

# GIS Working Group Meeting – 17<sup>th</sup> May 2023

Chair: Zaw Win (MIMU)

Participants: BIMM, CDE, DRC, FAO, HALO, ICRC, Ipas, JOICFP, MIMU, MRCS, OCHA, SKT, UNDP, UN-Habitat, UNODC, WFP, WWF (29 participants from 17 organisations)

## 1 Spatial Analysis of probable affected population by Cyclone Mocha – MIMU

- Preparation of [Cyclone Mocha Page](#)
  - Latest reports, Situation Updates, Recent Maps, Awareness Raising and Preparedness Messages, Dashboards (Myanmar [Flood Monitoring](#) Dashboard supported by UNOSAT and Emergency Preparedness Dashboard), Resources (Baseline Datasets & Place Codes), MIMU 5W Resources, Reference Base Maps, and other resources which can be useful for Cyclone Mocha preparedness and response, have been made available through a dedicated page on the MIMU website.
- Produced Forecast and track maps of Cyclone Mocha
  - Continually monitored Cyclone forecast data from GDACS (<https://www.gdacs.org/>), JTWC (<https://www.metoc.navy.mil/jtwc/jtwc.html>) and other sources
  - Downloaded data in various formats, prepared forecast track map for emergency preparedness and response and shared with partner organisations
  - Also uploaded track information through new layers on MIMU Map Maker ([https://app.themimu.info/mimu\\_mimumapmaker/](https://app.themimu.info/mimu_mimumapmaker/))
- Probable Flood Map with JAXA image supported by Sentinel Asia
  - MIMU has been producing emergency maps (Cyclone, Landslide, Earthquake, Flood etc.) by analysis of reliable satellite imagery.
  - As a member of Sentinel Asia, when disaster occurs, MIMU can request Satellite images for AOI and other products.
  - For Cyclone Mocha, AHA centre and DDM requested to charter.
  - Prepared Probable Flood Inundated Area for Rakhine State (as of 15 May 2023 00:30am MMT (14 May 2023 18:00 UTC))
- Spatial Analysis of [probable affected population](#) by Cyclone Mocha
  - Used Admin boundary, MERIT DEM, Worldpop 2022 population estimates and Forecast Wind Speed
  - As the result, probable affected population by township with the overlay of areas below 5m and wind speed range (60 km/h, 90 km/h and 120 km/h)

### Discussion on Worldpop

Methodology to estimate population in the affected areas. Worldpop 2022 population estimates are based on the relationship between land cover and population data and include geospatial data that may correlate with human population presence (e.g., road networks, large water bodies, settlements, etc).

### Discussion on MERIT DEM

It was developed by removing multiple error components (absolute bias, stripe noise, speckle noise, and tree height bias) from the existing spaceborne DEMs (SRTM3 v2.1 and AW3D-30m v1). It represents the terrain elevations at a 3sec resolution (~90m at the equator), and covers land areas between 90N-60S, referenced to EGM96 geoid.

## 2 Mapping Mangrove Dynamics: Monitoring the Ayeyarwady Delta – MDO (UNDP)

Mangrove forests in the Ayeyarwady Delta play a vital role in the region's growth, providing coastal protection, and providing resources such as food and fuel. They contribute to water quality improvement and carbon sequestration, making them valuable in mitigating climate change. However, mangrove cover is declining due to overuse and deforestation, requiring improved management, restoration, and conservation methods.

Researchers have used remote sensing, GIS analysis, field surveys, and historical data analysis to assess mangrove cover change in Myanmar. These approaches provide valuable insights into the spatial and temporal dynamics of mangrove cover change.

- Research question and objectives  
To assess the extent of mangrove cover change in the Ayeyarwady Delta in Myanmar, and to quantify and analyze the rate and patterns of change over time
- Methods
  - image pre-processing
  - delineation of ROI (CEO)
  - image classification
  - accuracy assessment
  - change analysis
  - Earth & UTM
- Image Pre-processing
  - Landsat images were pre-processed to calculate six indices: NDTI, EBI and BI, EVI, NDVI, and SAVI, LSWI. L-band SAR images were used, with the Refined Lee filter applied. Non-satellite data such as elevation and distance from the coastal line were also included.
  - MDO project used Sentinel 1 and 2 images and non-satellite data (elevation, distance from coastal line, and canopy height data) for 2000-2022, 2018-2022 (Myanmar).
- Image Classification (2018, 2020 and 2022)
  - Produced output as Land cover map of Ayeyarwady Region with Mangrove area
  - The Ayeyarwady Region, Pyapon Delta Region, and Labutta Delta Region of Myanmar experienced changes in land area and annual decrease rates between 2018-2022. The Ayeyarwady Region experienced a decline in land area from 831 sqkm in 2018 to 773 sqkm in 2022, with an average annual decrease rate of 1.88%. Pyapon Delta Region also experienced a reduction in land area, with an average annual decrease rate of 1.08%. Labutta Delta Region had the highest annual decrease rate, with a decline in land area from 248 sqkm in 2018 to 232 sqkm in 2022, with an average annual decrease rate of 2.73%.
- Change Analysis (2018, 2020 and 2022)
  - Change analysis was conducted using Landsat, Sentinel-2, and SAR images to assess temporal variations in mangrove cover. The mangrove gain area was 67 sq km, while the loss area was 127 sq km. The unchanged mangrove area was 704 sq km, representing 2.0% of the total area studied. The changed area, which excludes mangrove cover, accounted for 9,102 sq km, representing 26.0% of the total area studied.

	<ul style="list-style-type: none"> <li>• Accuracy Assessments             <ul style="list-style-type: none"> <li>- The accuracy assessments of the land cover mapping were conducted for mangrove cover using field data provided by UoQ and the results indicate that the accuracy of the land cover classifications were more than 80%.</li> </ul> </li> <li>• The Cumulative Enhanced Vegetation Index (EVI) Anomaly Analysis             <ul style="list-style-type: none"> <li>- EVI anomaly data is a useful tool for monitoring vegetation health, allowing us to identify regions where vegetation health is declining or improving and take appropriate measures to protect or enhance it. It is especially valuable for land managers, policymakers, and conservationists who need to make informed decisions.</li> </ul> </li> </ul> <p>As a conclusion, the net change of mangrove between 2018 and 2022 was <b>-60 sqkm</b>, with the transition from mangrove to agriculture extension being the primary reason. Illegal mangrove cutting was also detected, and some villagers abandoned their rice crops and focused on reforestation due to Cyclone Nargis' saltwater incursion. Locals are aware of their need to preserve these mangroves, but financial constraints prevent them from concentrating on conservation.</p>
<p><b>4</b></p>	<p><b>AOB</b></p> <p>MIMU – Release new PCode version, Updating Village level map</p> <p>FAO – Story on Cyclone Mocha including analysis based on affected area of agriculture, Rainfall, Cyclone Track, Probable Flood Inundated Area and other data</p> <p>OCHA – Analysis of population in need with wind speed and worldpop data together with BDC, WFP and OCHA</p>