IAM*Blue*CECAM/*Blue*CARES
Progress and Plan for Mangrove Remote Sensing in the Philippines

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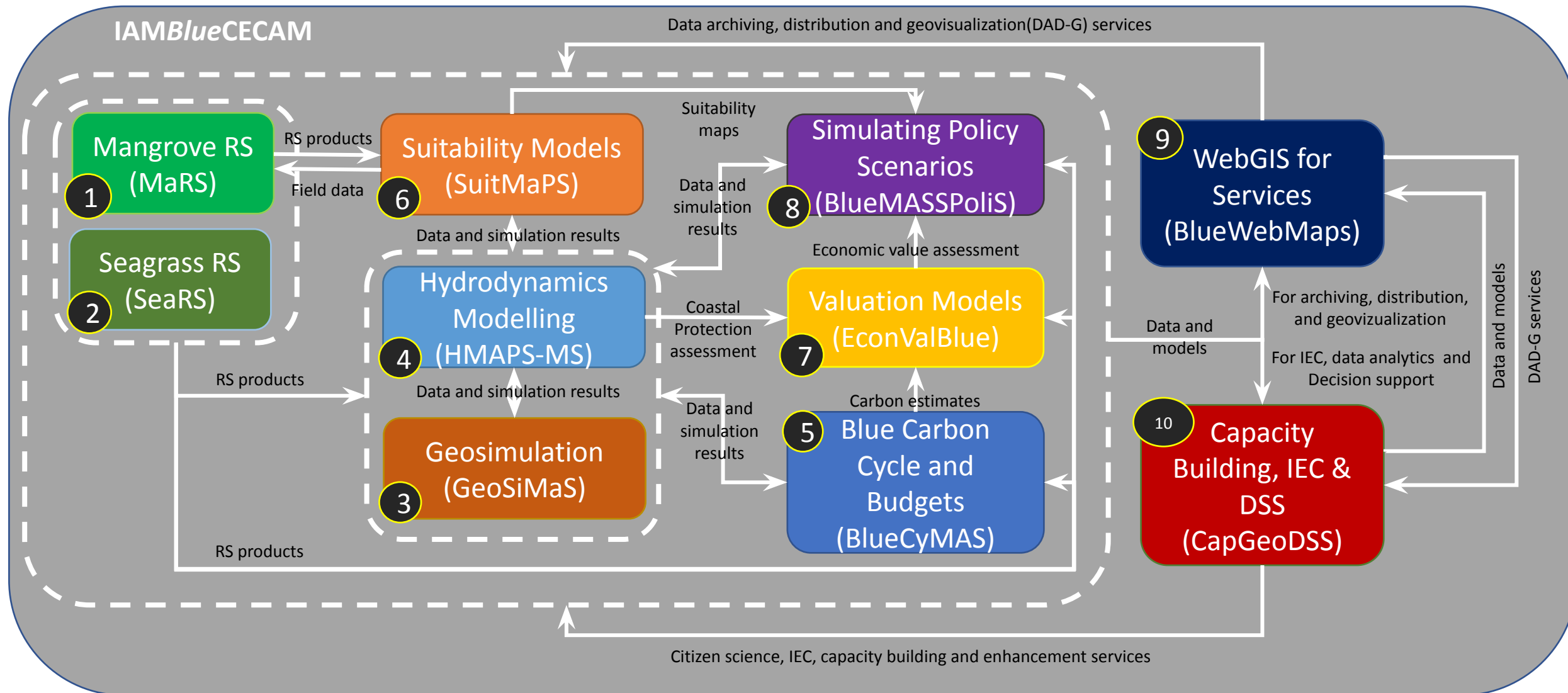*UP Training Center for Applied Geodesy and Photogrammetry*

Outline

- Introduction
- Mangrove Genus/Species Mapping
- Mangrove Zonation Mapping
- Biomass Estimation from Optical and SAR Images
- LiDAR RS
- Topics for Years 2 and 3

AM*Blue*CECAM Program Framework

Integrated Assessment and Modelling of Blue Carbon Ecosystems for Conservation and Adaptive Management Program

Remote Sensing of Mangroves and Seagrasses

- Mangrove cover
- Estimated fractional cover

- Mangrove cover, density, classes/genus, health, 3D structure

While limited to above-ground biomass in terms of blue carbon estimation, RS provides valuable information about mangroves and seagrass over space and time. This is important in the assessment of blue carbon ecosystem services.

- Detailed mangrove cover, density, health, mangrove classes/genus/species, and 3D structure from dense point clouds and multispectral data

- Extent, density, health of seagrass, species distribution if possible

Classification of Mangrove Species at Katunggan-It-Ibajay (KII) Mangrove Ecopark using Unmanned Aerial System (UAS) and Object-based Image Analysis (OBIA)

Parrot Sequoia Multispectral Camera
1. Includes four 1.2 MP sensors
2. Four spectral bands (Green, Red, Red–Edge, and Near–Infrared)
3. 16 MP RGB Sensor
4. Spectral Band width:
- Green: 530–570 nm
- Red: 640–680 nm
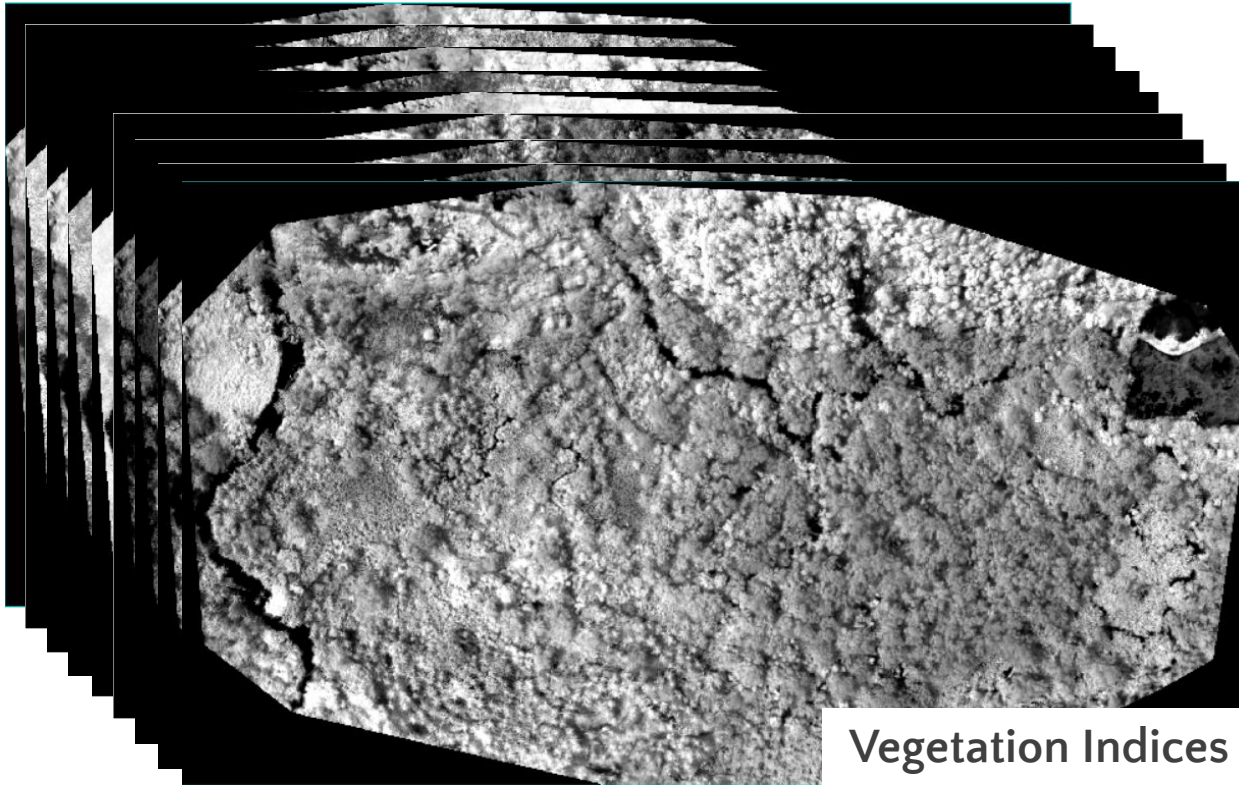- Red–Edge: 730–740 nm
- NIR: 770–780 nm
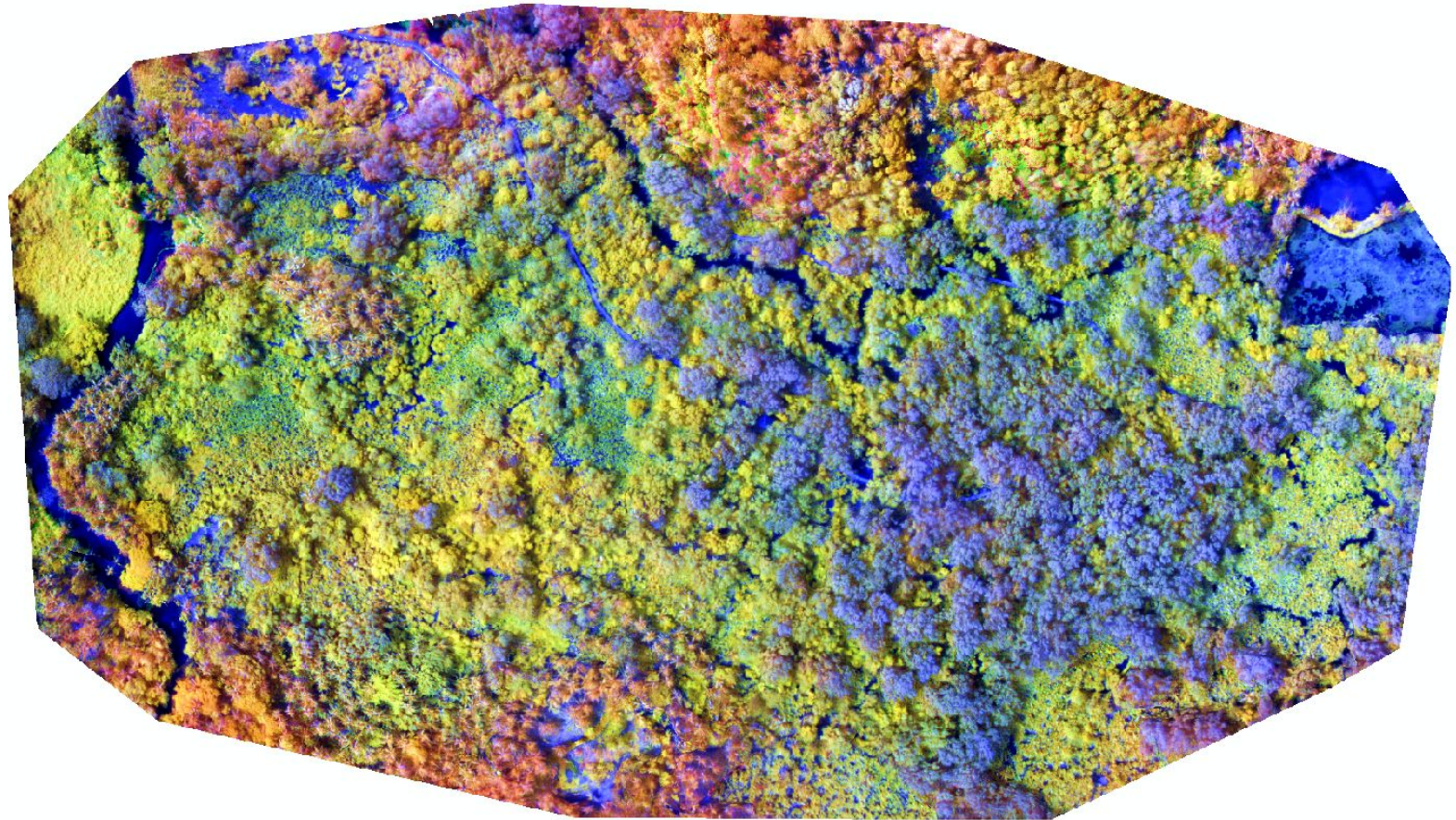
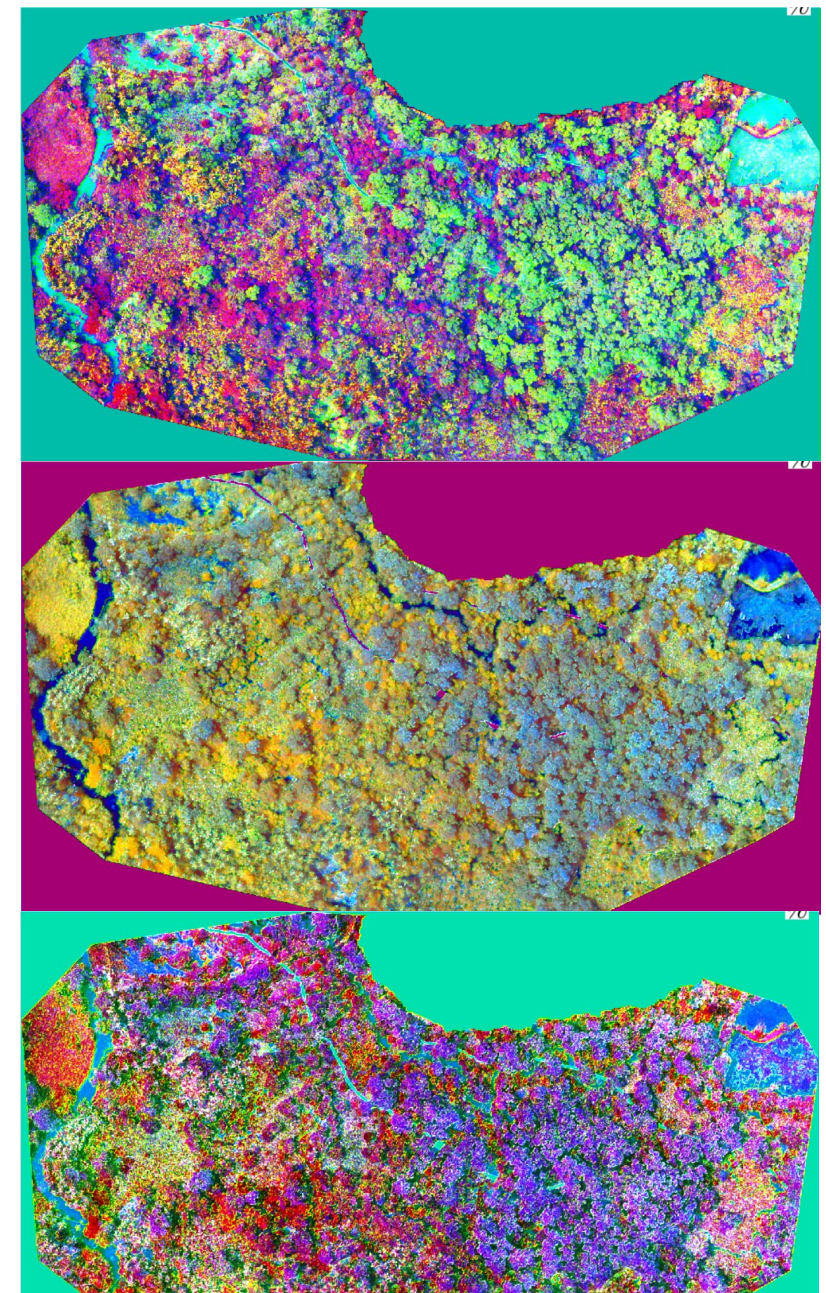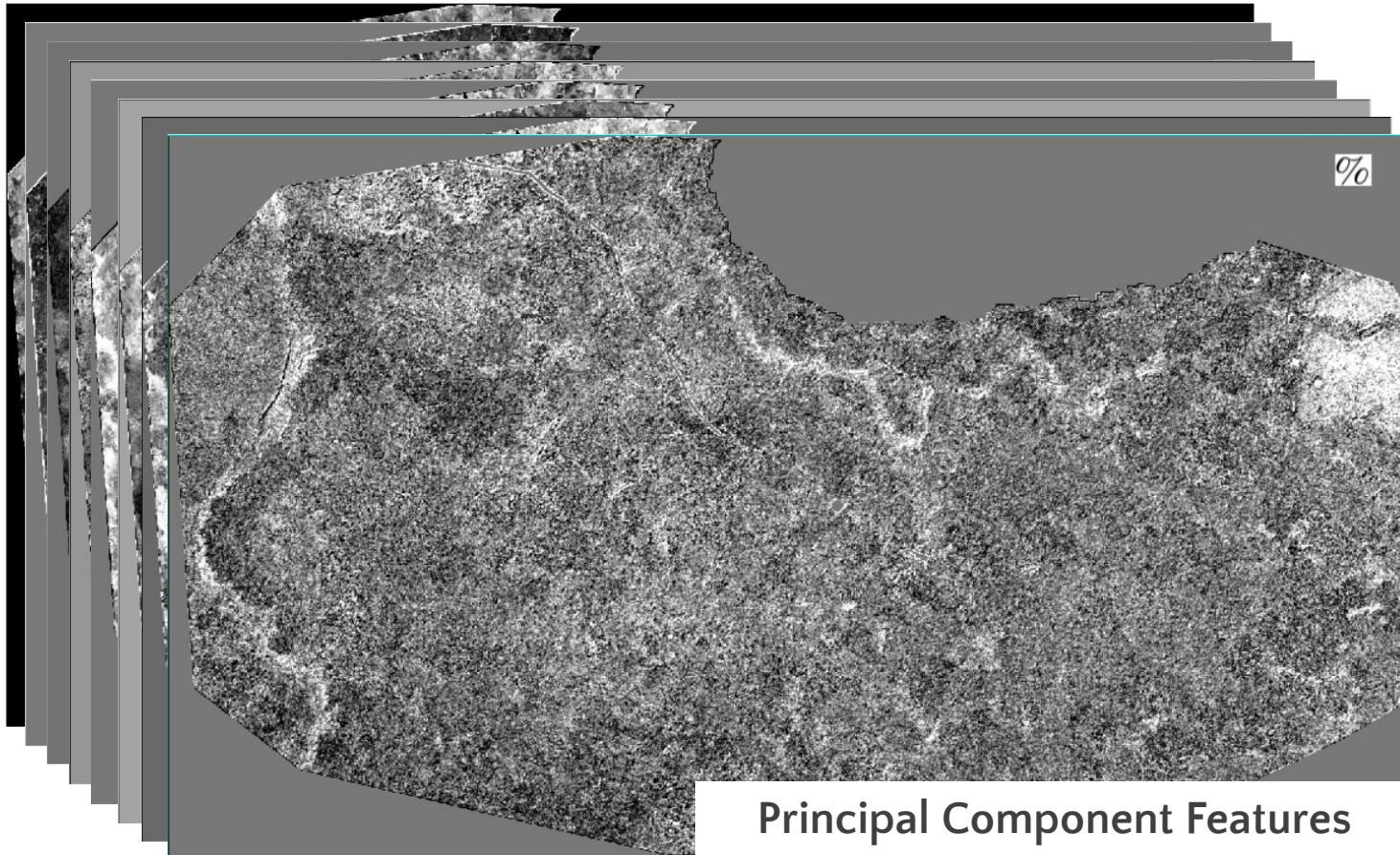# Methodology
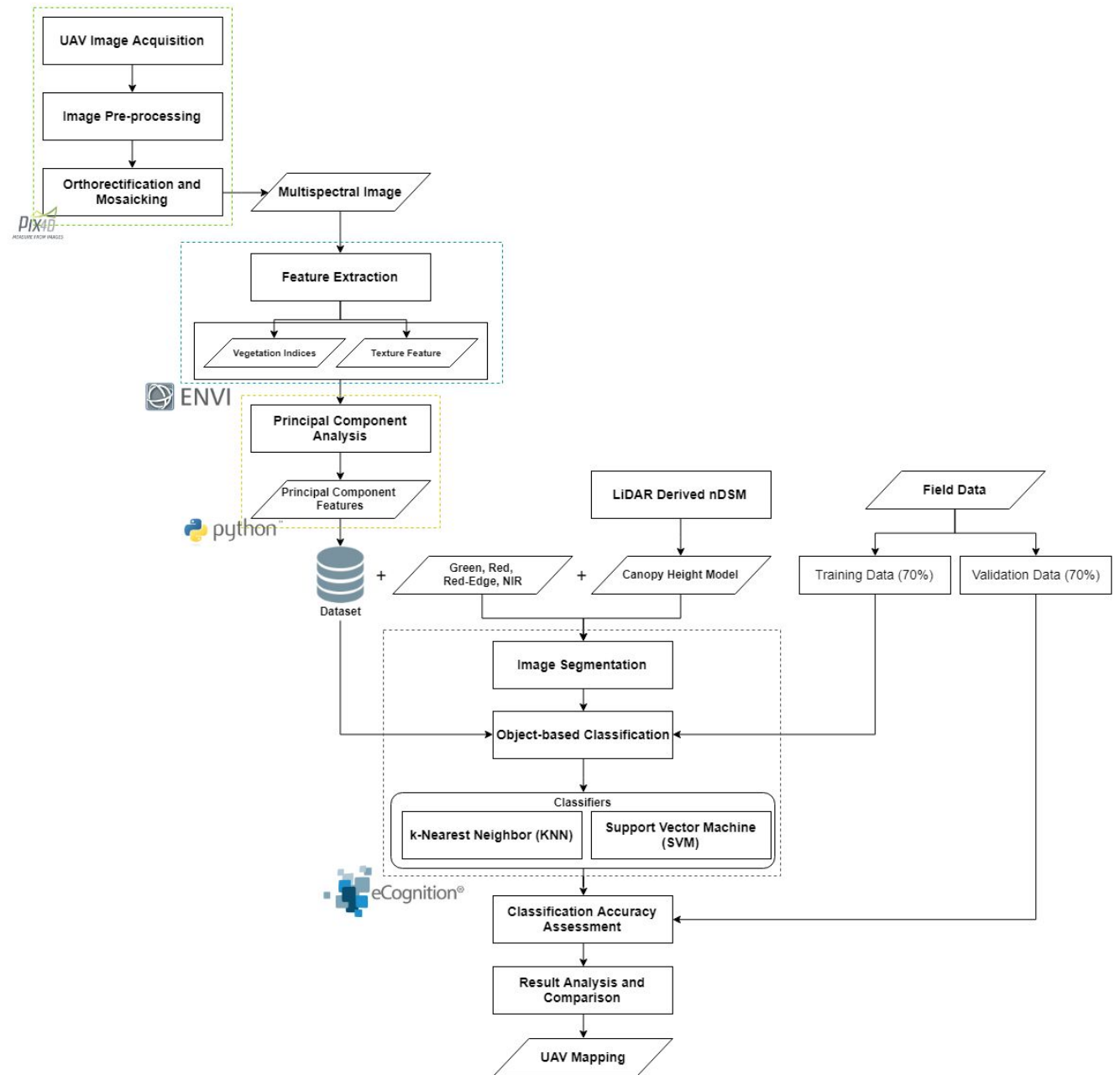
FEATURE EXTRACTION

Vegetation Indices

Vegetation Indices

1. NDVI
2. GDVI
3. TDVI
4. TCARI
5. SAVI
6. EVI
7. MERIS Terrestrial Chlorophyll Index
8. Red-Edge Chlorophyll Index
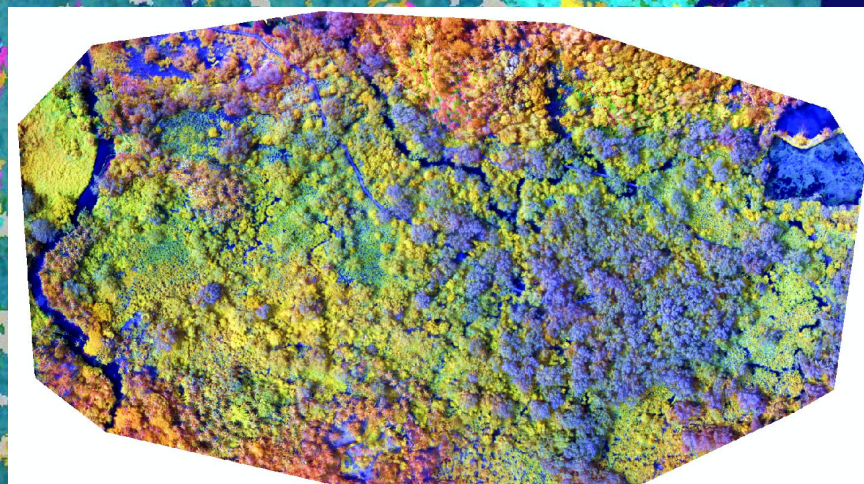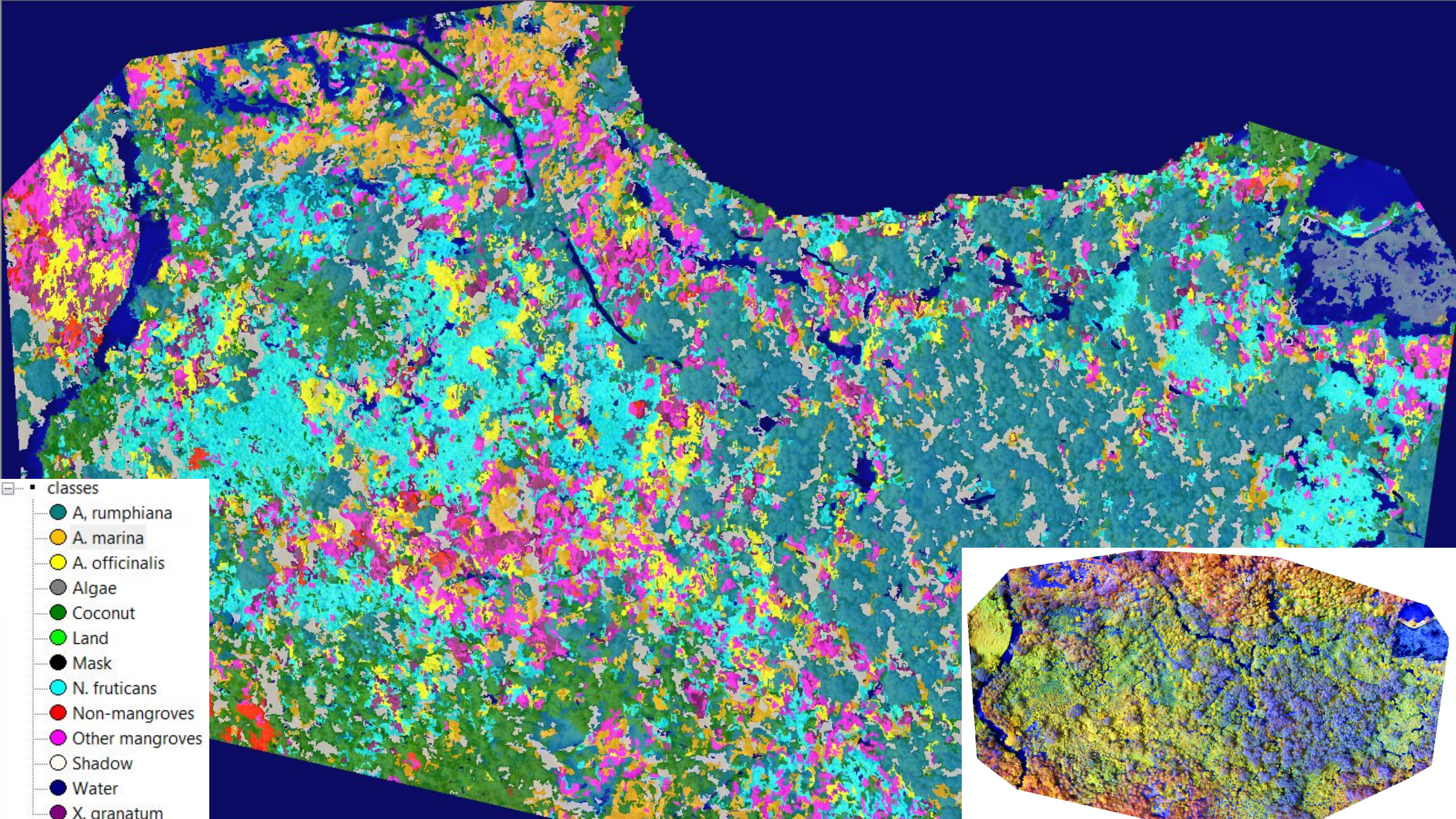9. Green Chlorophyll Index

PRINCIPAL COMPONENT ANALYSIS
using Python Programming Language

Principal Component Features

Different PCA Band Combinations

classes
- 🟢 A, rumphiana
- 🟠 A. marina
- 🟡 A. officinalis
- ⚫ Algae
- 🟢 Coconut
- 🟢 Land
- ⚫ Mask
- 🔵 N. fruticans
- 🔴 Non-mangroves
- 🟣 Other mangroves
- ⚪ Shadow
- 🔵 Water
- 🟣 X. granatum

Plans for detailed mangrove species mapping using UAS Multispectral

- Obtain complete coverage of KII and Bakhawan Ecopark, using cross flight pattern.

- Investigate if the application of "topographic" correction would improve the result

- Use other machine learning algorithms