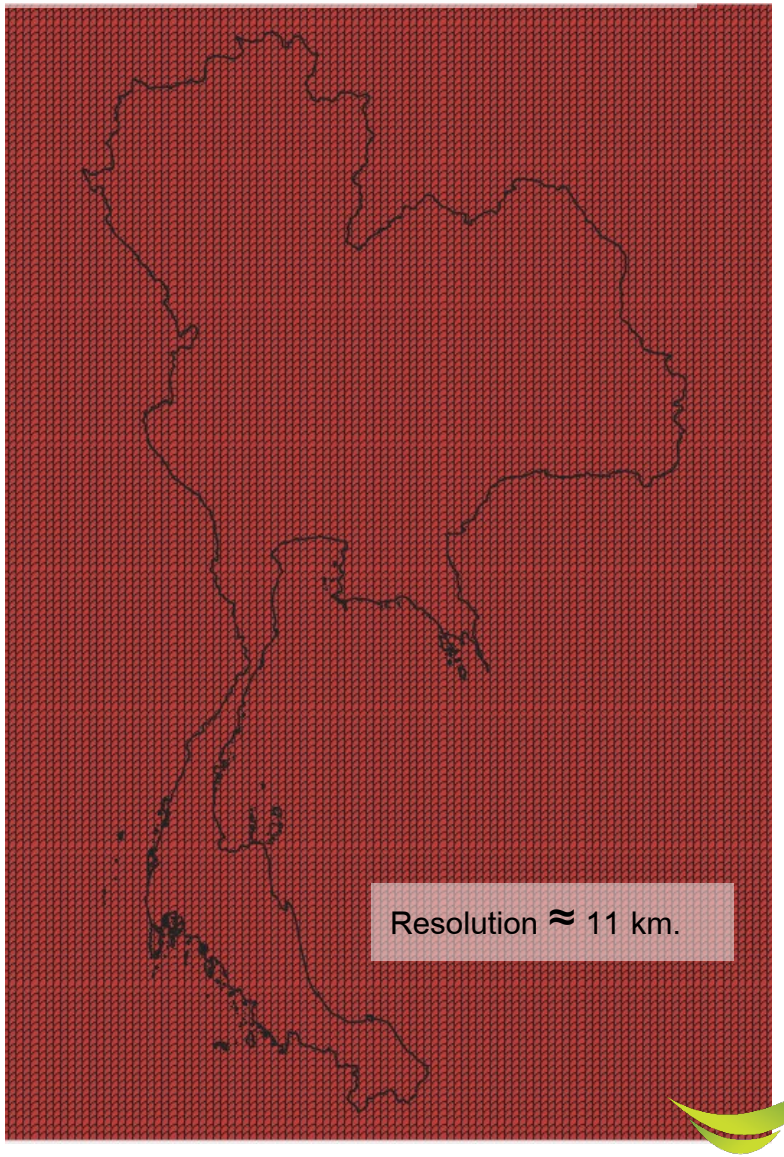
- **HII Weather Station**

  2,903 station

- **TMD Weather Station**

  106 station

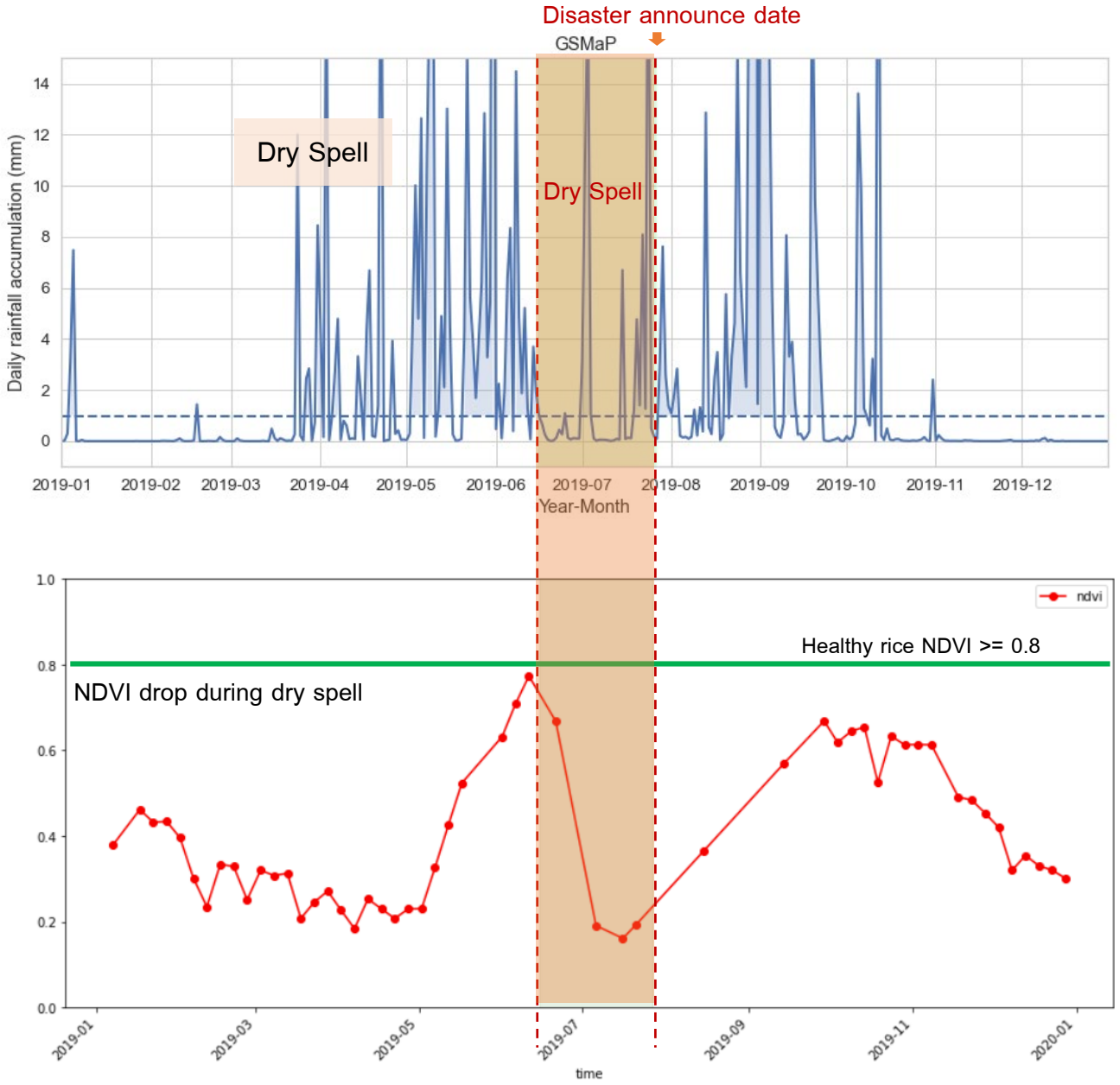
Rainfall data from Satellite



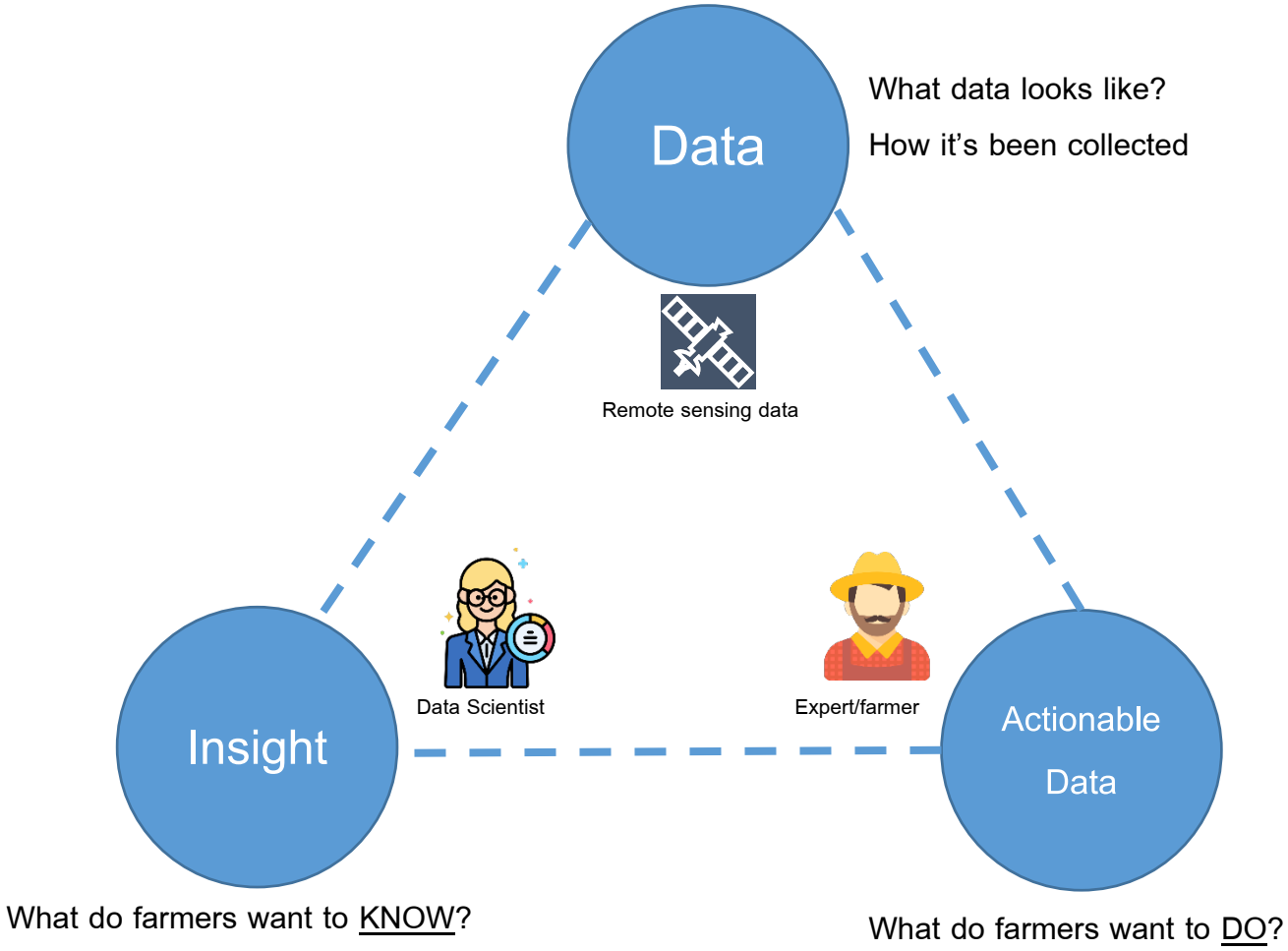
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Dry Spell


Disaster announce date
GSMaP
Dry Spell
Dry Spell
Daily rainfall accumulation (mm)
Year-Month
ndvi
Healthy rice NDVI >= 0.8
NDVI drop during dry spell
time

3 Components for Applying Geospatial Data Analysis to Agriculture



THAICOM Business Portfolio

SATELLITE BUSINESS

THAICOM

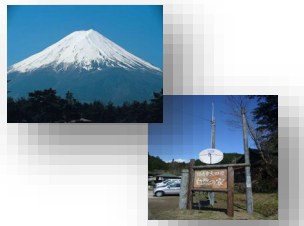
IPA GROUP



IPSTAR INDIA



IPSTAR JAPAN



NATION SPACE AND TECHNOLOGY CO., LTD.



DIGITAL SERVICES & NEW SPACE ECONOMY

Thai AI

THAICOM expresswifi

EARTH INSIGHTS

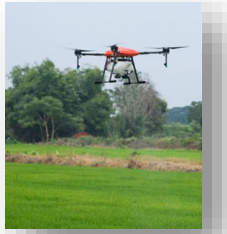
Exkasan



DRONE AND RELATED SERVICES

ATi ATI TECHNOLOGIES

AiANG เจ้าเอี้ยง



MOBILE NETWORKS

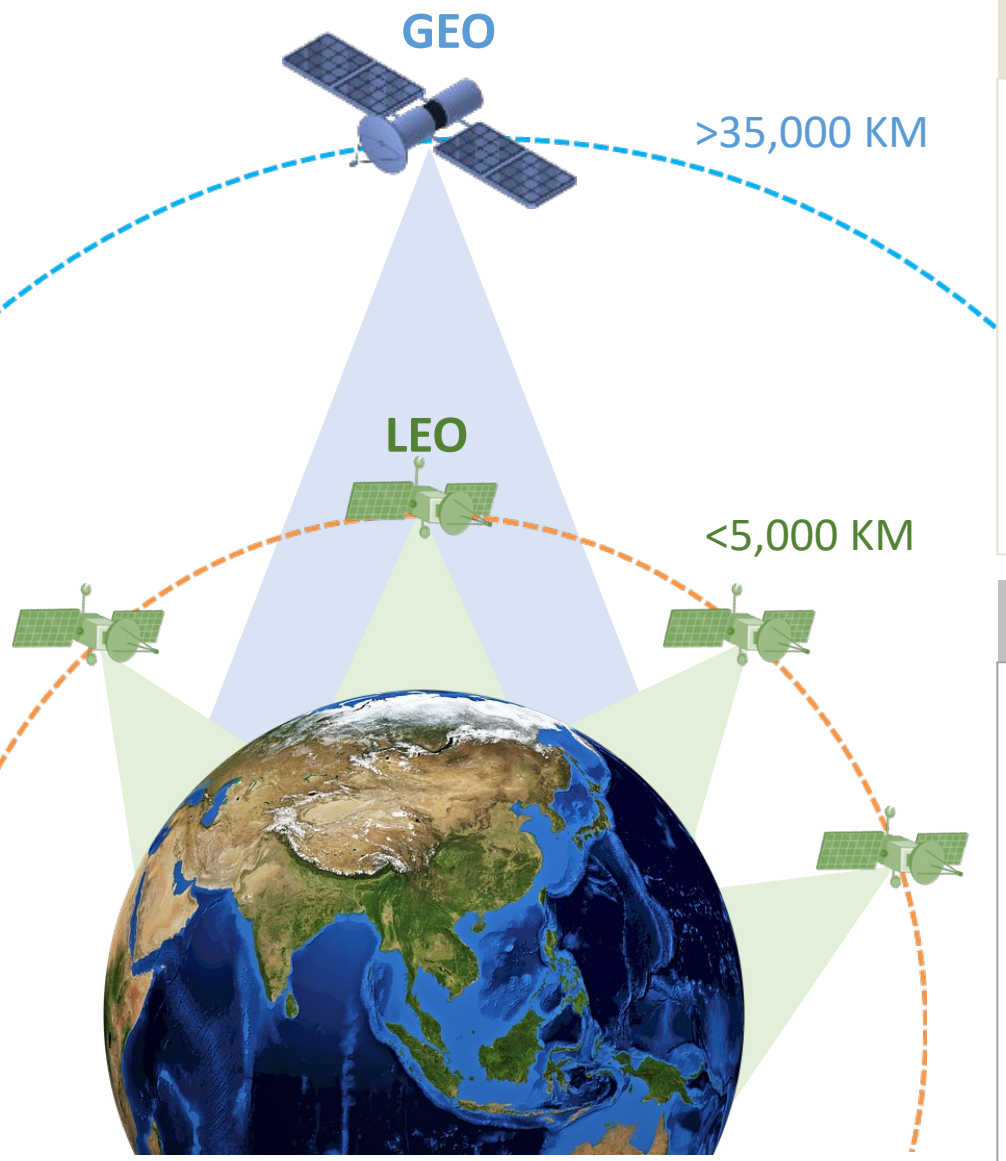
ลาว โทรคมนาคม LAO TELECOM



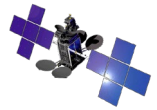
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THAICOM Satellite



Geostationary Earth Orbit (GEO) Satellites


Thaicom 4


Thaicom 6


Thaicom 7


Thaicom 8

New Satellite

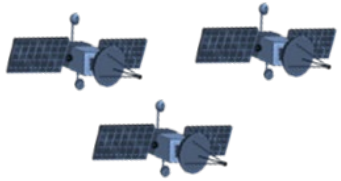
Low Earth Orbit (LEO) Satellites

Globalstar

- Operate **ground station** facilities
- **Reseller** for GlobalStar services and IOT solutions
- "**Smart Life Jacket**" launched in Phuket



THAICOM



New Satellite

(LEO RF-Detection Satellite)

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Thaicom The Next Gen Internship & Co-Operation Program 2022

Position : Business Development
Focused Skill : Business Analysis / Business Intelligence
Related Faculty : Business Administration

Position : Remote Sensing
Focused Skill : Remote Sensing
Related Faculty : Resource and Environment

Position : Data Science
Focused Skill : Data Science / Data Technology
Related Faculty : Computer Science / ICT

Position : Developer
Focused Skill : Software development / Front End Developer
Related Faculty : Computer Engineer / Computer Science

Position : Marketing
Focused Skill : Digital Marketing / Technology
Related Faculty : Marketing / Engineering

Position : UX/UI Designer
Focused Skill : Graphic Designer
Related Faculty : Digital Media

Position : GIS
Focused Skill : Geographic Information System
Related Faculty : Geography and Geoinformatics

Position : Human Resource
Focused Skill : Human Resource / Business Admin
Related Faculty : HR / Business / Political Science

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THANK YOU

