



# MYANMAR KOEI INTERNATIONAL

## ID&E's Innovation Revolution Showcase 2024 Kuaka Lumpur, Malaysia



DIGITAL SERVICES

AI & REMOTE SENSING

ENERGY

ENVIRONMENTAL SERVICES

“Engineering for a better future, a better world”

Venue: Hotel Le Meridien, Kuala Lumpur

Date: 3<sup>rd</sup> July, 2024

Time: 18:30 – 22:30, Malaysia Time



## Highlighted Energy Projects



### URABAN & INFRA ADVANCED TECHNOLOGY SERVICES

#### AI -MACHINE LEARNING

- Deforestation
- Urbanization
- Mangrove Mapping
- Land Use Classification

#### REMOTE SENSING

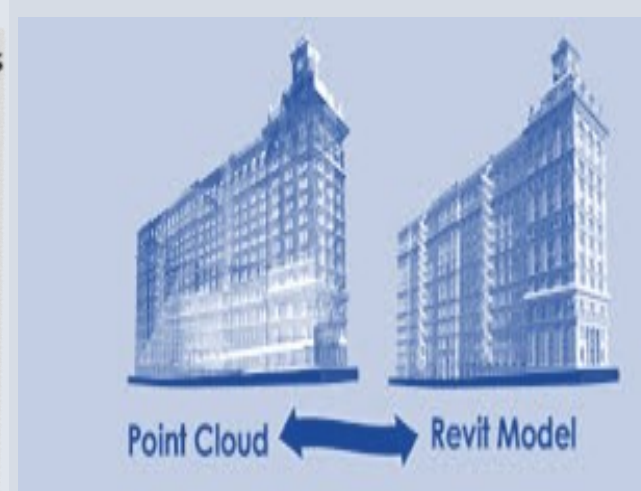
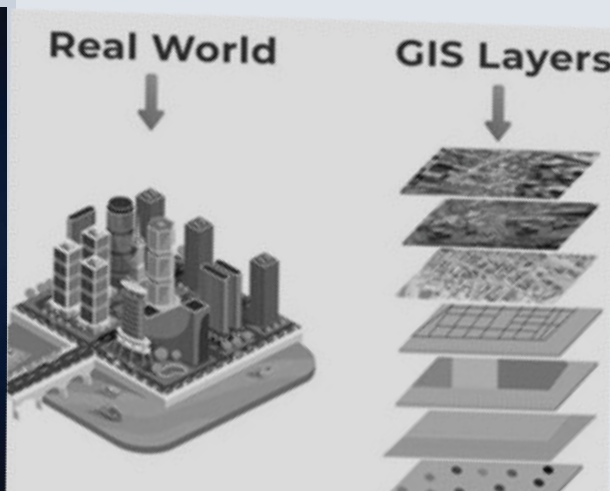
- Large-scale Mapping
- Growth Status
- Change Detection
- Shore Line Changes

#### GIS

- Construction Implementation Phase
- Traffic/People flow
- Urban/ Infra Design Planning

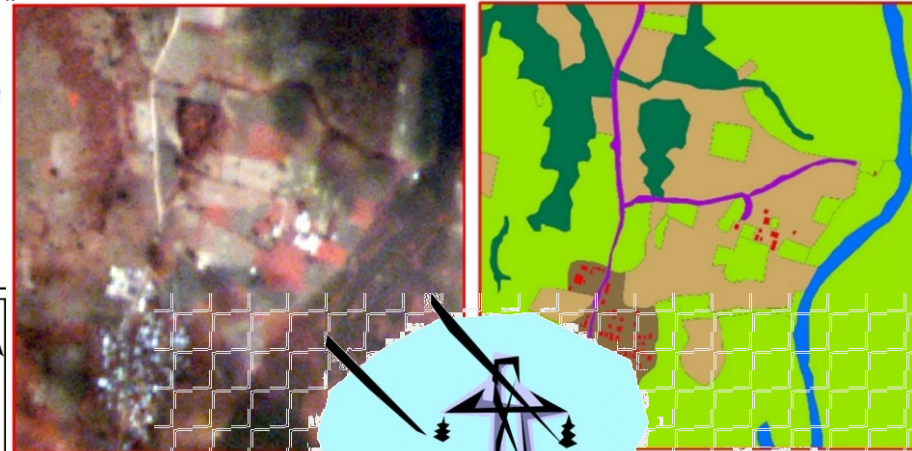
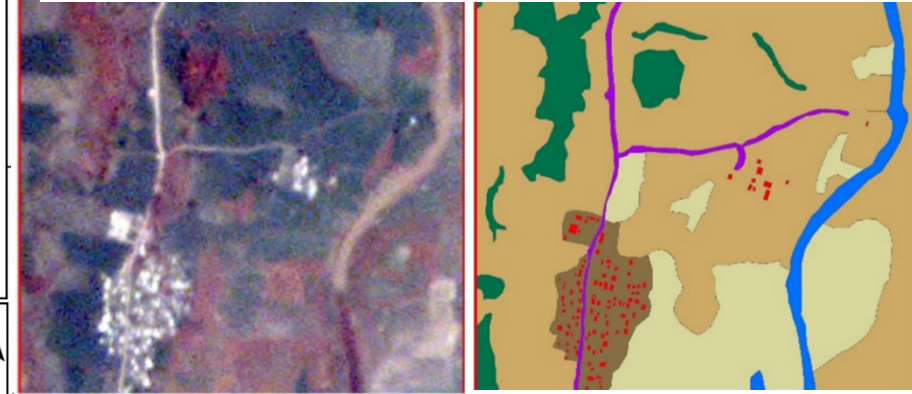
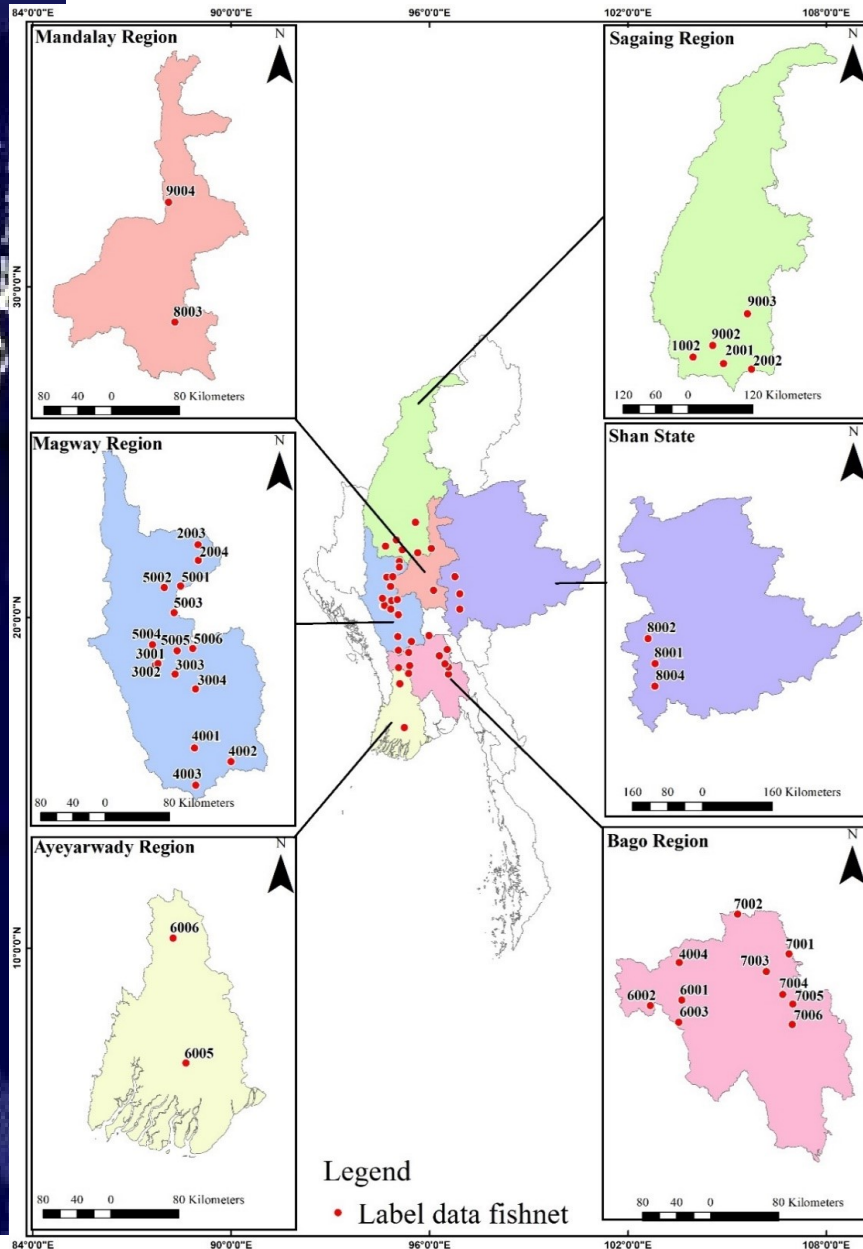
#### BIG DATA (POINT CLOUD)

- 3D modeling
- High definition surveying
- Virtual tour
- Remodeling/Renovation historical Structures



# Study on the Relationship Between Electricity Demand and Land Uses in Myanmar

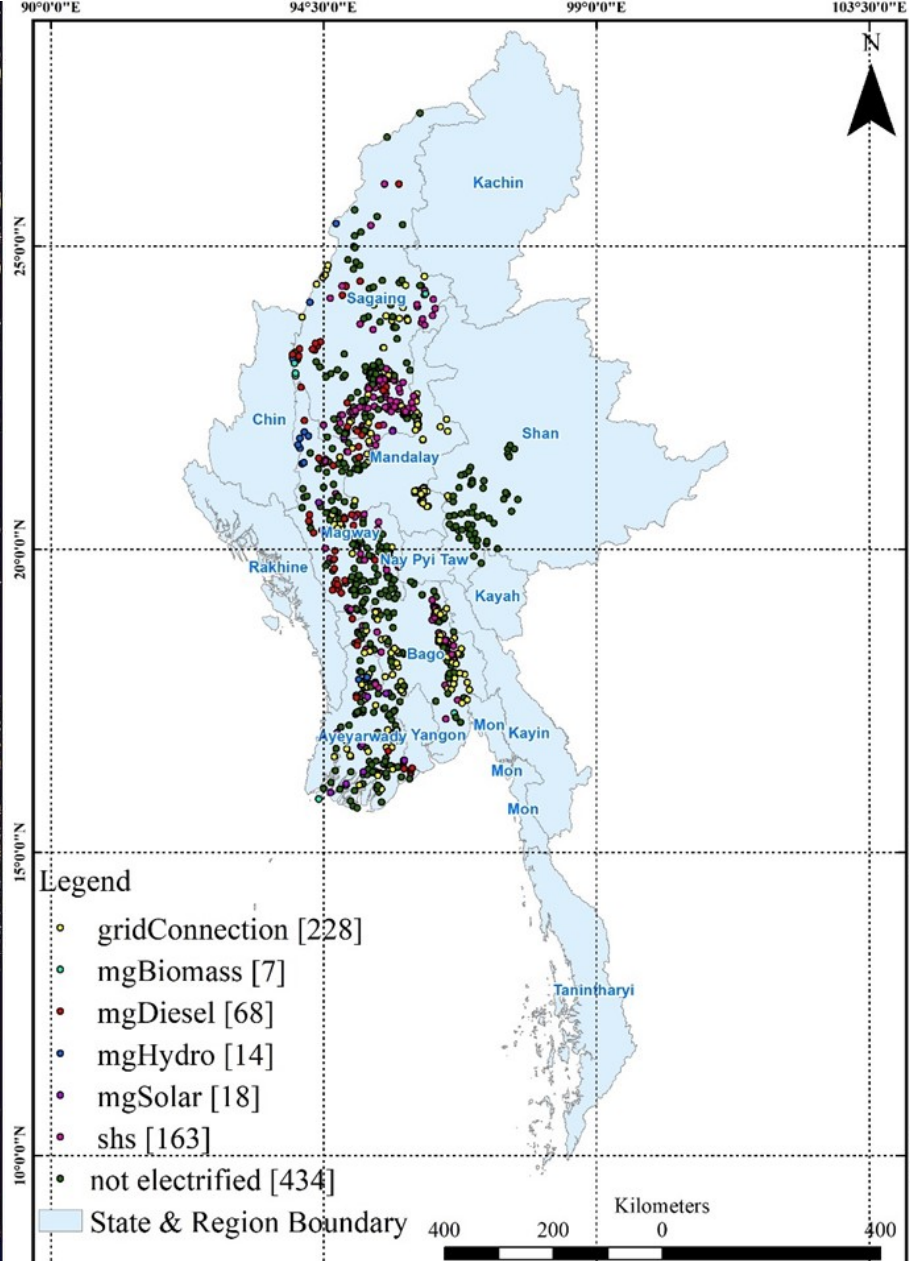
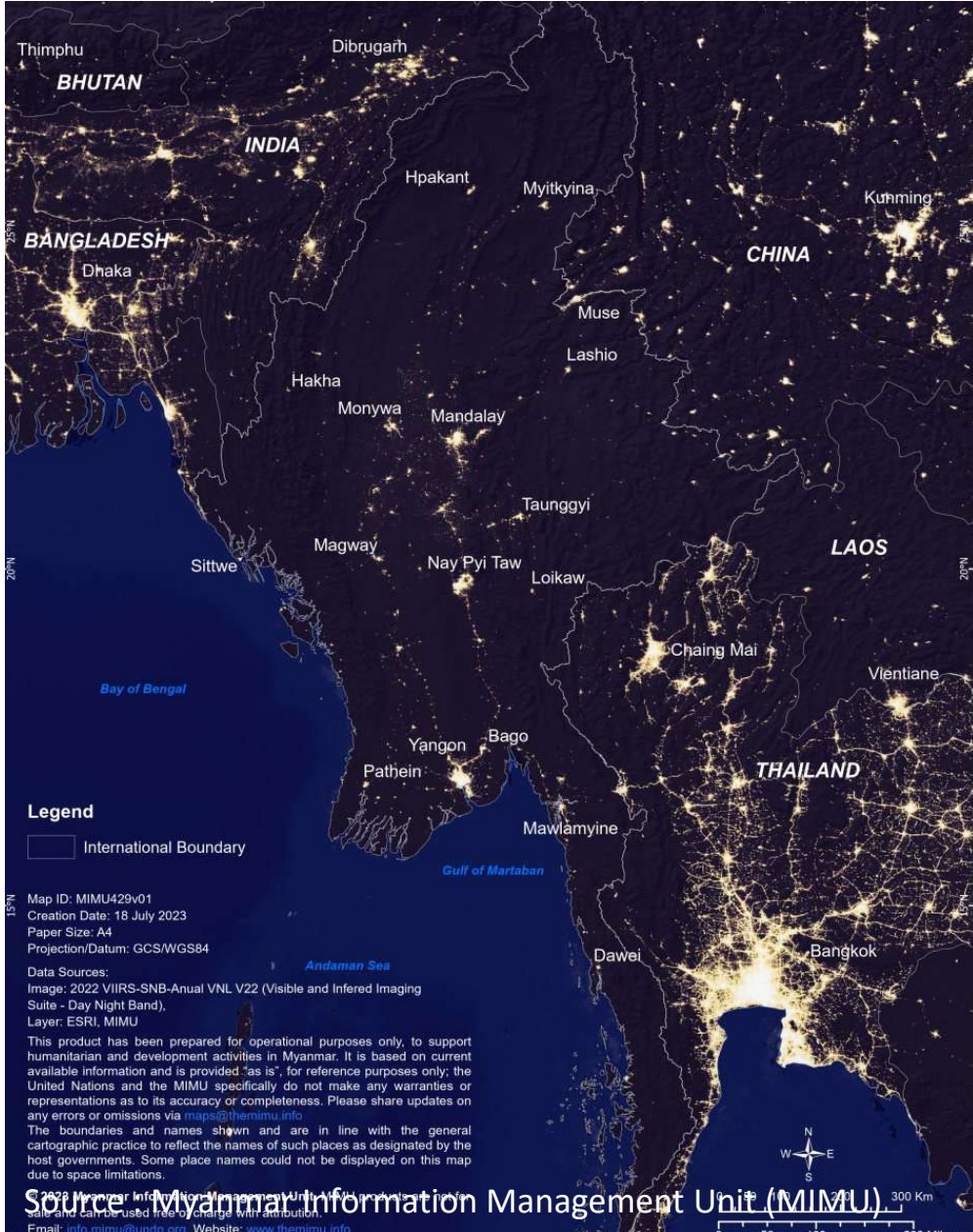
## Land Use Classification



**Legend**

Land Cover Name	Color
0 (No Data Value)	Grey
101 (Forest Cover)	Dark Green
201 (Water Body)	Blue
401 (Rooftops)	Red
501 (Road)	Purple
601 (Rice Paddies)	Light Green
701 (Sugar cane)	Yellow
901 (Beans)	Olive Green
1,001 (Fruit trees)	Light Green
1,201 (Fallow land)	Tan
1,202 (Bare ground)	Brown





### Background

- ❖ Only 16% of the rural people in Myanmar can access to electricity while almost all urban area has already access to electrification

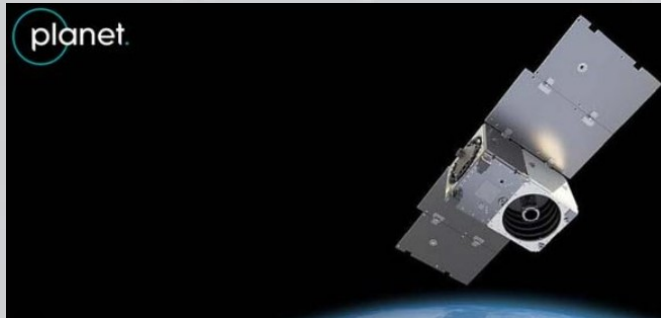
### Objective

- ❖ To provide an analysis of the land use land cover changes in AOI villages by presenting the temporal variations of land use changes
- ❖ To study the impact of electrification on land use at village level

### Expected Outcomes

- ❖ Seasonal land use for selected 932 villages will be classified
- ❖ Correlation between Land use and electricity demand will be calculated.

### Planet Scope Imagery



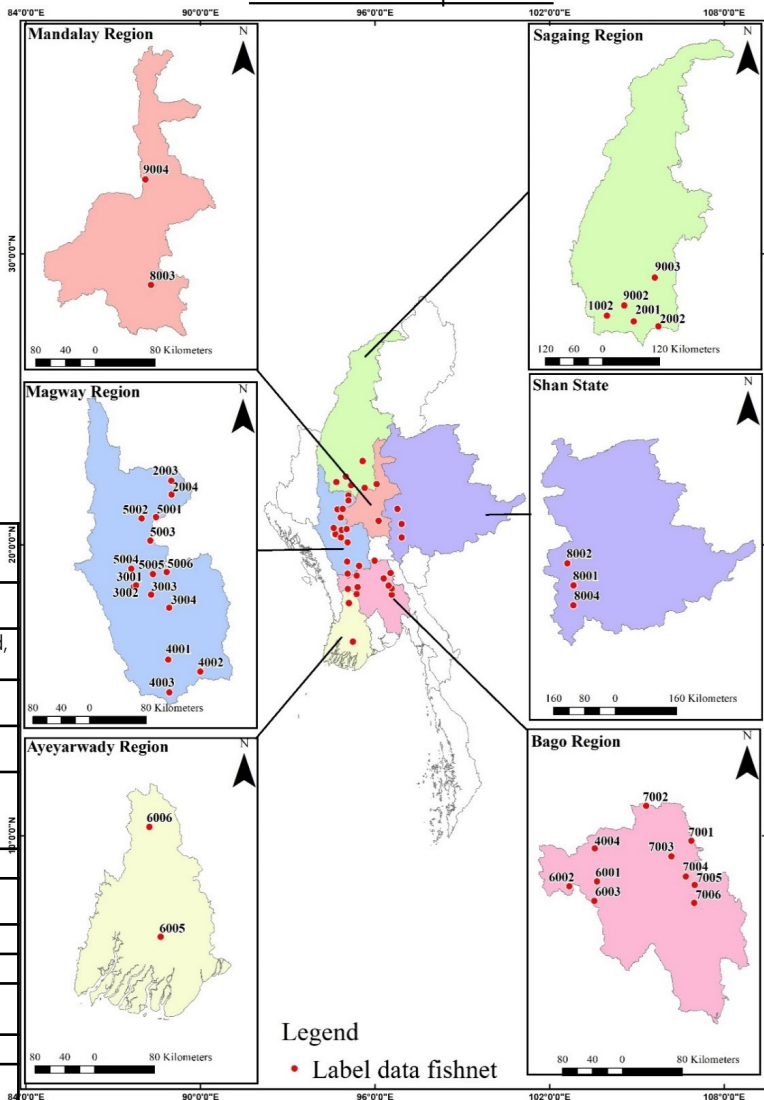
Instrument	Band Name	Spectral Range (nm)	Resolution (m)	Revisit Cycle	Coverage
PS2.	Band 1- Blue	455 - 515	3 m	Daily	Global
	Band 2- Green	500 - 590			
	Band 3- Red	590 - 670			
	Band 4 - NIR	780 - 860			
PSB.SD	Band 1- Coastal Blue	431 - 452	3 m	Daily	Global
	Band 2 - Blue	465 - 515			
	Band 3 - Green I	513 - 549			
	Band 4 - Green	547 - 583			
	Band 5 - Yellow	600 - 620			
	Band 6 - Red	650 - 680			
	Band 7 - Red Edge	697 - 713			
	Band 8 - NIR	845 - 885			



## Label Data Preparation

### Location map of 37 fishnet boxes for label Data Preparation

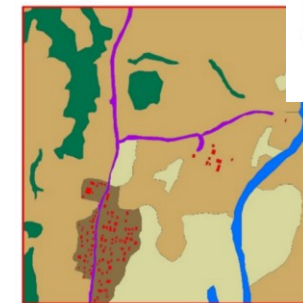
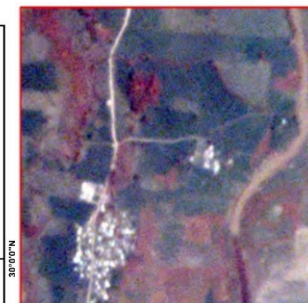
- (1) Natural features
  - I. Forest cover
  - II. Waterways
  - III. Lakes, reservoirs
  - IV. Flooded land
- (2) Rooftops
  - I. Small rooftops (residential buildings)
  - II. Big rooftops (commercial & industrial buildings)
  - III. Metal and cement roofs
  - IV. Bamboo, thatch & palm roofs
- (3) Roads
  - I. Dirt roads
  - II. Concrete roads
- (4) Crops
  - I. Rice paddies
  - II. Sugarcane
  - III. Maize
  - IV. Beans
  - V. Opium trees
  - VI. Fallow land



Label Code	Name	Description
0	No Data value	No Data value of pixel
101	Forest cover	Dense Forest, Trees cover, Woodland, Spare Forest
201	Water Body	Waterways, Lake, Reservoirs
301	Flooded Land	Flooded land
401	Rooftops	Small and big rooftops, Metal, Cement, Bamboo, Thatch and palm roofs
501	Road	Dirt road, Concrete roads
601	Rice paddies	Seasonal Rice
701	Sugar cane	All season
801	Maize	Seasonal maize
901	Beans	Seasonal crop may include chilly, cotton and small vegetation
1001	Fruit trees	All season
1101	Opium poppy	Seasonal opium poppy
1201	Fallow land	Seasonal fallow land
1202	Bare ground	Surface ground

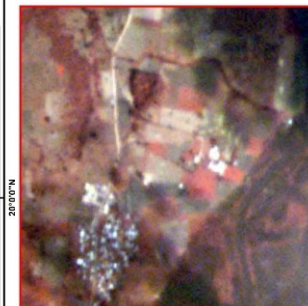
### Sample Label data

Remote Sensing



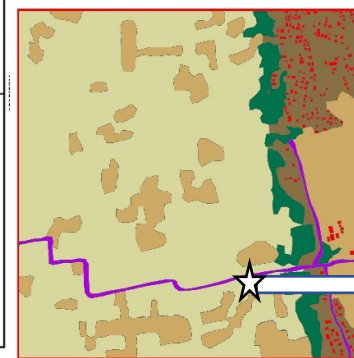
- Legend
- ▲ Village
  - Land Cover Name
  - 0 (No Data Value)
  - 101 (Forest Cover)
  - 201 (Water Body)
  - 401 (Rooftops)
  - 501 (Road)
  - 601 (Rice Paddies)
  - 701 (Sugar cane)
  - 901 (Beans)
  - 1,001 (Fruit trees)
  - 1,201 (Fallow land)
  - 1,202 (Bare ground)

Planet Scope Image and label data for fishnet 8004 at April 2022



- Legend
- ▲ Village
  - Land Cover Name
  - 0 (No Data Value)
  - 101 (Forest Cover)
  - 201 (Water Body)
  - 401 (Rooftops)
  - 501 (Road)
  - 601 (Rice Paddies)
  - 701 (Sugar cane)
  - 901 (Beans)
  - 1,001 (Fruit trees)
  - 1,201 (Fallow land)
  - 1,202 (Bare ground)

Planet Scope Image and label data for fishnet 8004 at October 2022



Ground truth Checking



Satellite Image



Prediction by Model 1

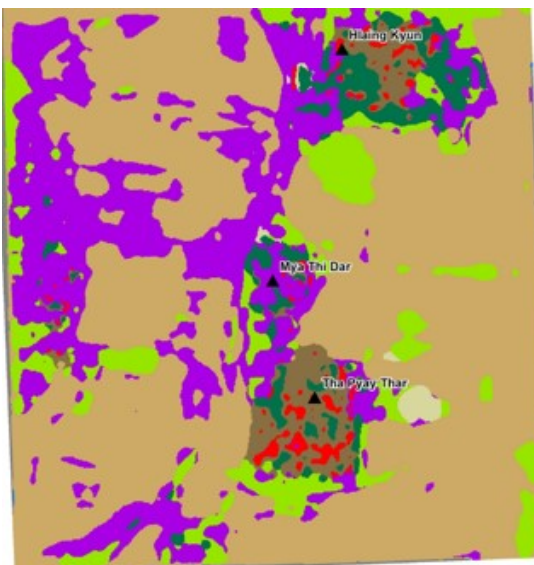


Prediction by Model 2

October 2022

**Land Cover Name**

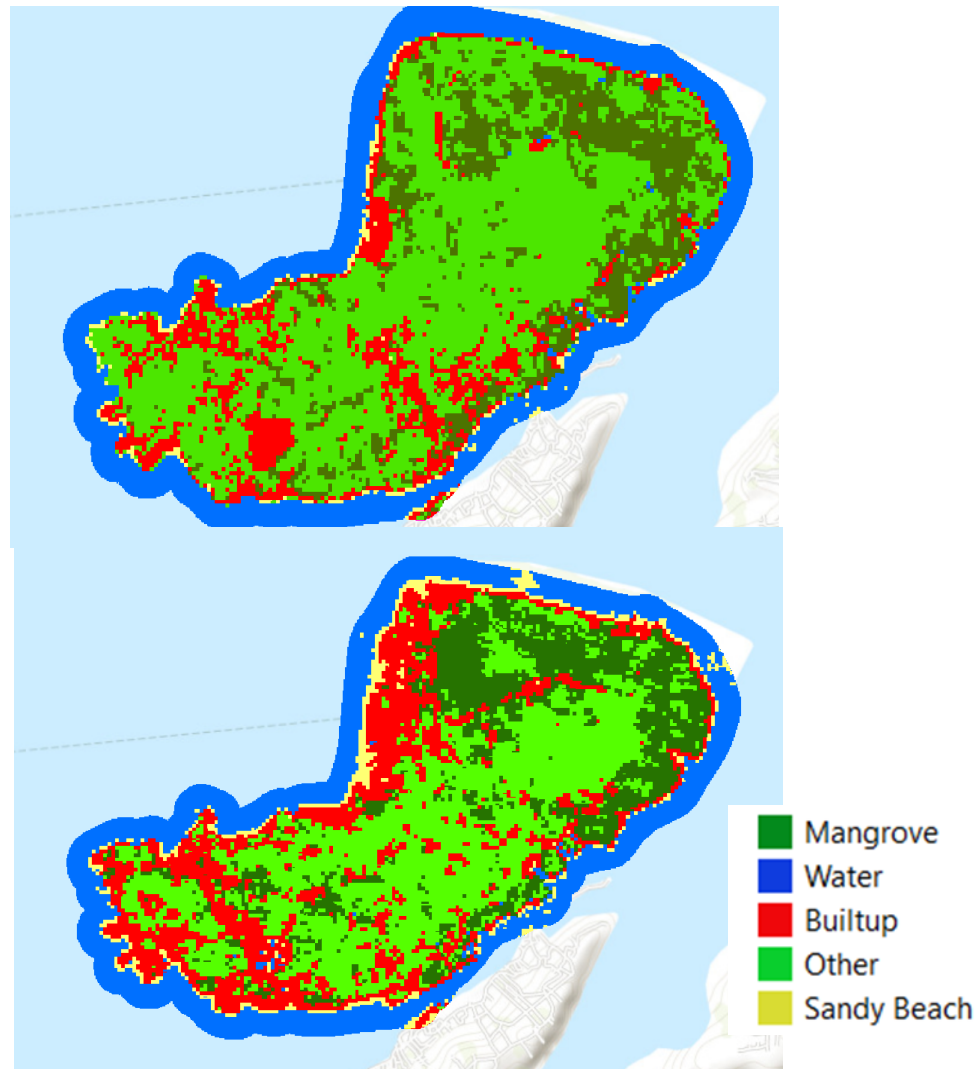
- 0 (No Data Value)
- 101 (Forest Cover)
- 201 (Water Body)
- 401 (Rooftops)
- 501 (Road)
- 601 (Rice Paddies)
- 701 (Sugar cane)
- 901 (Beans)
- 1,001 (Fruit trees)
- 1,201 (Fallow land)
- 1,202 (Bare ground)



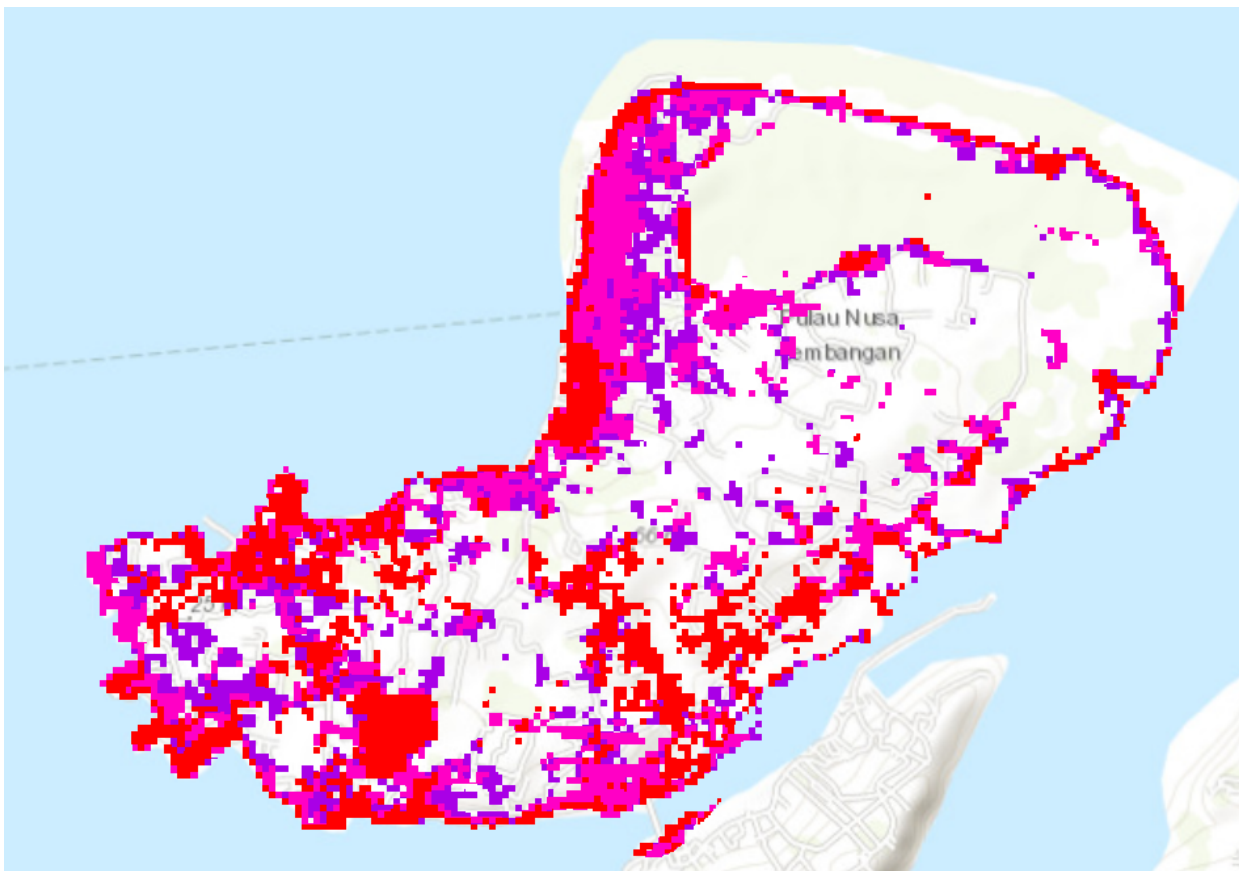
April 2022



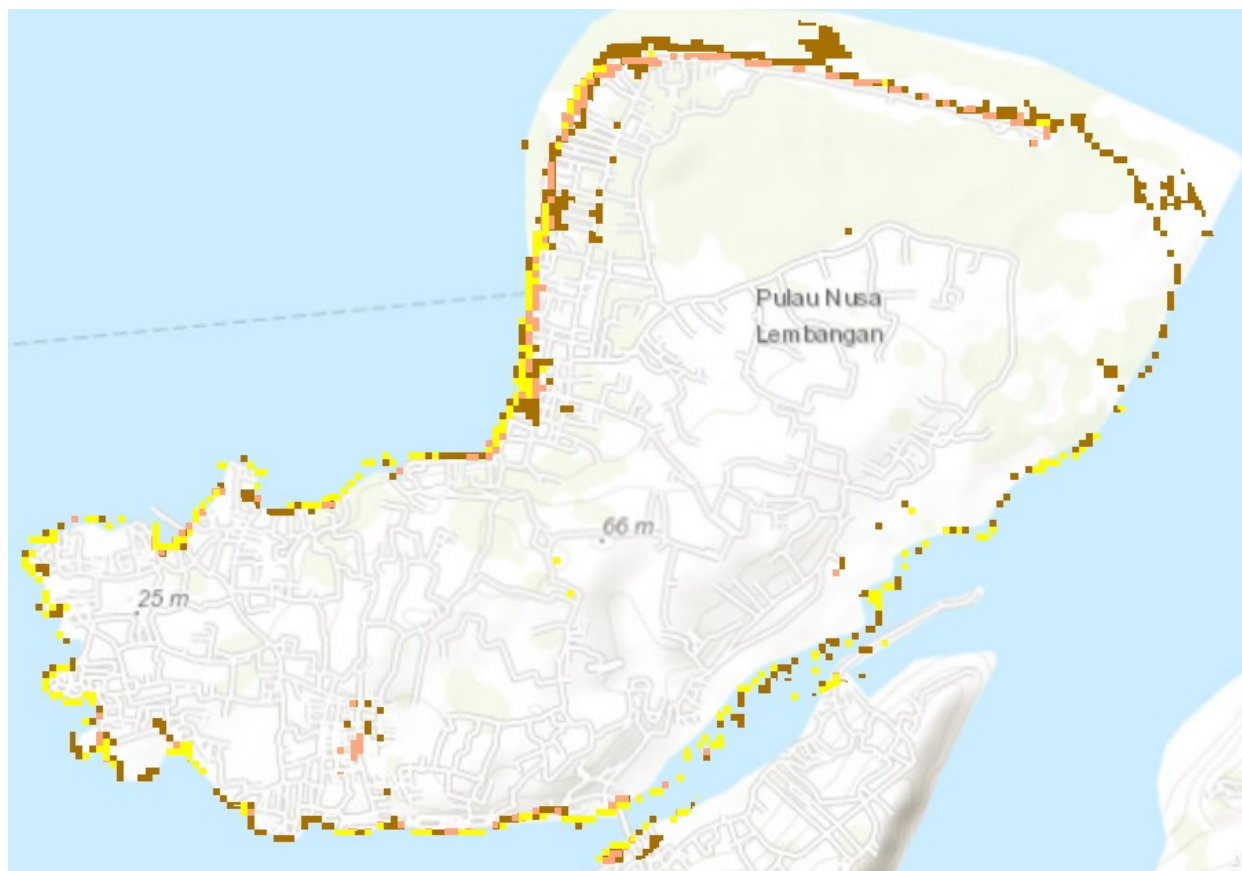
# AI based Sentinel 2 & Landsat 7 Images Analysis LULC classification & Shore-line Change Detection



# Land Use Change during last 20 years

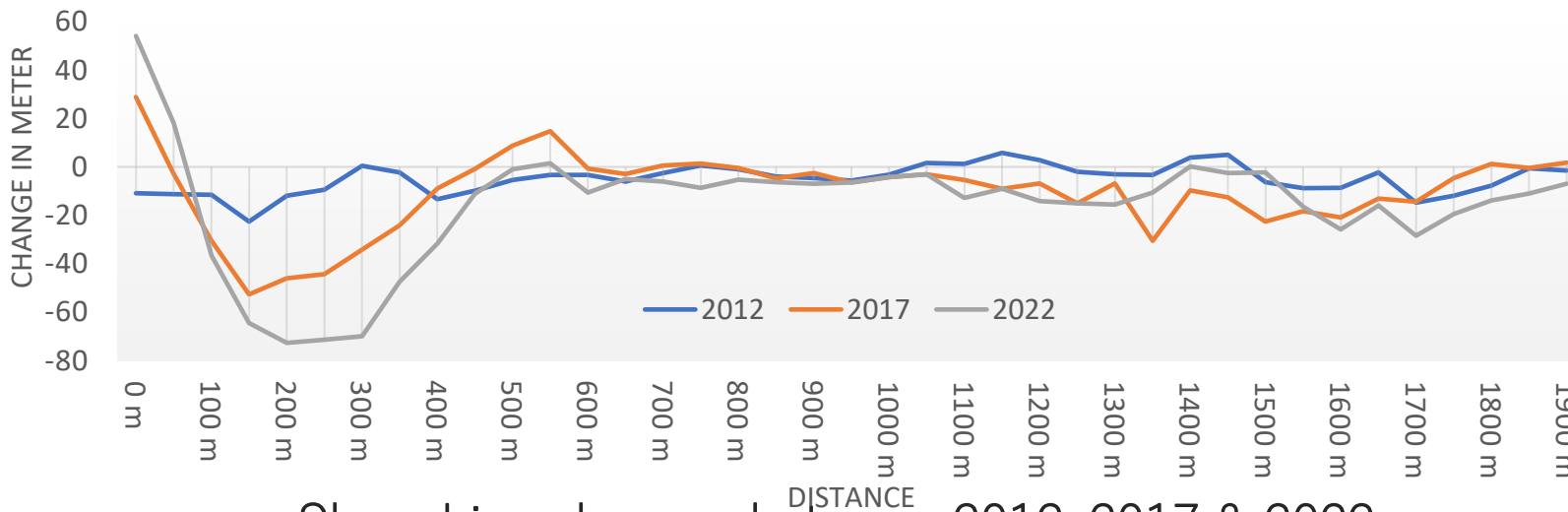


- 2002- Build-up
- 2012- Build-up
- 2022- Build-up



- 2002- Sandy Beach
- 2012- Sandy Beach
- 2022- Sandy Beach

# Shore Line Changes during last 20 years



Shore Line changes between 2012, 2017 & 2022

# Planning and Improvement of solid Waste Management in Yangon City

## Time & Motion Survey

The Time and Motion survey (T &M) measures the time required for collection work while following the collection and transportation vehicle with another vehicle.



Collection time (collection time, travel time, etc.)



Amount collected (FDS weight scale)



Collection distance



# Photo of Collection Vehicle and Transfer Station



Handcart



Tricycle



Hopper



Compactor



Transfer station  
(Dust Bin)



Transship point  
(25cu.m container)

**Photo of Time & Motion Survey**



Collecting Sample Data



On-site Meeting



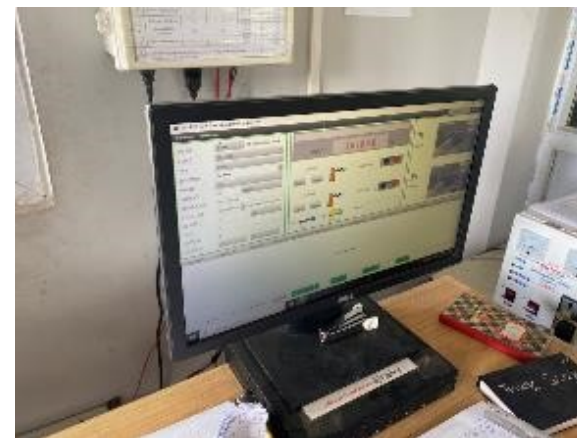
Collecting Wastes



Data Collecting by Survey Team

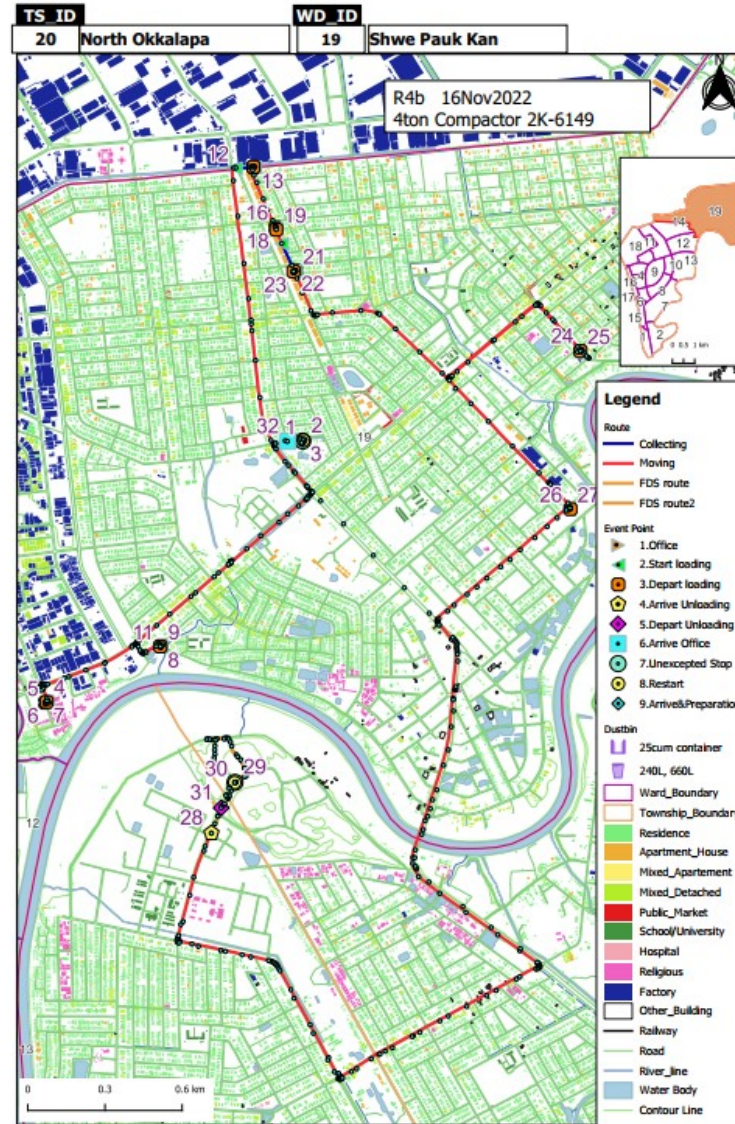


Weight Scale at FDS



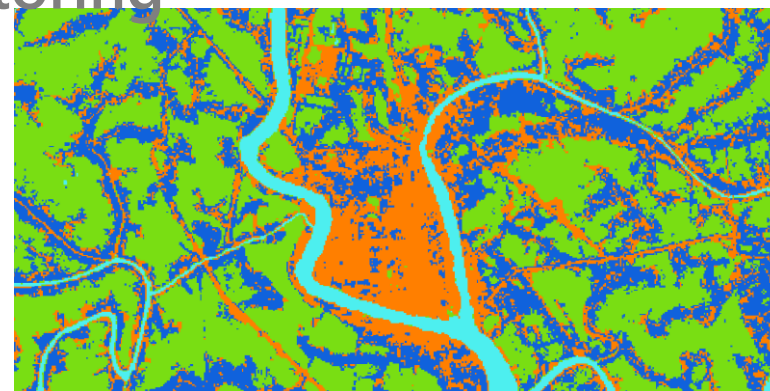
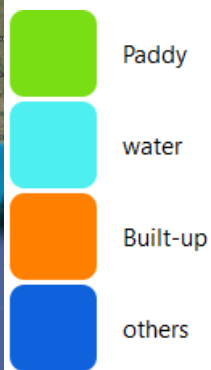
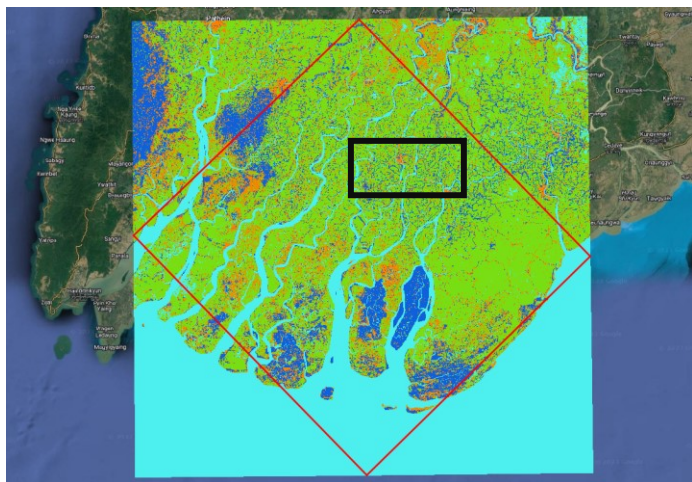
Weight Scale Record at FDS

## GIS Analysis Outcomes

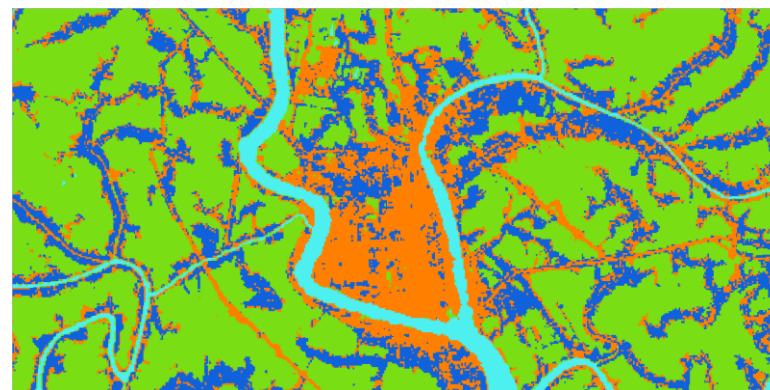


# Rice Field Mapping & Growth Status Monitoring

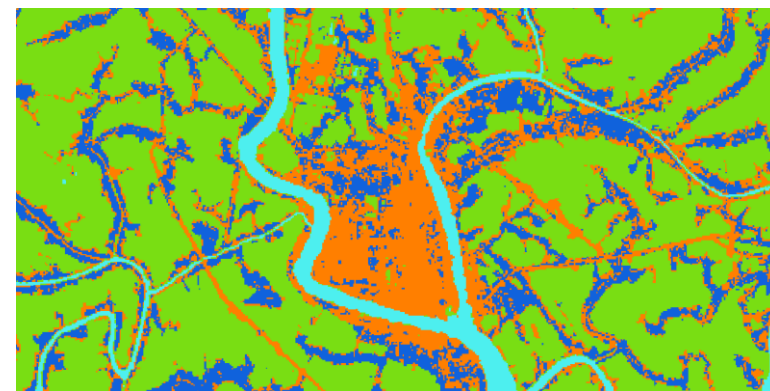
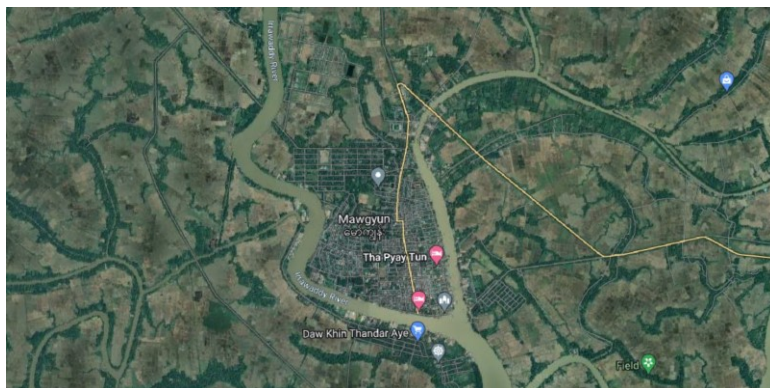
## Sensitivity of Label Points



**Rice  
50 Pts**



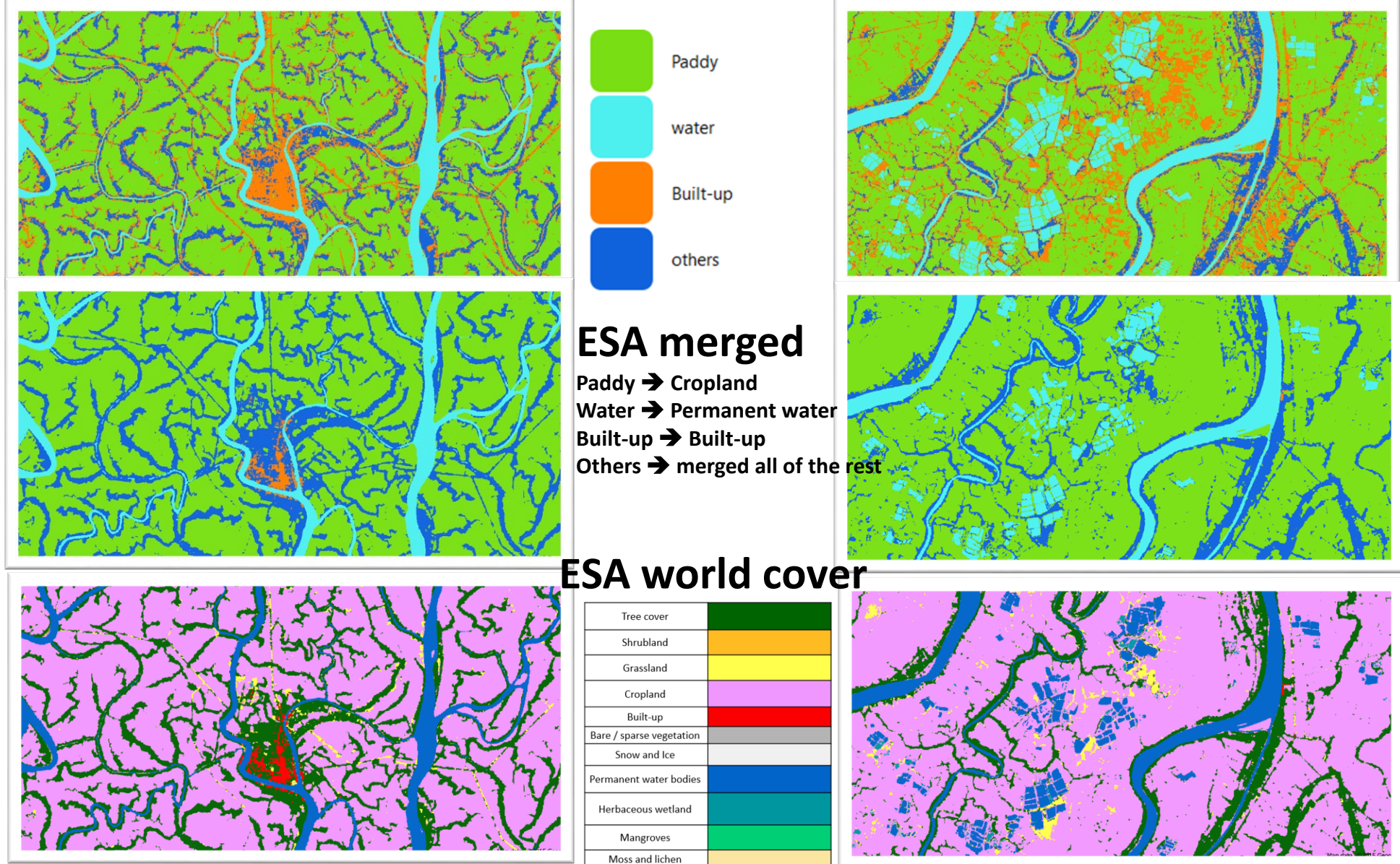
**Rice  
100 Pts**



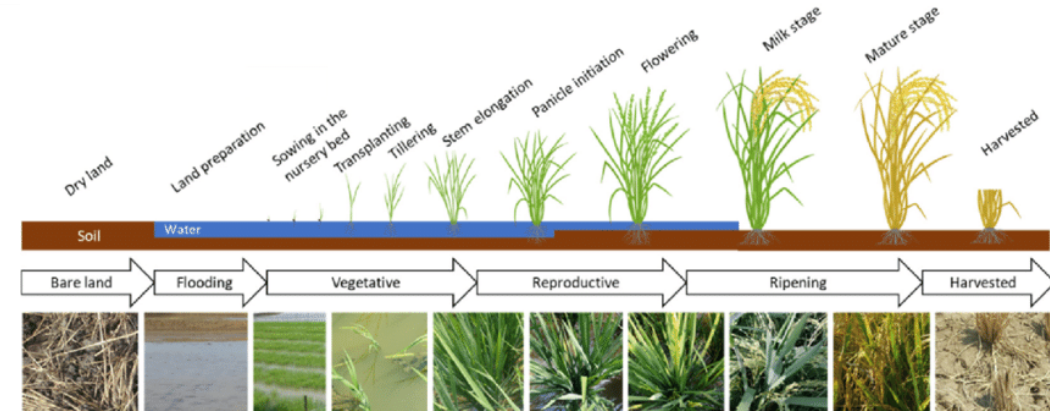
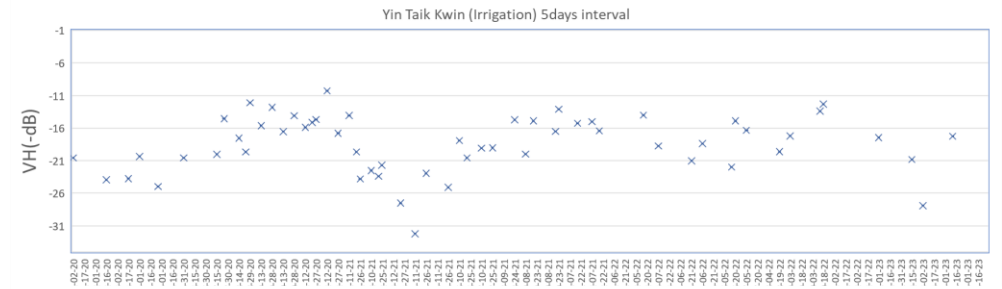
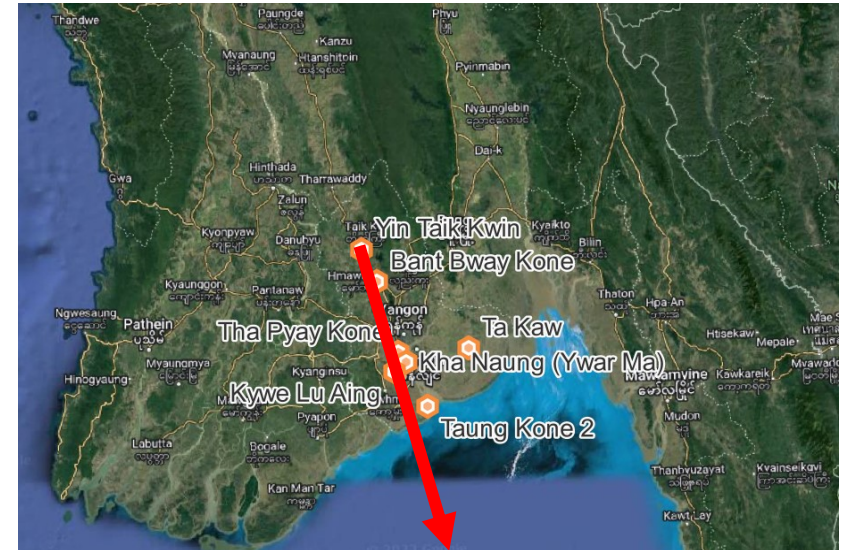
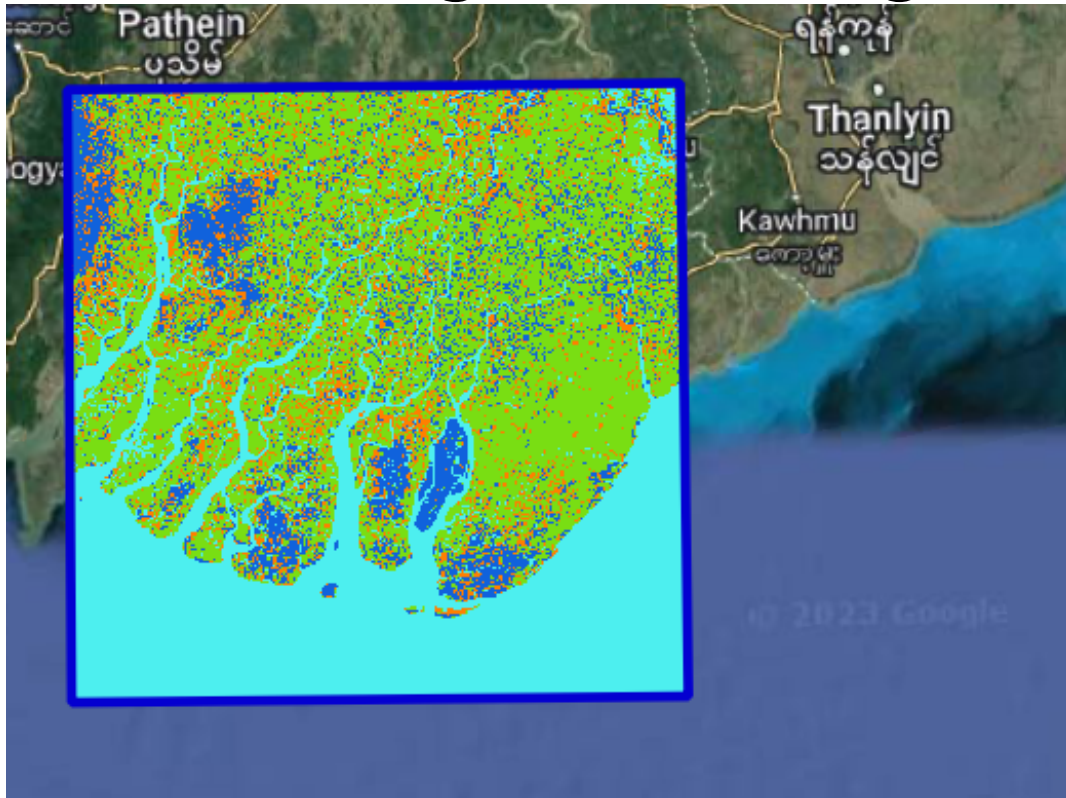
**Rice  
200 Pts**



# Validation with ESA World Cover 2021



# Rice Field Mapping & Growth Stage Monitoring



**Thanks for your attentions.**