

Lawrence O. Okello¹, Antony Ndubi¹, Wondimagegn T. Beshah¹, Robinson Mugo¹, Hussein Farah¹, Laurent V. Mtaroni¹, Ashutosh Limaye², Africa Flores², Gwendolyn Artis², Daniel Irwin²

1. Regional Centre for Mapping of Resources for Development, Nairobi- Kenya 2. The SERVIR Coordination Office, NASA Marshall Space Flight Centre, Huntsville, Alabama, USA.

1. Rationale

The Seagrass ecosystem provides shelter and food to numerous marine species in addition to having a key functional role in maintaining equilibrium, such as sediment stabilization. However, this ecosystem is increasingly under threat from effects of, among others, climate change (e.g. erratic and torrential rains leading to flooding and massive erosion/deposition), marine pollution (dumping of domestic and industrial waste), over exploitation of living marine resources and coastal habitat loss. This is despite national and international efforts to address these problems.

3. Approach/Project Activities

- ▶ Geospatial data layers of the current Seagrass bed covers in Kenya, Tanzania, Mozambique, and Madagascar coastlines have been derived from medium resolution (30m) Landsat-8 OLI Sensor imagery using water column correction and classification techniques
- ▶ Stakeholder engagement to establish the current status of Seagrass mapping and determine gaps in each country
- ▶ Products validation done through selective field site verification in each country
- ▶ Capacity building

5. Results

- ▶ Digital imagery database,
- ▶ Geospatial Seagrass layers for the four countries,
- ▶ Seagrass map products for the four countries
- ▶ Visualization tool with querying capability
- ▶ Skills transfer to stakeholders/collaborating Institutions

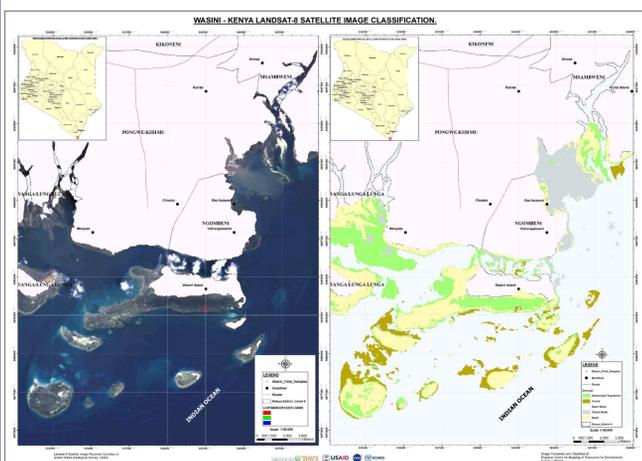


Figure 8: Sample Map generated.



Figure 9: Stakeholders capacity building and products review workshop.



Figure 1: Healthy Seagrass is a source of food and shelter to numerous aquatic species as well as Blue Carbon storage.



Figure 2: Stressed or degraded Seagrass habitats negatively impact on marine ecosystem balance.

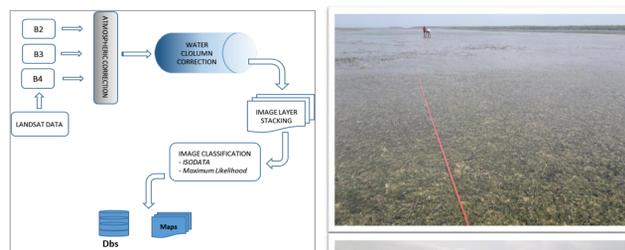


Figure 3: Data and Methods



Figure 4: Stakeholders awareness creation and gaps determination workshop



Figure 5: Sampled products field validation exercise

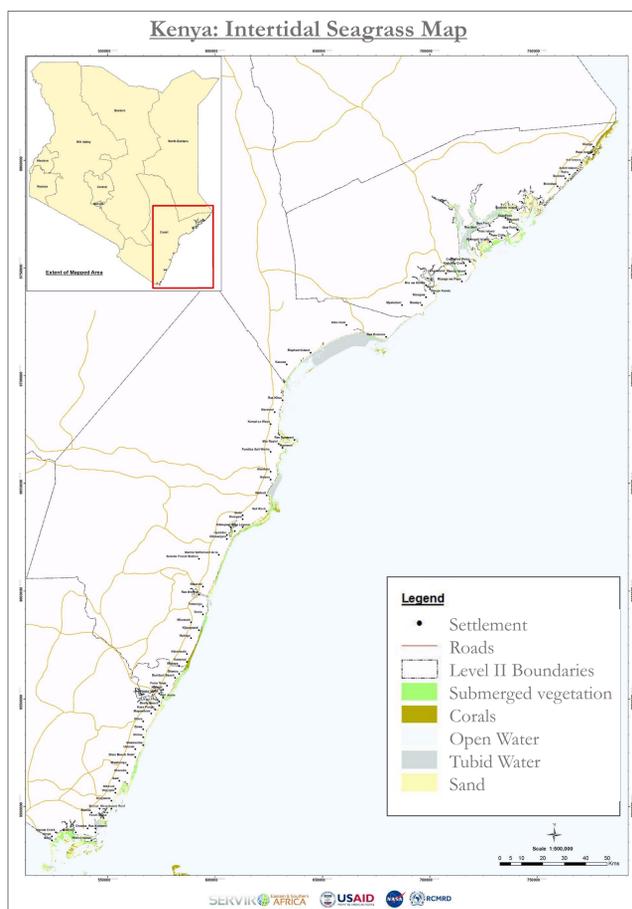


Figure 10: Sample Seagrass Country Map.

Achievements (Summary)	Amount
No. of stakeholders (Individuals) trained	16
No. of Institutions (Govt. and NGO's) engaged	13
No. of stakeholders engagement events	6
No. of data layers generated	4
No. of Climate adaptation tools developed	1

2. Objectives

To map the general Seagrass covers along the inter-tidal zone of the Eastern Africa coastlines using earth observation data and determine:

- ▶ Location of Seagrass along the coast,
- ▶ Extent of the covers and
- ▶ Condition of Seagrass in the region.

4. Earth Observations and Other Inputs

- ▶ Landsat-8 OLI data
- ▶ Global Position System (GPS) data
- ▶ National Administrative Boundary files



Figure 6: Sample Landsat-8 OLI Image.



Figure 7: GPS handset

6. Outcomes/Anticipated Impacts

- ▶ Increased availability of regionally consistent seagrass coverage data vital for coastal ecosystem resource conservation
- ▶ Improved access to seagrass baseline data to marine ecologist in West Indian Ocean region on SERVIR visualization tool
- ▶ Enhanced capacity of collaborating institutions to utilize earth observation data in mapping seagrass

7. Project Partners/End Users

- ▶ Kenya Marine and Fisheries Research Institute (KMFRRI)
- ▶ Coastal & Marine Resources Development (COMRED)
- ▶ University of Dar es Salaam - Institute of Marine Sciences (UDSM-IMS), Tanzania
- ▶ Tanzania Fisheries Research Institute (TAFIRI) - Dar es Salaam
- ▶ University Eduardo Mondlane (UEM) - Department of Biological Sciences, Mozambique
- ▶ Center for Sustainable Development of Coastal Zones CDS-ZC - Ministry of Land, Environment and Rural Development, Mozambique
- ▶ Wide World Fund for Nature (WWF) - MWIOPO, Madagascar.
- ▶ Madagascar National Parks (MNP) - Nosy Hara.
- ▶ Western Indian Ocean Marine Science Association (WIOMSA)



Figure 11: Project partners and end users.