Ocean observation and prediction for coastal sustainability in Africa

The Go Blue Project

Connecting People, Cities and the Ocean

6th June 2023
Mohamed Ahmed

Introduction

- Partnership GoK & EU – advance the **Blue Economy** agenda for the coastal counties of Kenya.

- Funding - EUR 24.7Million for the period 2021 – 2024.

- Three main Result Areas:

  - **Blue growth** – GIZ (TVET), AICS (support cassava production & fisheries), Camoes (Tourism & Culture).

  - **Environment** – UNEP and UN-Habitat (land-sea planning).

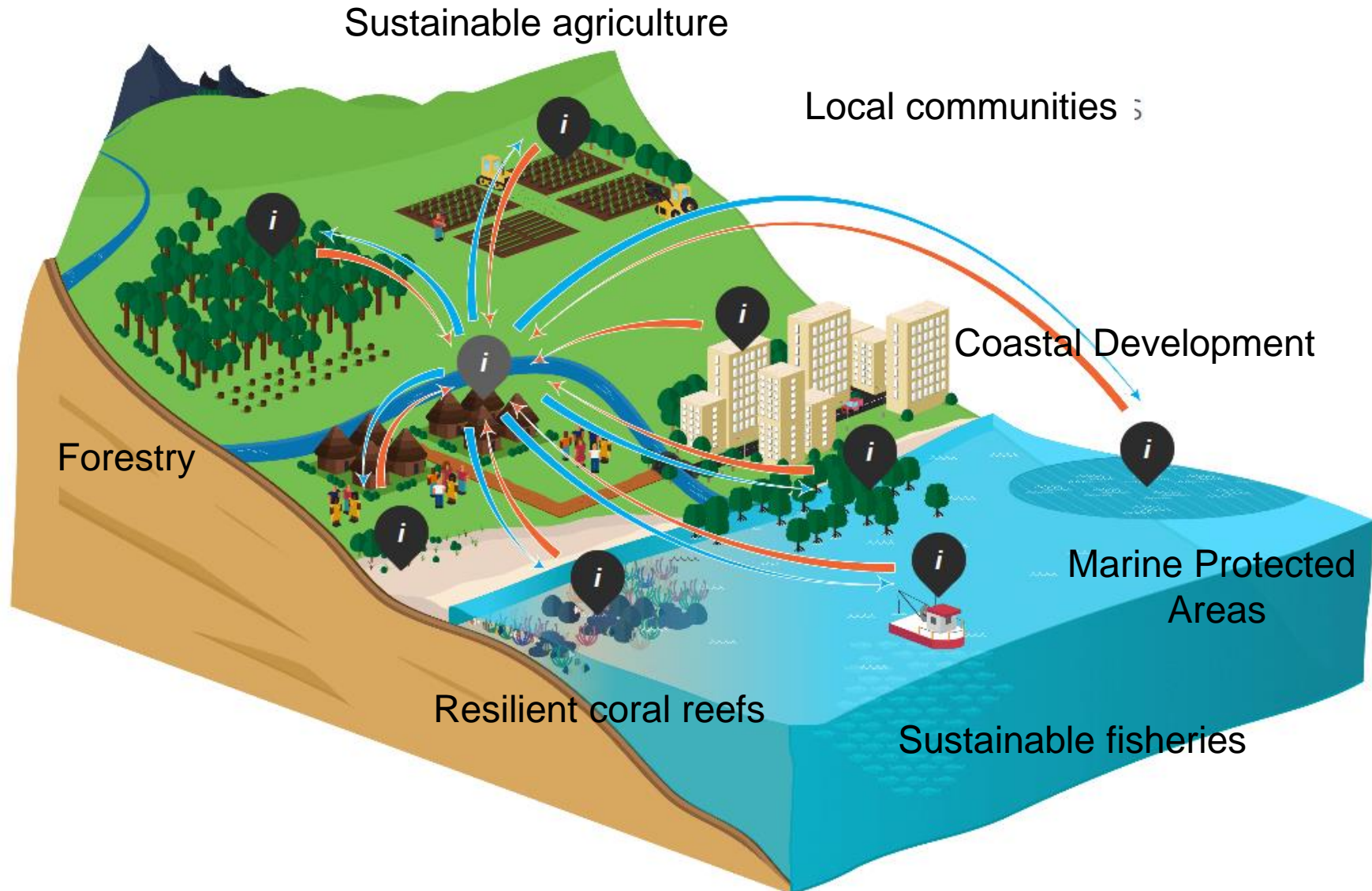 - **Maritime Security** – Expertise France.

Outcomes

1. **Data** - strengthened capacity for data collection and information management in the six JKP counties.

2. **Integrated land-sea planning** - enhanced capacity of the JKP counties and coastal cities in land-sea planning and management for climate change adaptation and mitigation.

3. **Pilots** - enhanced environmental, social and economic benefits for communities and cities through pilot implementation of the land-sea plans.

4. **Knowledge sharing** - approaches and benefits from integrated land-sea planning disseminated to county and national stakeholders.

1. **Data** - strengthened capacity for data collection and information management in the six JKP counties.

2. **Integrated land-sea planning** - enhanced capacity of the JKP counties and coastal cities in land-sea planning and management for climate change adaptation and mitigation.

Holistic approach to sea-land planning and management to ensure long-term sustainable blue economies: *Link to National MSP Framework and BE*

Sustainable agriculture

Local communities

Coastal Development

Forestry

Marine Protected Areas

Resilient coral reefs

Sustainable fisheries

- Recognize the interdependence of land and offshore systems

- SBE - healthy coastal ecosystems for resilient communities.

- Integrate planning guidelines to the MSP process.

- Data is needed.

UNEP (2017): Coastal Ecosystem-based Adaptation Decision Support Tool

GO BLUE - Data

Working folder

Shared teams folder

ArcGIS Pro

GIS Dashboard

Data needs matrix

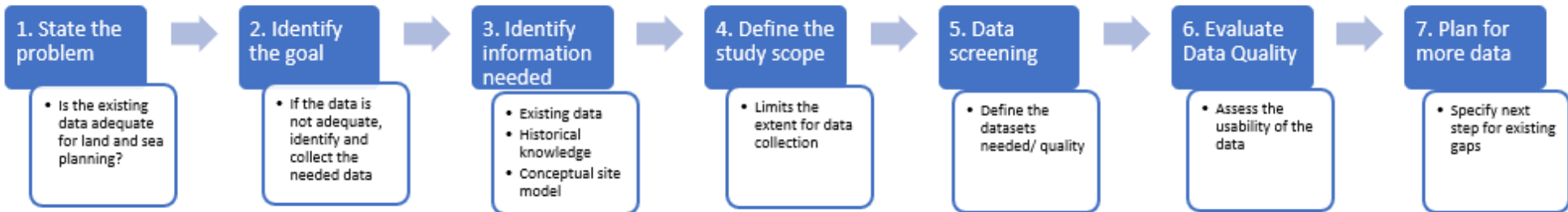Gap assessment

Phase 1.

Understanding
data needs

Phase 2.

Data acquisition
and quality check

Phase 3.

Data storage and
Integrated spatial
data framework

Phase 4.

Data sharing

Open sources

Implementing partners

Procurement

ArcGIS Hub

❑ https://datahub.gpm
arinelitter.org/

UN❀HABITAT
FOR A BETTER URBAN FUTURE

Data – 1. Mapping needs and gap assessment

	Activ_name	Description	Data_avail	Data_Gap	Activ_code	County	Sub_county	Ward	Agency	Scale	Activ_nam2
0	Ecosystem services mapping, assessment and valuation		County, Coral Reef, Maritime boundary, Mangrove habitats,	Ecosystem category, Ecosystem Services, Socio-economic	1.1.6	Kilifi			UNEP	Regional	Ecosystem services mapping, asses
1	Training and Capacity building				3.1.1, 3.1.4	Kwale			UNEP & UNHABITAT	Regional	Strengthening inter-governmental (co
2	Ecosystem services mapping, assessment and valuation		County, Coral Reef, Maritime boundary, Mangrove habitats,	Ecosystem category, Ecosystem Services, Socio-economic	1.1.6	Lamu			UNEP	Regional	Ecosystem services mapping, asses
3	Assess and identify wastewater hotspots in Mombasa (quality, sources and impact		Roads, Subcounty, Roads, Rivers, Buildings, landuse, econo	Wastewater hotspot, Waste drainage	3.6.1	Mombasa			UNEP	County	
4	Training and Capacity building				3.1.1, 3.1.4	Taita Taveta			UNEP & UNHABITAT	Regional	Strengthening inter-governmental (co
5	Training and Capacity building				3.1.1, 3.1.4	Tana River			UNEP & UNHABITAT	Regional	Strengthening inter-governmental (co
6	Ecosystem services mapping, assessment and valuation		County, Coral Reef, Maritime boundary, Mangrove habitats,	Ecosystem category, Ecosystem Services, Socio-economic	1.1.6	Tana River			UNEP	Regional	Ecosystem services mapping, asses
7	Training and Capacity building				3.1.1, 3.1.4	Lamu			UNEP & UNHABITAT	Regional	Strengthening inter-governmental (co
8	Carry out waste audit and develop source inventory in at the whole coast, with a fo		Roads, Settlements, Buildings, Rivers, land uise, Neighborh	Waste disposal sites, Waste management systems, Landfill	3.5.1, 3.5.3, 3.5.4	Taita Taveta			UNEP	County	Update and upgrade solid waste recy
9	Ecosystem services mapping, assessment and valuation		County, Coral Reef, Maritime boundary, Mangrove habitats,	Ecosystem category, Ecosystem Services, Socio-economic	1.1.6	Kwale			UNEP	Regional	Ecosystem services mapping, asses
10	Training and Capacity building				3.1.1, 3.1.4	Kilifi			UNEP & UNHABITAT	Regional	Strengthening inter-governmental (co
11	Study feasibility to apply these techniques and technologies at pilot site in Momba				3.6.2	Mombasa			UNEP	County	
12	Ecosystem services mapping, assessment and valuation		County, Coral Reef, Maritime boundary, Mangrove habitats,	Ecosystem category, Ecosystem Services, Socio-economic	1.1.6	Mombasa			UNEP	Regional	Ecosystem services mapping, asses
13	Training and Capacity building				3.1.1, 3.1.4	Mombasa			UNEP & UNHABITAT	Regional	Strengthening inter-governmental (co
14	Build 1 GIS data center at JKP level and 6 GIS data nodes at County level	GIS Nodes	Administrative, Natural environment, Land cover, Population	Detailed Land use, infrastructure	1.1.4	Kilifi			UNHABITAT	County	
15	Build 1 GIS data center at JKP level and 6 GIS data nodes at County level	GIS Nodes	Administrative, Natural environment, Land cover, Population	Detailed Land use, infrastructure	1.1.4	Kwale			UNHABITAT	County	
16	Build 1 GIS data center at JKP level and 6 GIS data nodes at County level	GIS Nodes	Administrative, Natural environment, Land cover, Population	Detailed Land use, infrastructure	1.1.4	Lamu			UNHABITAT	County	
17	Build 1 GIS data center at JKP level and 6 GIS data nodes at County level	GIS Nodes	Administrative, Natural environment, Land cover, Population	Detailed Land use, infrastructure	1.1.4	Mombasa			UNHABITAT	County	
18	Build 1 GIS data center at JKP level and 6 GIS data nodes at County level	GIS Nodes	Administrative, Natural environment, Land cover, Population	Detailed Land use, infrastructure	1.1.4	Taita Taveta			UNHABITAT	County	
19	Build 1 GIS data center at JKP level and 6 GIS data nodes at County level	GIS Nodes	Administrative, Natural environment, Land cover, Population	Detailed Land use, infrastructure	1.1.4	Tana River			UNHABITAT	County	
20	Integrate the Spatial Development Framework (SDF) and Ecosystem Management				2.1.1	Taita Taveta			UNEP & UNHABITAT	Regional	
21	Organise EGMs to customize framework	Organise EGMs to customize framework (urban planne			2.1.2, 2.1.3	Kilifi			UNEP	County	Organise stakeholder training worksh
22	Organise EGMs to customize framework	Organise EGMs to customize framework (urban planne			2.1.2, 2.1.3	Kwale			UNEP	County	Organise stakeholder training worksh
23	Organise EGMs to customize framework	Organise EGMs to customize framework (urban planne			2.1.2, 2.1.3	Lamu			UNEP	County	Organise stakeholder training worksh
24	Organise EGMs to customize framework	Organise EGMs to customize framework (urban planne			2.1.2, 2.1.3	Mombasa			UNEP	County	Organise stakeholder training worksh
25	Organise EGMs to customize framework	Organise EGMs to customize framework (urban planne			2.1.2, 2.1.3	Taita Taveta			UNEP	County	Organise stakeholder training worksh
26	Organise EGMs to customize framework	Organise EGMs to customize framework (urban planne			2.1.2, 2.1.3	Tana River			UNEP	County	Organise stakeholder training worksh
27	Neighbourhood Plan	Public space neighborhood assessment.	Transport, Vegetation, Roads, Soil, Topography	Specific site, Land use, Cadastre, Detailed Building, Econom	2.4.3	Kilifi			UNHABITAT	Neighbourhood	
28	Integrated coastal management plan for a selected area in Kilifi			Specific Site	2.4.3	Kilifi			UNHABITAT	City	
29	ISUD (LPLDP) Plan for Hola Municpality		Roads, Rivers, Protected area, Land cover, Soil, Farm land	Socio-economic data, Buildings, Forests, Detailed satellite im	2.4.2	Tana River	Garsen, Galole	Kinakomba, Mikinduni, C	UNHABITAT	City	
30	Study feasibility of blue carbon project (carbon stock and ecosystem service asse		Mangrove, Settlement, Land Cover, Vegetation	Carbon stock, ecosystem service, seagrass	3.4.1, 3.4.2, 3.4.3	Kilifi			UNEP	County	Support the communities to access t
31	Study feasibility of blue carbon project (carbon stock and ecosystem service asse		Mangrove, Settlement, Land Cover, Vegetation	Carbon stock, ecosystem service, seagrass	3.4.1, 3.4.2, 3.4.3	Kwale			UNEP	County	Support the communities to access t
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34	Study feasibility of blue carbon project (carbon stock and ecosystem service asse		Mangrove, Settlement, Land Cover, Vegetation	Carbon stock, ecosystem service, seagrass	3.4.1, 3.4.2, 3.4.3	Tana River			UNEP	County	Support the communities to access t
35	Develop a solid waste management strategy in at least one town in Taita Taveta (V		Road network,	Specific sites, Land use, Waste collection points, Infrastruct	3.5.2	Taita Taveta	Voi, Wundanyi,		UNEP	City	
36	Apply technique and technology in Shimo La Tewa, Mombasa	Apply technique and technology to at least one site in	Roads, buildings	Detailed plans, socioeconomic data	3.6.2	Mombasa	Kisauni		UNEP	City	
37	Outcome 4: Enhanced dissemination of good practices, innovations and benefits f				4.1.1, 4.1.2, 4.1.3, 4.1.4,4.2.1,4.3.1,4.3.2,4.3.3	All			UNEP & UNHABITAT	Regional	Strengthening coastal counties' capa
38	Study the feasibility of conservation effectiveness (MPAs)	Cost-benefit analysis for establishing MPAs; Support	Protected areas, conservation areas, Land use, Land cover,	Ecological system, mangrove, forests, population, economic	3.2.1,3.2.2,3.2.3,3.2.4,3.2.5	Kwale			UNEP	County	Develop MPA management plan, imp
39	Provide and customise and offer training materials and courses for the managem				3.3.1, 3.3.2	Kwale			UNEP	County	Offer alternative livelihood opportuni
40	Design, develop and enhance the functionality of an urban coastal public space (e		Fish landing sites, Public beach front	Cultural heritage sites, Buildings, Hotels,	3.1.2	Kilifi			UNHABITAT	County	
41	Design, develop and enhance the functionality of an urban coastal public space (e		Fish landing sites, Public beach front	Cultural heritage sites, Buildings, Hotels,	3.1.2	Mombasa			UNHABITAT	County	
42	Build a GIS and data system	GIS Shapefiles, Socio-economic, coastal ecosystem	Administrative boundaries, Road infrastructure, Natural feat	Buildings, Land use, Parcel, Office infrastructure	1.1.3, 1.1.1	Kilifi			UNEP & UNHABITAT	County	Data availability mapping and gap ar
43	Build a GIS and data system	GIS Shapefiles, Socio-economic, coastal ecosystem	Administrative boundaries, Road infrastructure, Natural feat	Buildings, Land use, Parcel, Office infrastructure	1.1.3, 1.1.1	Kwale			UNEP & UNHABITAT	County	Data availability mapping and gap ar
44	Build a GIS and data system	GIS Shapefiles, Socio-economic, coastal ecosystem	Administrative boundaries, Road infrastructure, Natural feat	Buildings, Land use, Parcel, Office infrastructure	1.1.3, 1.1.1	Lamu			UNEP & UNHABITAT	County	Data availability mapping and gap ar
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46	Build a GIS and data system	GIS Shapefiles, Socio-economic, coastal ecosystem	Administrative boundaries, Road infrastructure, Natural feat	Buildings, Land use, Parcel, Office infrastructure	1.1.3, 1.1.1	Taita Taveta			UNEP & UNHABITAT	County	Data availability mapping and gap ar
47	Build a GIS and data system	GIS Shapefiles, Socio-economic, coastal ecosystem	Administrative boundaries, Road infrastructure, Natural feat	Buildings, Land use, Parcel, Office infrastructure	1.1.3, 1.1.1	Tana River			UNEP & UNHABITAT	County	Data availability mapping and gap ar
48	Organize training course on data/information and planning										
49	Organize training course on data/information and planning										
50	Organize training course on data/information and planning										
51	Organize training course on data/information and planning										
52	Organize training course on data/information and planning										
53	Organize training course on data/information and planning										
54	Social and ecological vulnerability assessment + scenarios										
55	Social and ecological vulnerability assessment + scenarios										
56	Social and ecological vulnerability assessment + scenarios										
57	Social and ecological vulnerability assessment + scenarios										
58	Social and ecological vulnerability assessment + scenarios										
59	Social and ecological vulnerability assessment + scenarios										
60	Customize regional land-sea framework to Kenyan marine and coastal areas										
61	Customize regional land-sea framework to Kenyan marine and coastal areas										
62	Customize regional land-sea framework to Kenyan marine and coastal areas										

1. State the problem
- Is the existing data adequate for land and sea planning?

2. Identify the goal
- If the data is not adequate, identify and collect the needed data

3. Identify information needed
- Existing data
- Historical knowledge
- Conceptual site model

4. Define the study scope
- Limits the extent for data collection

5. Data screening
- Define the datasets needed/ quality

6. Evaluate Data Quality
- Assess the usability of the data

7. Plan for more data
- Specify next step for existing gaps

2. Data collection

- ✓ Open source data acquisition

- ✓ Data Extraction using AI and Machine learning (Eg. Google Earth Engine, ArcGIS Pro)

- ✓ Secondary data compilation

- ✓ Data gaps analysis

- ✓ Socio-economic surveys
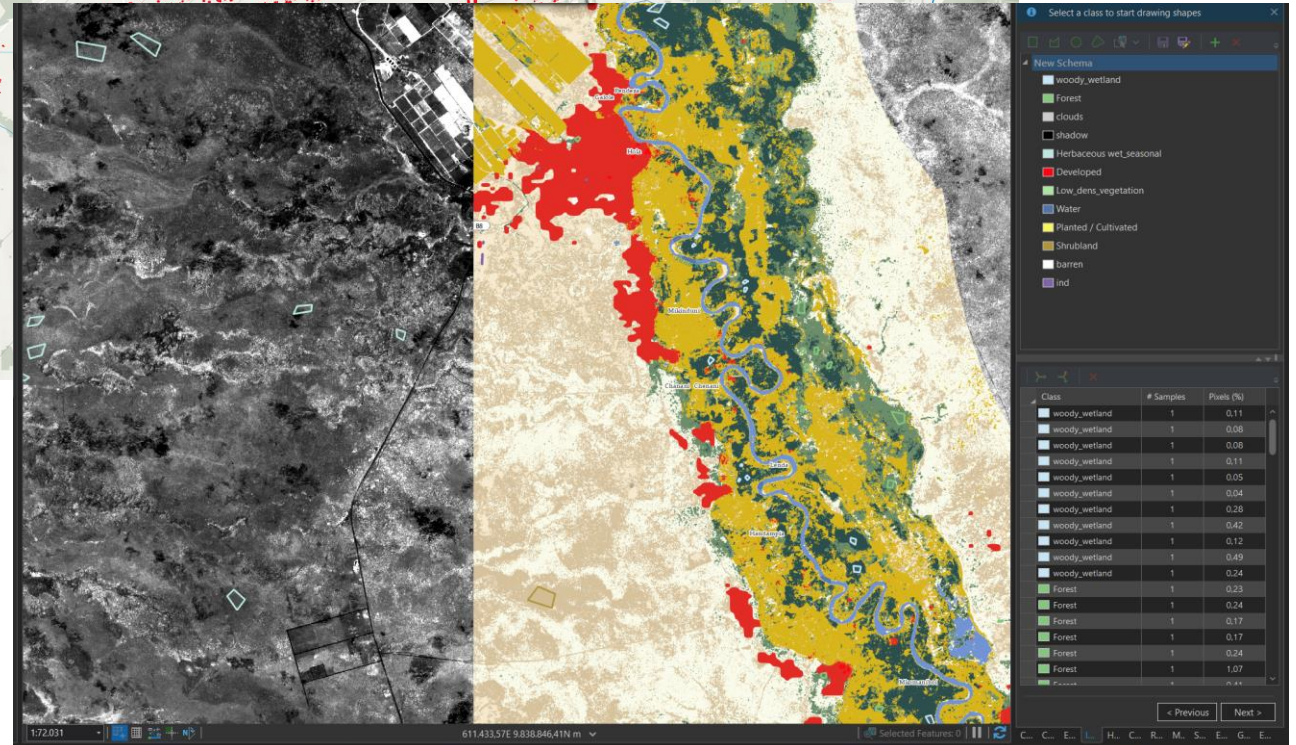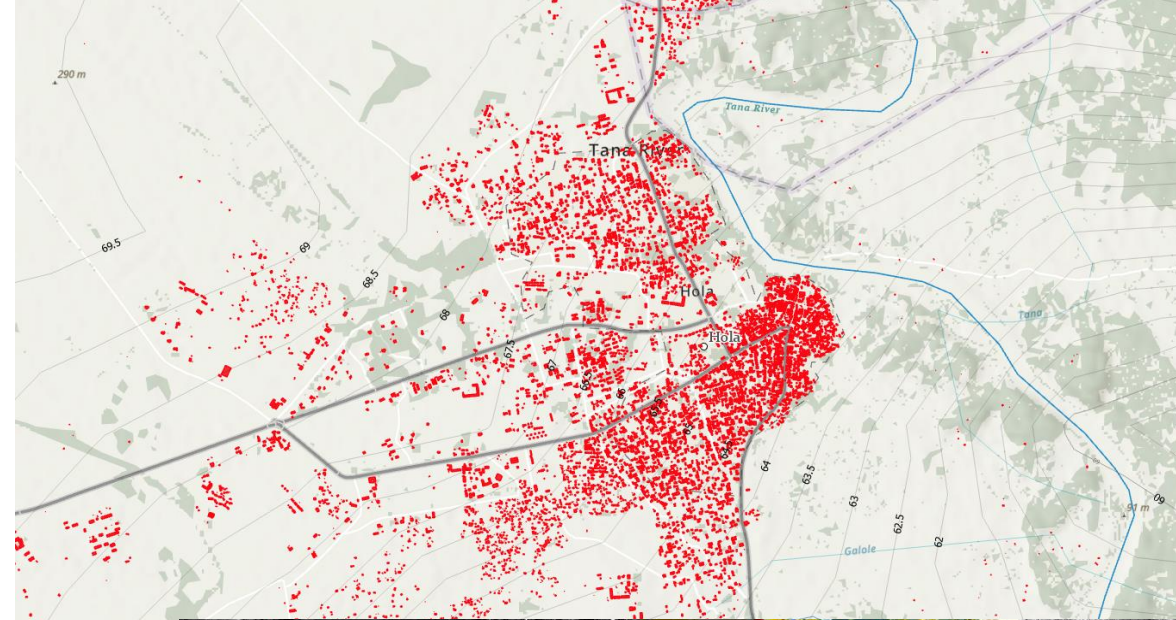
3. Data Storage

DASHBOARD

Spatial Representation of GIS Data and Project Sites within the 6 JKP counties (ArcGIS Software)

✓ Data needs mapping

✓ Available GIS Datasets

✓ Status of the project

✓ Responsible agency

✓ Integrated view with links to partners and relevant documents

✓ Consolidate a solid Data Base System to share with the JKP Counties for the Data Centers

Build GIS and data systems

- 1 GIS data center at JKP level and 6 GIS data nodes at County level.

- Plotter and network system.

- RCRMD – station set-up, networking and regular maintenance.

- Organize training course on data/information & planning.
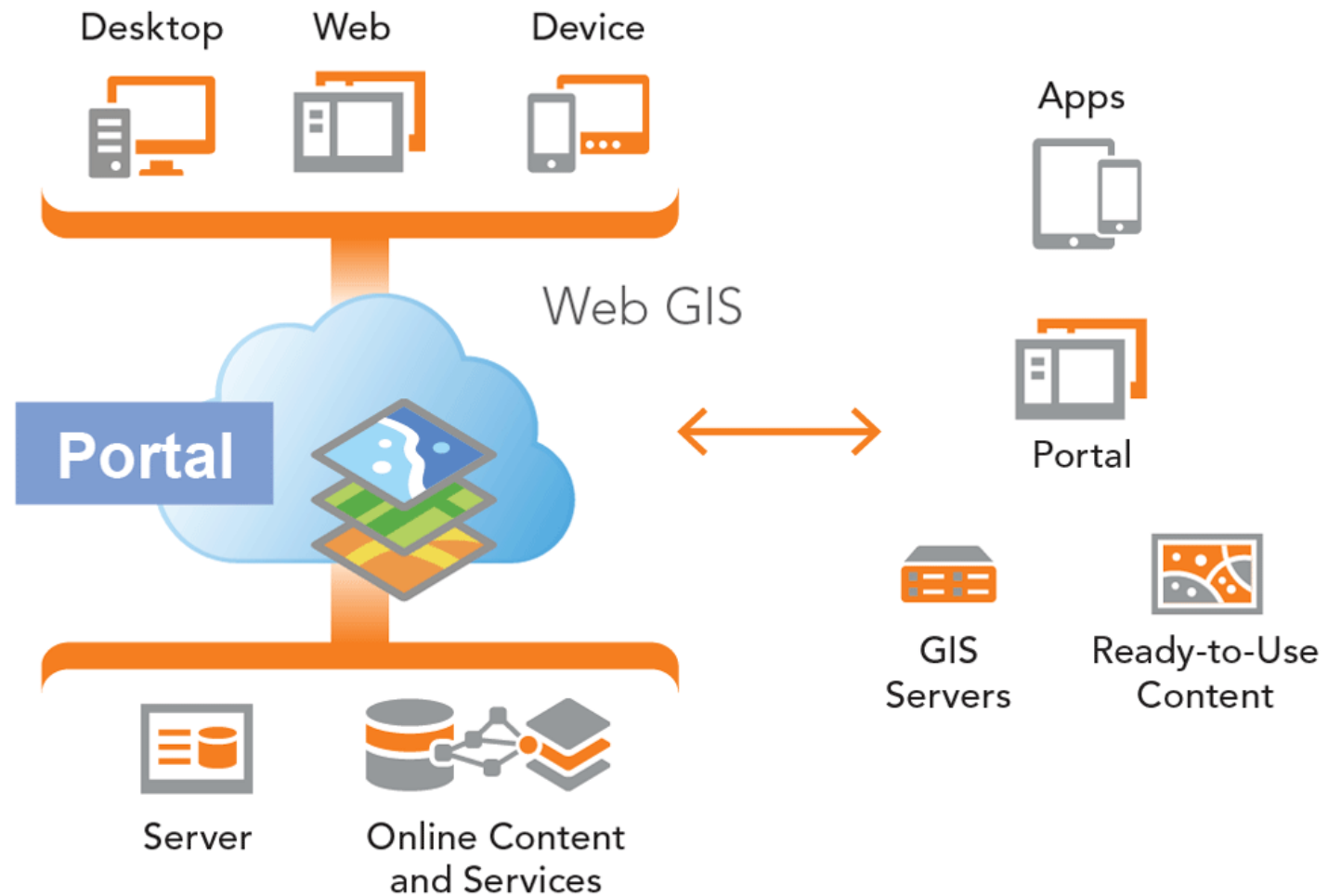
Collaboration with GEMS Ocean for the marine data – satellite and InSitu observation

https://unep-viewer.mercator-ocean.eu/-/lzmatfmr6w
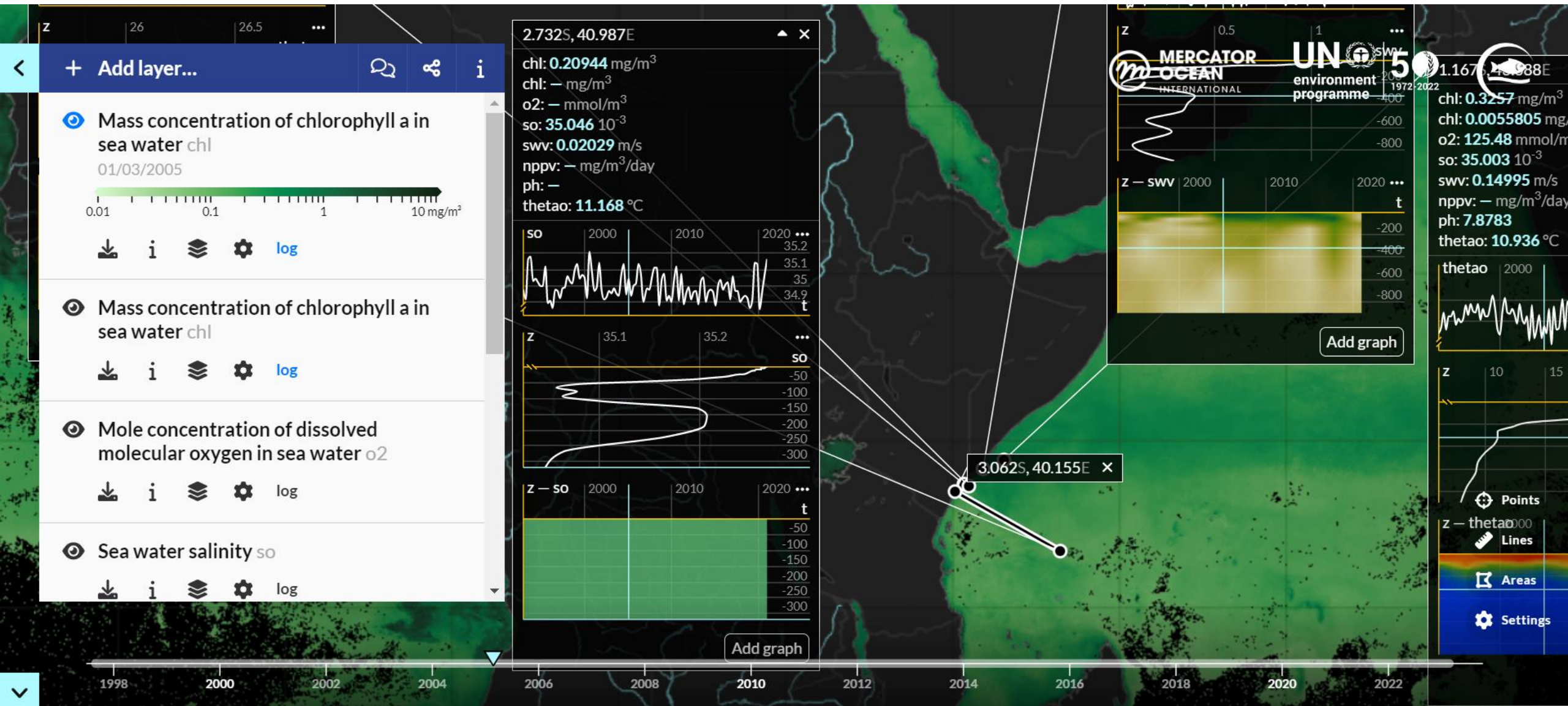
Ecosystem services mapping, assessment and valuation

- UN System of Environmental Economic Accounting Ecosystem Accounting (SEEA EA)
- Built on five core accounts:
- Implementing partner - UoN
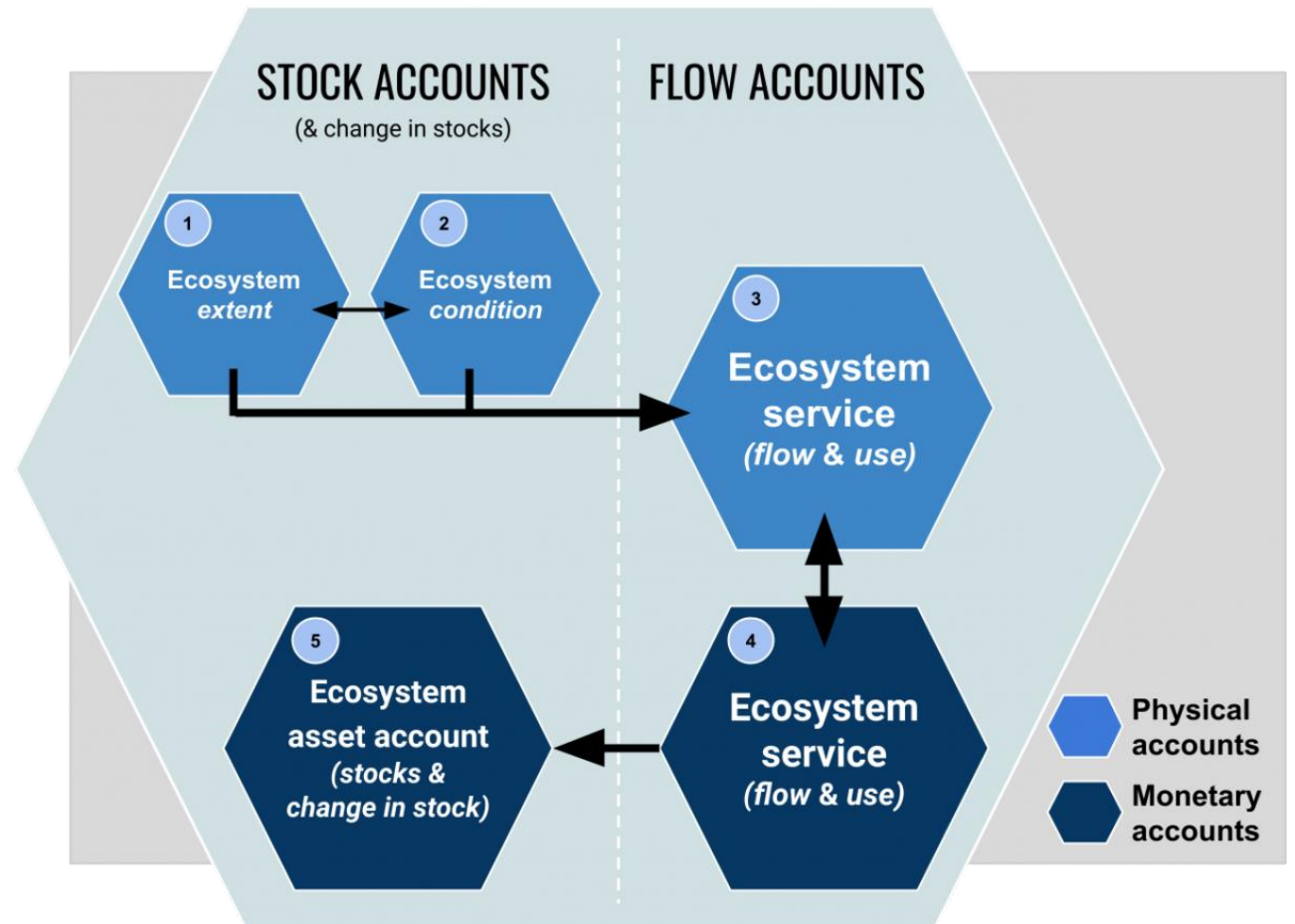
Example of how ecosystem assets generate ecosystem services to beneficiaries in a spatial relationship
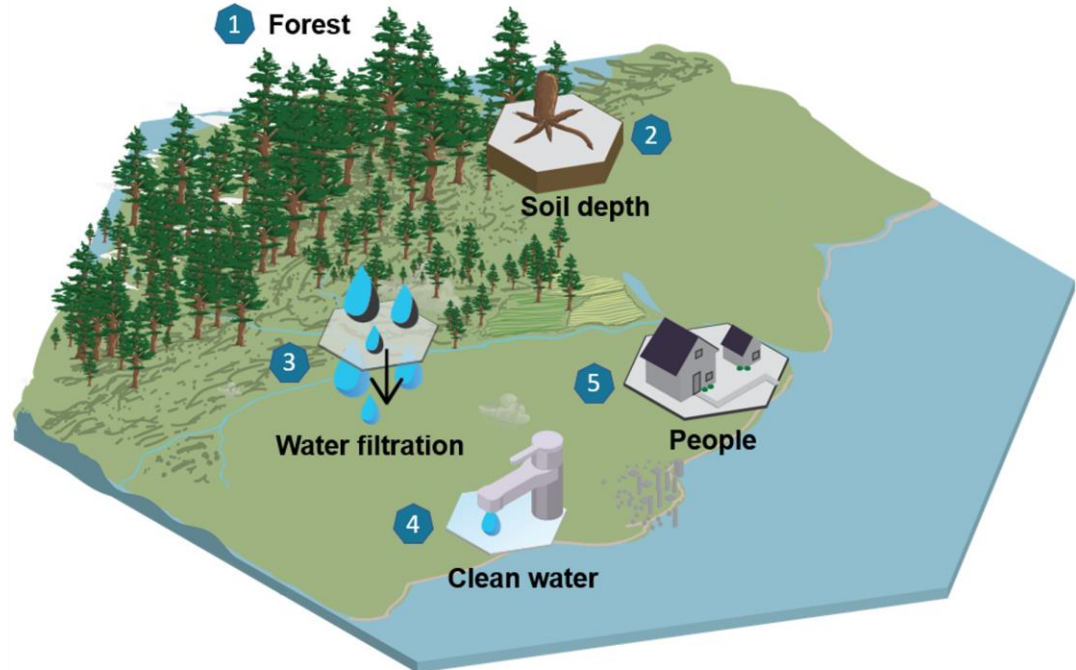
1 Asset	2 Condition	3 Service	4 Benefit	5 Beneficiaries
Forest	Soil depth	Water filtration	Clean water	People
The model starts with identifying an ecosystem asset, in this case, a forest, that can be measured by its extent (e.g. hectares).	This forest asset can be further described in terms of its condition, through indicators that reflect its overall quality (e.g. soil depth).	The biomass in this forest collects and filters rainfall before it reaches streams and rivers, providing the important ecosystem service of water filtration.	The benefits generated by the filtration service take the form of cleaner water and reduced water treatment costs.	These benefits accrue to the actors in the economy, including businesses and households that produce elements of well-being that can be measured using quantitative economic techniques.

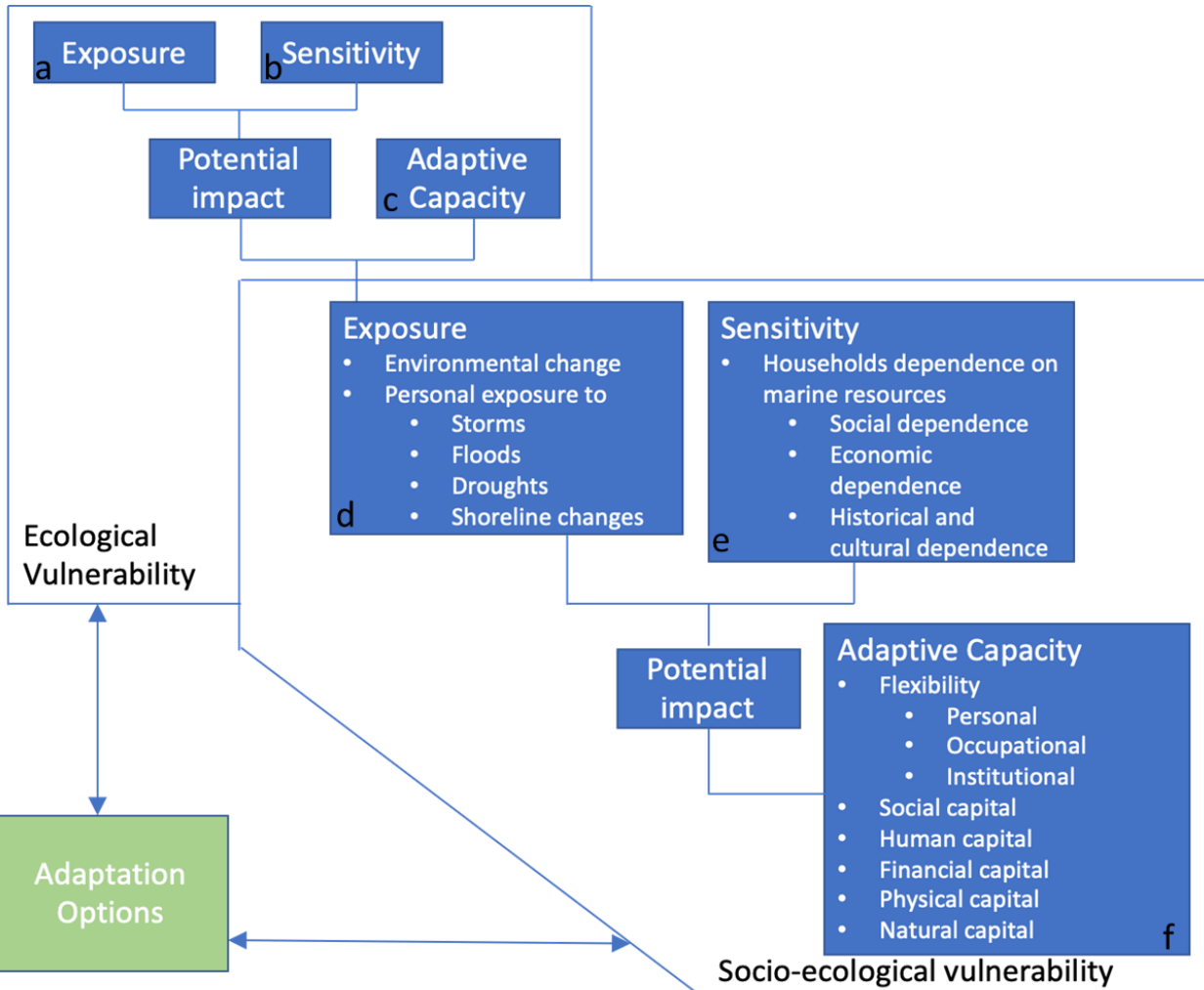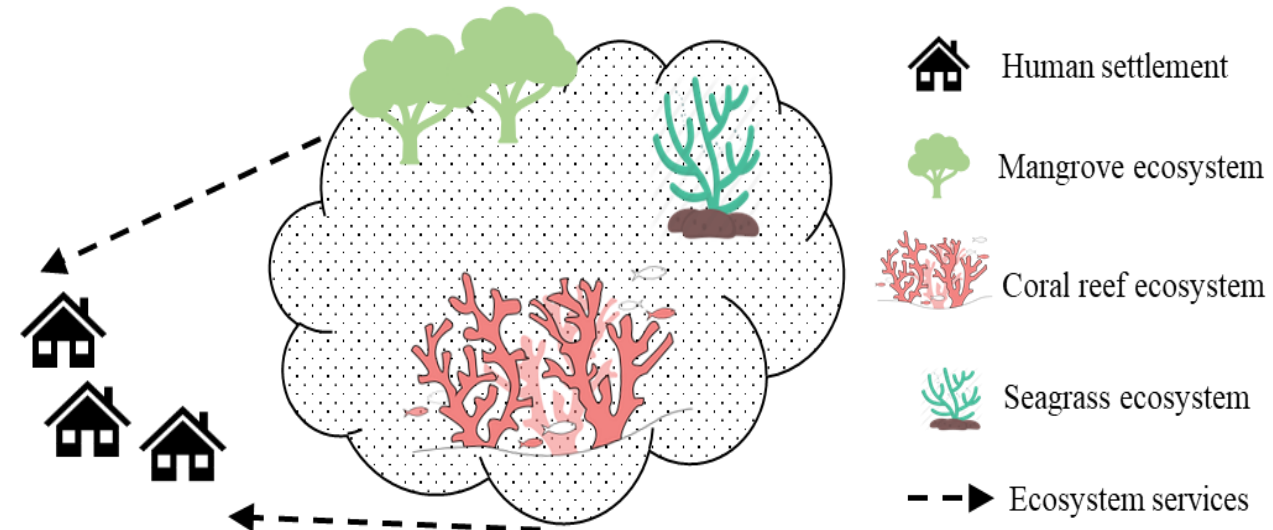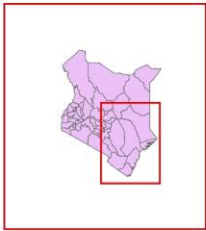# Climate Change Vulnerability Assessment

Figures adopted from the *CCVA toolkit* –Nairobi Convention

GO BLUE PROJECT
Result Area 2

Legend

- Kilifi
- Kwale
- Lamu
- Mombasa
- Taita Taveta
- Tana River

1. Hola Municipality Plan
2. Report on Land-Sea Nexus for CSP
3. Climate Change Vulnerability Assessment
4. Ecosystems mapping & Valuation

1. Lamu Waterfront Public Space
2. Mangrove Blue Carbon
3. Data Station with socio-economic data
4. Ecosystments Mapping & Valuation

1. Solid Waste Audit
2. Solid Waste Strategy
3. Material Recovery Facility
4. Data Station with socio-economic data
5. Ecosystems mapping & valuation

Tana River

Lamu

Taita Taveta

Kilifi

ZERO WASTE

1. Mazingira Public Park
2. Kilifi Neighbourhood Regeneration Plan
3. Data Station with socio-economic data
4. Ecosystems mapping and valuation

Kwale

Mombasa

1. Marine Protected Area (MPA)
2. Locally Managed Marine Area (LMMA)
3. Data Station with socio-economic data
4. Ecosystems mapping and valuation

1. Mikindani Constructed Wetland
2. Tudor Urban Water Sports
3. Data Station with socio-economic data
4. Climate Change Vulnerability Assessment
5. Ecosystems mapping and valuation

0 12.5 25   50   75   100
Kilometers

Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

Author: Jeremiah OUGO

Thank you!