A ROADMAP FOR ACCESSING ECOLOGICAL AND HUMAN USE DATASETS FOR MSP IN TANZANIA

THE UNITED REPUBLIC
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A ROADMAP FOR ACCESSING ECOLOGICAL AND HUMAN-USE DATASETS FOR MARINE SPATIAL PLANNING IN TANZANIA

The Nature Conservancy

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Executive Summary

Tanzania's rich marine resources are vital for its economy and livelihoods but face increasing pressure from competing uses and environmental change. Marine Spatial Planning (MSP) offers a crucial framework for sustainable management, balancing conservation with activities like fishing, shipping, and tourism. However, effective MSP hinges on accessible, high-quality spatial data, a significant challenge currently facing Tanzania. Existing data on marine ecosystems and human activities are often fragmented, inconsistent, or held by disparate institutions, hindering informed decision-making.

This report presents a strategic roadmap designed to overcome these data limitations and establish a baseline for MSP in Tanzania. The roadmap prioritizes **Data Inventory and Gap Analysis**: It systematically identifies existing datasets, assessing their quality, pinpointing critical information gaps, and charting out the key steps in implementing the roadmap. Implementing this roadmap is the essential first step towards developing an MSP framework for Tanzania. By strengthening the data foundation, Tanzania can improve decision-making, mitigate conflicts between users, conserve marine biodiversity, and unlock the potential of a sustainable Blue Economy.

Abbreviations

EAC – East African Community

EEZ – Exclusive Economic Zone

GIS – Geographic Information System

HB – Heshimu Bahari [Project]

IUU – Illegal, Unreported, and Unregulated [fishing]

LNG – Liquefied Natural Gas

MPA – Marine Protected Area

MSP – Marine Spatial Planning

NADS – National Aquaculture Development Strategy

NGO – Non-governmental Organisation

SADC – Southern African Development Community

SNM – National Shipping Line [Shirika la Meli la Taifa]

TCF – Trillion Cubic Feet

USAID – United States Agency for International Development

1 Introduction

Tanzania's extensive 1,424-kilometer coastline along the Western Indian Ocean harbors a wealth of marine resources critical to the nation's economy, livelihoods, and biodiversity. From vital fisheries supporting millions (Section 2.1) and burgeoning mariculture potential (Section 2.2), to strategic maritime transport hubs (Section 2.4), significant offshore gas reserves (Section 2.3), and world-renowned tourism destinations (Section 2.5), the ocean offers immense opportunities for development. However, these valuable ecosystems and the industries they support face mounting pressures. Challenges such as overfishing, habitat degradation from coastal development, climate change impacts like coral bleaching, pollution, and increasing conflicts between competing uses (e.g., fishing vs. conservation) threaten the long-term health and productivity of Tanzania's marine space.

To address these complexities and unlock the potential of a sustainable Blue Economy, a structured and integrated management approach is essential. MSP provides such a framework – a public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that are usually specified through a political process (UK-IOC 2023; Wikipedia contributors 2025). Recognizing this potential, Tanzania has undertaken initial steps, including scoping studies (URT 2023) and integrating MSP principles into national dialogues and policy considerations. However, translating these initial steps into a comprehensive, operational framework requires a clear, actionable, and effective national MSP framework.

This report presents a strategic roadmap as an initial step toward developing a comprehensive MSP framework in Tanzania. It builds directly upon stakeholder assessments and a detailed inventory and ranking of critical datasets (Table 4.1, Table 4.2). The roadmap outlines a phased approach designed to address identified challenges, particularly concerning data availability, while leveraging existing strengths and aligning with national priorities. Successful implementation of this roadmap, driven by sustained political will, robust stakeholder engagement, and adaptive management, will enable Tanzania to establish an effective MSP system. This system will serve as a crucial tool for balancing diverse ocean uses, mitigating conflicts, conserving marine biodiversity, and ultimately fostering a prosperous and sustainable Blue Economy for the benefit of current and future generations.

2 Tanzania's ocean industries

Tanzania's marine environment supports critical industries including fisheries, mariculture, energy, transport, and tourism, all vital to the national economy but facing increasing pressures and user conflicts, highlighting the need for integrated management through Marine Spatial Planning (MSP) to ensure sustainable development within its Blue Economy.

2.1 Fisheries and other living marine resources

Tanzania's marine fisheries are vital for national food security, livelihoods, and economic growth, directly supporting over 4 million people. The sector is predominantly small-scale and artisanal, accounting for over 90% of the total catch (Figure 2.1), primarily from coastal waters using traditional gear. A smaller industrial and semi-industrial fleet targets high-value species like tuna, prawns, and lobsters, often for export, operating further offshore, including within the Pemba Channel and the wider Exclusive Economic Zone (EEZ).

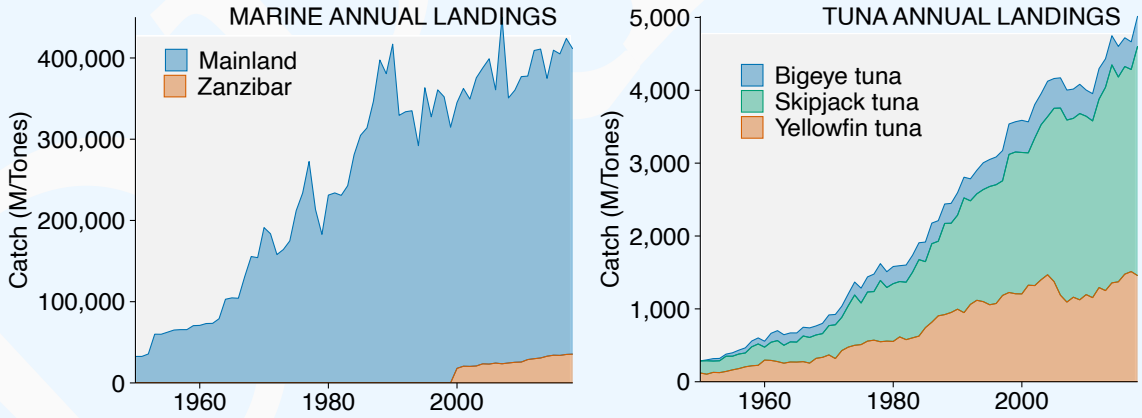

Figure 2.1: Annual marine landings (left panel) and tuna catches (right panel) in the coastal and marine waters of Tanzania. Source: Ram, Boettiger, and Dyck (2016)

However, Tanzania's fish stocks face significant pressure. Many demersal species (snappers, groupers) are overfished in nearshore areas, while even moderately exploited small pelagics (sardines, mackerel) show signs of localized depletion. High-value invertebrates (prawns, sea

cucumbers) have declined sharply, leading to management interventions like seasonal closures. Tuna stocks, crucial for the industrial sector (Figure 2.1), face increasing pressure from both domestic and foreign fleets.

MSP offers a strategic framework to address fisheries challenges by systematically allocating marine space to different uses while ensuring ecological sustainability. By mapping fishing grounds, critical habitats, and competing ocean activities, MSP can minimize conflicts between small-scale fishers, industrial fleets, and conservation areas. MSP can also identify and safeguard breeding and nursery areas through seasonal closures or permanent marine protected areas (MPAs), allowing overexploited stocks to recover.

2.2 Mariculture Development

Tanzania's mariculture sector offers significant potential to complement capture fisheries, enhance food security, and drive economic growth within the Blue Economy framework. Currently, the sector is dominated by seaweed farming, particularly in Zanzibar, making Tanzania a major global producer. However, substantial untapped potential exists for cultivating other high-value species like shrimp, finfish, bivalves (oysters, clams), and sea cucumbers. Recognizing this potential, government initiatives like the National Aquaculture Development Strategy (NADS) aim to stimulate growth through improved seed and feed availability, technical training, and attracting private investment. Despite this promise, the expansion of mariculture faces challenges, most notably the need for careful site selection to avoid environmental impacts and conflicts with other marine users (e.g., fisheries, tourism, conservation areas). MSP is essential for overcoming these hurdles. By systematically analyzing environmental conditions and existing uses, MSP can proactively identify and designate optimal zones for various types of mariculture (coastal and offshore). This spatial planning approach helps minimize user conflicts, streamline permitting processes, and ensure that mariculture development proceeds sustainably, balancing economic objectives with ecological health and social considerations.

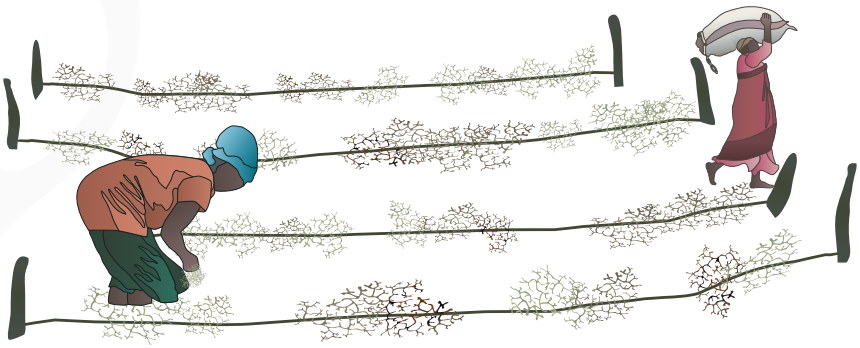

Figure 2.2: Concepual diagram of seaweed farming in shallow coastal waters

The Nature Conservancy

RESTORATIVE MARICULTURE

Where seaweed, people and nature thrives

Photo credit: The Nature Conservancy

2.3 Oil and Gas Industry

Tanzania's petroleum sector has gained prominence following major offshore natural gas discoveries, positioning the country as a potential energy hub in East Africa. With proven reserves exceeding 47 trillion cubic feet (TCF) (Table 2.1), primarily located in deep-water blocks off the southern coast (Figure 2.3), Tanzania's gas potential has attracted significant international investment (PURA 2023). Current utilization focuses on domestic power generation and industrial use, while ambitious plans for large-scale Liquefied Natural Gas (LNG) exports are progressing.

Table 2.1: Offshore water discovery and gas volume in the United Republic of Tanzania

	Gas Discovery				
Block	Well	Year	Operator	Status	Resources (TCF)
Block 1	Chaza-1	2011	BG Tz	Undeveloped	0.47
Block 1	Jodari-1	2012	BG Tz	Undeveloped	3.53
Block 1	Jodari North-1	2012	BG Tz	Undeveloped	-
Block 1	Jodari South-1	2012	BG Tz	Undeveloped	-
Block 1	Mzia-1	2012	BG Tz	Undeveloped	8.50
Block 1	Mzia-2	2013	BG Tz	Undeveloped	-
Block 1	Mzia-3	2013	BG Tz	Undeveloped	-
Block 1	Mkizi-1	2013	BG Tz	Undeveloped	0.60
Block 1	Taachui-1	2014	BG Tz	Undeveloped	1.10
Block 2	Zafarani-1	2012	Statoil	Undeveloped	6.00
Block 2	Zafarani-2	2012	Statoil	Undeveloped	-
Block 2	Lavani-1	2012	Statoil	Undeveloped	3.60
Block 2	Lavani-2	2012	Statoil	Undeveloped	1.40
Block 2	Tangawizi-1	2013	Statoil	Undeveloped	5.40
Block 2	Mronge-1	2013	Statoil	Undeveloped	2.50
Block 2	Piri-1	2014	Statoil	Undeveloped	3.00
Block 2	Giligiliani-1	2014	Statoil	Undeveloped	1.70
Block 2	Mdalasini-1	2015	Statoil	Undeveloped	1.80
Block 3	Papa-1	2012	BG Tz	Undeveloped	2.00
Block 4	Chewa-1	2010	BG Tz	Undeveloped	1.80
Block 4	Pweza-1	2010	BG Tz	Undeveloped	1.90
Block 4	Ngisi-1	2013	BG Tz	Undeveloped	0.80
Block 4	Kamba-1	2014	BG Tz	Undeveloped	1.03
TOTAL	-	-	-	-	47.13

Exploration activities have been concentrated in offshore blocks operated by Shell, Equinor, and ExxonMobil, with significant discoveries made in recent years. However, commercial production has faced delays due to prolonged negotiations between the government and investors over fiscal terms and regulatory frameworks. The proposed Tanzania LNG project, a $40 billion

initiative to build a liquefaction plant in Lindi, represents the sector's most ambitious undertaking but has yet to reach final investment decision. Environmental concerns, particularly regarding offshore drilling's impact on marine ecosystems, and social issues related to land acquisition for onshore facilities are major concerns and the need for MSP come to play. MSP can help mitigate environmental risks by identifying sensitive marine areas requiring protection from petroleum activities.

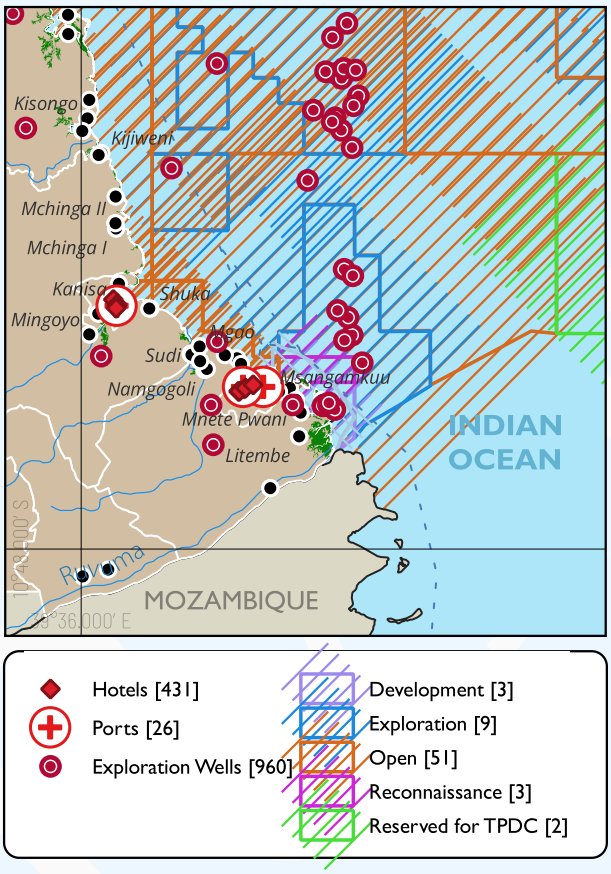

Figure 2.3: Gas wells and oil blocks in the coastal and offshore waters of Mtwara

2.4 Maritime Transport

Tanzania's maritime transport sector is a vital economic engine, leveraging its strategic Indian Ocean location to connect the nation and its landlocked neighbors to global markets. The Port of Dar es Salaam (Figure 2.4) is the dominant hub, handling over 90% of the country's international trade and serving as a critical gateway for regional cargo. Recent expansions aim to boost its capacity significantly. Secondary ports in Tanga, Mtwara, and Zanzibar fulfill important regional and specialized roles. While ambitious plans for new large-scale facilities like the Bagamoyo Mega Port exist and inland developments, such as the Kwala Dry Port, further integrate the maritime network with terrestrial logistics.

Figure 2.4: Modern Dar es Salaam Port's container terminal with cranes. In the distance, the skyline of Dar es Salaam city center reflects the economic vitality driven by this harbor.

However, the growth and operation of maritime transport inherently interact with other marine uses and the environment. Port expansions, dredging, vessel traffic, and anchorage activities can impact sensitive habitats, conflict with fishing grounds or tourism areas, and increase pollution risks. MSP provides an essential framework for managing these interactions proactively. By mapping existing and planned shipping lanes, port infrastructure footprints, anchorage zones, and areas of potential conflict (e.g., with MPAs, fishing zones, tourism sites), MSP can guide sustainable port development, optimize vessel routing to minimize environmental impact and user conflicts, and inform decisions on safety and security measures within the maritime domain. Integrating maritime transport planning into MSP is crucial for optimizing the sector's efficiency while safeguarding marine ecosystems and accommodating other vital ocean uses.

2.5 Tourism and Leisure Activities

Tanzania's marine tourism sector is a cornerstone of the national economy, attracting global visitors to its stunning islands (like the Zanzibar Archipelago, Mafia, and Pemba), historic coastal towns, and vibrant coral reefs. This vital industry generates significant foreign exchange and supports numerous livelihoods in hospitality, transport, and guiding services. However, the long-term viability of this sector faces significant sustainability challenges. Unplanned coastal development can lead to habitat destruction, while climate change impacts,

such as coral bleaching, degrade key natural attractions. High visitor numbers in popular areas (e.g., Mnemba Atoll) can cause environmental stress through physical damage to reefs from unregulated activities and increased pollution (like plastic waste). These pressures, combined with growing coastal populations, intensify competition for resources and space.

Figure 2.5: Wooden tourist boat during the low spring tide along the coastal waters of Unguja Island, Zanzibar

While conservation initiatives like Marine MPAs (e.g., Mafia Island Marine Park) and MCA (e.g Misali Island Conservation Area) are crucial for protecting critical habitats, MSP offers a broader framework to manage tourism alongside other uses and conservation goals. By incorporating tourism into a comprehensive MSP process, Tanzania can better manage competing demands on its coastal and marine space, ensuring that tourism development is sustainable and does not compromise the ecological health or the needs of other ocean users.

3 Collate Dataset and Ranking

This section details the process of gathering existing marine spatial datasets relevant to Tanzania and prioritizing them using a standardized ranking system based on economic value, ecological risk, and urgency, forming a crucial foundation for the Marine Spatial Planning roadmap.

3.1 Existing Marine Datasets

Effective MSP fundamentally relies on comprehensive data covering human activities and ecological features. Essential datasets include biodiversity (e.g., coral reefs, seagrass beds, marine mammal habitats), fisheries (fishing grounds, landing sites, gear types), maritime transport (shipping lanes, port locations), tourism hotspots (dive sites, resorts), and energy development (oil/gas exploration zones, pipelines). In Tanzania, much of this vital data resides across various government agencies and non-governmental institutions. Recognizing the need for consolidation, efforts have been undertaken to collate key datasets, as conceptually illustrated in Figure 3.1.

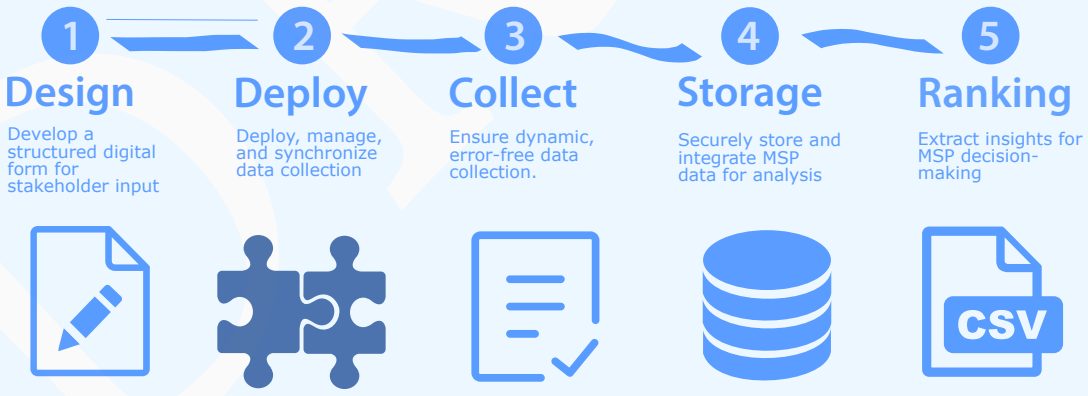

Figure 3.1: Conceptual framework for secondary data collection, storage and ranking

3.2 Ranking Existing Datasets

To effectively prioritize data collection and management efforts within Tanzania's MSP process, a standardized ranking system was developed. This system evaluates datasets across three critical dimensions – **Economic Value**, **Ecological Risk**, and **Urgency**. Each dataset was assessed against objective criteria within these dimensions, drawing upon expert opinion and a review of Tanzania's marine sector priorities and challenges. The specific criteria used for assigning High, Moderate, and Low rankings are detailed in Table 3.1.

Table 3.1: Ranking criteria

level	description
ECONOMIC VALUE	
High	Directly supports major revenue-generating sectors (fisheries, tourism, energy)
Moderate	Enables economic activities with indirect benefits
Low	Foundational data with minimal direct economic linkage
ECOLOGICAL RISK	
High	Involves critically endangered species, nursery grounds, or climate-vulnerable habitats
Moderate	Sensitive but resilient ecosystems with some buffer capacity
Low	Non-sensitive areas or human-made infrastructure
URGENCY	
High	Requires immediate management due to active threats or legal mandates
Moderate	Important for medium-term planning but not time-critical
Low	Can be addressed in long-term monitoring frameworks

4 Key Findings of Ranked Datasets

This section serrve as a bridge between the previous data analysis sections and the (implied) subsequent steps of the roadmap. However, as written, it primarily elaborates on the very first major action within the roadmap: getting a firm handle on the data situation based on three criteria—Economic Value, Ecological Risk, and Urgency for four thematic areas —Basemaps, administrative boundaries, marine living resources, and marine economic uses.

- It is important to indicate that data is foundational to the entire MSP process in Tanzania, reflecting the findings of the earlier data inventory and ranking.
- It interprets the immediate next step in the roadmap to be a deep dive into understanding existing data, identifying what's missing, and assessing the policy landscape related to data and MSP.
- While it highlights a generic MSP cycle process, the text itself concentrates only on the initial data assessment component of that cycle, suggesting this is the most immediate priority derived from the document's analysis.
- Essentially, it argues that a thoroughly understand of existing and foreseen marine spatial data in the country as a cornerstone of the MSP framework in the country.

Table 4.1: Ranked dataset based on economic value. ecological risk and urgency for MSP

Layer	Dataset	Economic value	Ecological Risk	Urgency
1. BASE MAPS				
1.1 Terrestrial Base Map	ESRI World_Basemaps_V.2	High	Low	High
1.1 Terrestrial Base Map	Satellite imagery	High	Low	High
1.1 Terrestrial Base Map	Others(??)	Moderate	Low	Moderate
1.2 Marine Base Map	GEBCO 2019 Grid	High	Low	High
1.2 Marine Base Map	General Bathymetric Chart	High	Low	High
1.2 Marine Base Map	Admiralty Hydrographic Charts	High	Low	High
1.2 Marine Base Map	Coastal geographic features	Moderate	Moderate	Moderate
2. ADMINISTRATIVE BOUNDARIES				
2.1 LGA Boundaries	Regional Boundaries	Moderate	Low	Moderate
2.1 LGA Boundaries	Urban Areas	Moderate	Low	Moderate
2.1 LGA Boundaries	Districts, villages etc	Moderate	Low	Moderate
2.1 LGA Boundaries	Islands	Moderate	Moderate	Moderate
2.2 Marine Base Map	Coastline	High	Moderate	High

2.2 Marine Base Map	Internal waters	High	Moderate	High
2.2 Marine Base Map	Territorial Sea (URT)	High	Moderate	High
2.2 Marine Base Map	Exclusive Economic Zone	High	Moderate	High
2.2 Marine Base Map	Extended Continental Shelf	High	Moderate	High
2.2 Marine Base Map	Maritime boundaries	High	Low	High
3. MARINE LIVING RESOURCES				
3.1 Marine & Coastal Habitats	Seabed classification	Moderate	High	High
3.1 Marine & Coastal Habitats	Coral distribution	Moderate	High	High
3.1 Marine & Coastal Habitats	Seagrass distribution	Moderate	High	High
3.1 Marine & Coastal Habitats	Mangrove distribution	High	High	High
3.1 Marine & Coastal Habitats	Coastal wetlands??	Moderate	High	High
3.1 Marine & Coastal Habitats	Coastal forests??	Moderate	High	High
3.1 Marine & Coastal Habitats	Sand	Low	Moderate	Moderate
3.1 Marine & Coastal Habitats	Mud	Low	Moderate	Moderate
3.1 Marine & Coastal Habitats	Rocky reef	Moderate	High	High
3.1 Marine & Coastal Habitats	Ecological Sensitivity Index	High	High	High
3.2 Marine Biodiversity	Humpback whale sitings	Moderate	High	High
3.2 Marine Biodiversity	Dolphin sitings	Moderate	High	High
3.2 Marine Biodiversity	Dugong sitings	Moderate	High	High
3.2 Marine Biodiversity	Marine mammal nursery areas	High	High	High
3.2 Marine Biodiversity	Turtle nesting sites	Moderate	High	High
3.2 Marine Biodiversity	Important Bird Areas (IBA)	Moderate	High	High
3.2 Marine Biodiversity	Shark sites	Moderate	High	High
3.2 Marine Biodiversity	Fish spawning grounds (??)	High	High	High
3.2 Marine Biodiversity	Benthic organisms (??)	Moderate	High	High
3.2 Marine Biodiversity	Coelacanth	Low	High	Moderate
3.2 Marine Biodiversity	Whale Sharks	Moderate	High	High
3.3 Marine Conservation	MPAs (Parks/Reserves)	High	High	High
3.3 Marine Conservation	RAMSAR Sites	High	High	High
3.3 Marine Conservation	Locally Managed Marine Areas	High	High	High
3.4 Oceanography	MODIS-AQUA SST	Moderate	Moderate	Moderate
3.4 Oceanography	MODIS-AQUA Chlorophyll	Moderate	Moderate	Moderate
3.4 Oceanography	Ocean currents	Moderate	Moderate	Moderate
3.4 Oceanography	Upwelling areas	Moderate	High	High
4. MARINE ECONOMIC USES				
4.1 Fisheries	Fish landing sites	High	Moderate	High
4.1 Fisheries	Fishing ports	High	Moderate	High
4.1 Fisheries	Fishing areas (gear specific) ??	High	High	High
4.1 Fisheries	Fish/prawn farms sites	High	Moderate	Moderate
4.1 Fisheries	Seaweed farm sites	Moderate	Moderate	Moderate
4.2 Ports & Shipping	Shipping routes - AIS data	High	Moderate	High
4.2 Ports & Shipping	Ports & harbours	High	Moderate	High
4.2 Ports & Shipping	Dredging areas	High	High	High
4.3 Oil & Gas	Offshore oil and gas concessions	High	High	High
4.3 Oil & Gas	Sub-sea pipelines	High	High	High
4.4 Subsea Cables	Telecommunications cables	High	Moderate	Moderate

4.5. Marine & Coastal Tourism	Diving and snorkelling sites	High	Moderate	High
4.5. Marine & Coastal Tourism	High amenity beaches	High	Moderate	High
4.6 Cultural Heritage	Cultural heritage/historical sites	Moderate	Moderate	Moderate

4.1 Basemaps

Basemaps provide the fundamental geographic context upon which all other spatial data layers are overlaid in MSP . The ranking analysis of essential Basemaps for Tanzania (Table 4.1) revealed a consistent pattern: they generally exhibit **low ecological risk**, **high urgency**, and **moderate economic value** (Figure 4.1). The low ecological risk suggests these foundational layers (like coastlines, bathymetry, administrative boundaries within the sea) do not inherently represent sensitive ecosystems themselves. However, their high urgency underscores the critical need to have accurate and up-to-date Basemaps readily available at the *start* of the MSP process to enable effective planning and analysis. The moderate economic value indicates that while essential for underpinning activities, they are not typically direct drivers of major revenue streams like fisheries or tourism data might be. Therefore, securing and standardizing high-quality Basemaps should be an immediate priority in Tanzania's MSP implementation, ensuring a reliable foundation for subsequent spatial analysis and decision-making.

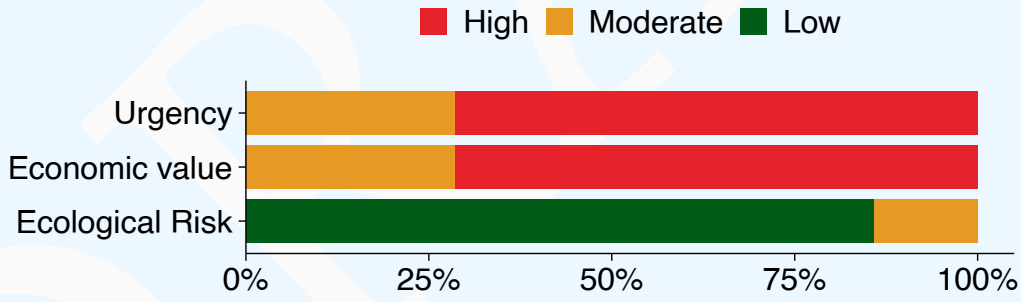

Figure 4.1: Ranked basemap layers based on urgency, economic values and ecological risk for Marine Spatial Planning

4.2 Administrative boundaries

Administrative boundaries are critical in MSP as they define the spatial extent of jurisdictions, management responsibilities, and regulatory application (e.g., national EEZ limits, district water boundaries, Marine Protected Area perimeters, port limits, concession blocks). The ranking analysis for these datasets (Table 4.1) indicated a combination of **moderate ecological risk**, **high urgency**, and **high economic value** (Figure 4.2).

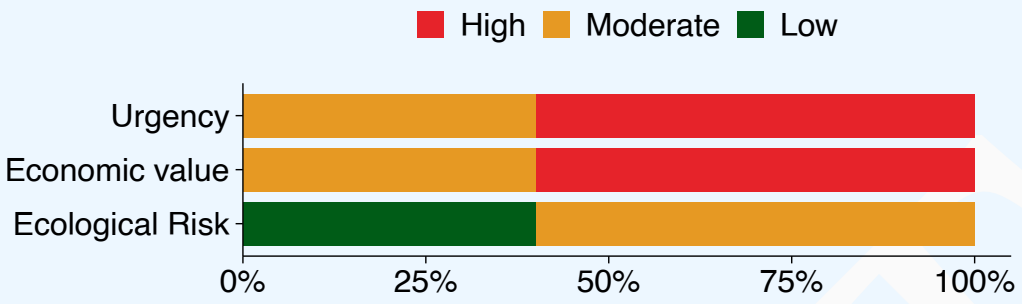

Figure 4.2: Ranked administrative boundary layers based on urgency, economic values and ecological risk for Marine Spatial Planning

The moderate ecological risk arises because while the boundary lines themselves are not ecological features, their precise location determines the management effectiveness for ecologically sensitive areas they encompass or delineate. The high urgency reflects the fundamental need for clear, undisputed boundaries early in the MSP process to establish governance frameworks and avoid jurisdictional conflicts. Furthermore, the high economic value is linked to how these boundaries define access rights, allocate resources (like fishing zones or oil and exploration rights), and delineate areas for revenue generation (e.g., port fees, tourism concessions), directly impacting economic activities. Therefore, ensuring accurate, legally recognized, and readily accessible spatial data for all pertinent administrative boundaries is a foundational and urgent requirement for successful MSP implementation in Tanzania.

4.3 Marine Living Resources

Marine living resources include the biodiversity and critical habitats within Tanzania's waters, like fish stocks, coral reefs, mangroves, seagrass beds, marine mammals, and seabird colonies. These components are fundamental to ecosystem health and support various economic sectors. The ranking analysis for datasets related to these resources (Table 4.1) revealed a distinct pattern: predominantly **high ecological risk**, **high urgency**, and **low economic value** (Figure 4.3). The high ecological risk highlights the inherent sensitivity of these biological resources and habitats to human pressures and environmental change; many are vulnerable, slow to recover, or form critical nursery and feeding grounds.

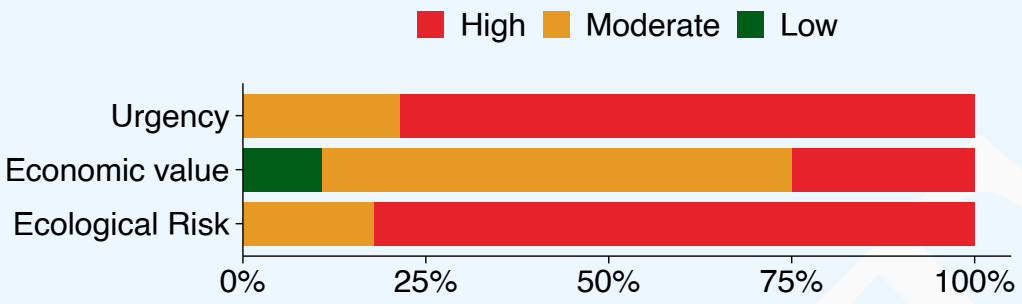

Figure 4.3: Ranked marine living resource layers based on urgency, economic values and ecological risk for Marine Spatial Planning

The high urgency stems from the significant threats they face, such as overexploitation, habitat degradation, pollution, and climate change impacts, necessitating immediate attention within the MSP framework to ensure their protection and sustainable management. The low economic value assigned primarily reflects that much of this foundational ecological data (e.g., habitat maps, biodiversity assessments) does not directly translate into immediate commercial revenue, unlike data on specific resource extraction activities, although the resources themselves underpin significant economic value (e.g., through fisheries and tourism). Therefore, accurately mapping, monitoring, and integrating data on marine living resources is crucial and urgent for MSP to effectively implement conservation measures and manage activities impacting biodiversity.

4.4 Marine Economic Uses

Marine economic uses refer to the diverse human activities that generate economic value from the ocean space, including commercial fishing, mariculture, maritime transport, tourism and recreation, and energy development (oil, gas, potentially renewables). These sectors are central to Tanzania's Blue Economy aspirations. The ranking analysis for datasets representing these uses (Table 4.1) consistently showed a combination of **high ecological risk**, **high urgency**, and **high economic value** (Figure 4.4).

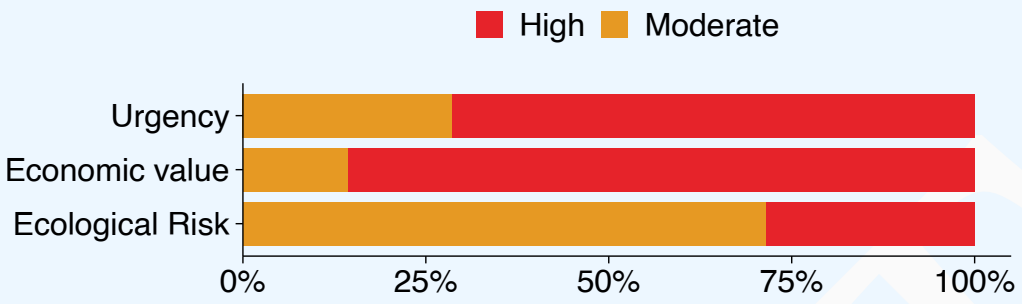

Figure 4.4: Ranked marine economic uses layers based on urgency, economic values and ecological risk for Marine Spatial Planning

The high ecological risk associated with many economic activities stems from their potential direct impacts, such as resource extraction (fishing), habitat alteration (coastal development, dredging), pollution (shipping, aquaculture), and disturbance (tourism). The high urgency reflects the need to proactively manage these often-expanding activities to prevent unsustainable practices, mitigate environmental damage, and resolve conflicts between users and with conservation objectives. The high economic value underscores the significant contribution of these sectors to national income, employment, and food security, making their effective management a top priority for sustainable development. Therefore, integrating accurate spatial data on marine economic uses into the MSP framework is critically important and urgent, enabling informed decisions that balance economic growth with ecological sustainability and social equity.

4.5 Inventory

Effective MSP fundamentally relies on the availability of comprehensive, reliable, accurate, and up-to-date spatial data. The preceding ranking analysis of existing datasets (Table 4.1) highlighted the varying levels of economic value, ecological risk, and urgency associated with different datasets. While a significant challenge in Tanzania has been the existence of outdated or fragmented datasets for coastal and marine resources (URT 2023), considerable efforts have been made to improve this landscape. Recent initiatives, notably the USAID-funded Heshimu Bahari Project, have generated substantial new data on socio-economic conditions, ecological features (like coral reefs, as shown in Figure 4.5), and fisheries across Tanzania's coastal waters. Furthermore, global datasets and models, such as the Allen Coral Atlas (Allen Coral Atlas (2020)), provide valuable complementary information, particularly for habitats like coral reefs where local data may be sparse.

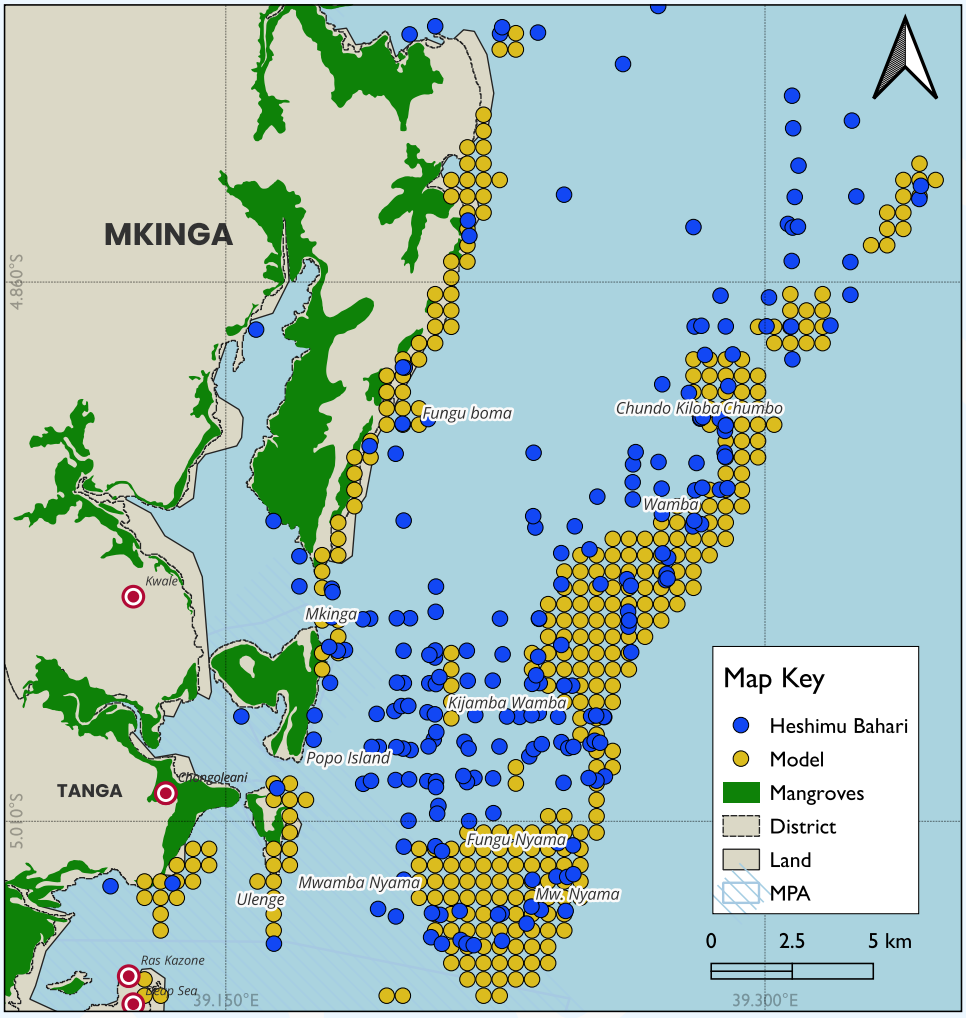

Figure 4.5: Mapped coral reef in shallow coastal waters of the northern Tanzania mainland from Heshimu Bahari Project (HB) and Model

Table 4.2 presents a compiled inventory resulting from an effort to collate key existing and newly generated datasets relevant to MSP in Tanzania, providing details on their category, source, format, and accessibility. This inventory is an ongoing process and serves as a crucial baseline for identifying remaining gaps and planning future data acquisition efforts outlined in the subsequent roadmap.

Table 4.2: A compiled list of atasets by theme

category	Dataset	Format	Coverage	Year	ownership	accessibility
BIODIVERSITY						
Critical habitats	Mangroves	shapefile	National	2012	NAFORMA	Request
Critical habitats	Mangroves	raster	National	2021	ESA	open
Critical habitats	Mangroves	shapefile	Rumaki	NS	WWF	Request
Critical habitats	Mangroves	shapefile	National	-	Global Mangrove Watch	open
Critical habitats	Seagrass	tabular	Patches	-	-	-
Critical habitats	Seagrass	tabular	National	2023	Heshimu Bahari	Request
Critical habitats	Seagrass	tabular&spatial	National	2013	Allen Coral Atlas	Open
Critical habitats	Seagrass	tabular&spatial	National	2022	Lugendo et al., 2024	Request
Critical habitats	Seagrass	raster	National	2020	Traganos et al., 2022	Request
Critical habitats	Coral reefs	tabular & spatial	Patches	-	WCS	-
Critical habitats	Coral reefs	tabular	National	2023	Heshimu Bahari	Request
Critical habitats	Coral reefs	tabular&spatial	National	2024	Lugendo et al., 2024	Request
Critical habitats	Coral reefs	tabular&spatial	Global	2013	Allen Coral Atlas	Open
Critical habitats	Coral reefs	tabular&spatial	Global	2013	Allen Coral Atlas	Open
Critical habitats	Coral reefs	tabular&spatial	Global	2013	Allen Coral Atlas	Open
Marine Managed Areas	MPAs	shapefile	Mainland	-	Marine Parks and Reserve Units	Request
Marine Managed Areas	MCA	shapefile	Zanzibar	-	MoBEF	Request
Marine Managed Areas	CFMA	shapefile	Mainland	-	MLF	Request
Marine Managed Areas	NTZ	shapefile	Patches	-	-	Not digitized
Dolphin	Dolphin sites	GPS tracks	National	-	Marine Parks and Reserve Units	Request
Whale shark	Whale sites	GPS tracks	National	-	Marine Parks and Reserve Units	Request
Sea turtle	Sea turtle	-	National	-	SeaSense	Request

Dugong	Dugong	-	National	-	SeaSense and MPRU	Request
Important Bird Areas	Bird	-	National	-	-	open
OTHER VALUES						
Ecosystem services	Mangroves	raster	Global	2000	NASA	open
Ecosystem services	Mangroves	raster	Global	2018	Harvard	open
Ecosystem services	Fringing reefs providing protection to people	-	Global	-	Ocean Wealth Atlas	Coral Reef Protection Values
Ecosystem services	Fringing reefs providing protection to economic values GDP-PPP	-	Global	-	Ocean Wealth Atlas	Coral Reef Protection Values
Ecosystem services	Fringing reefs providing protection to infrastructure/NTL	-	Global	-	Ocean Wealth Atlas	Coral Reef Protection Values
Ecosystem services	Coral Reef Tourism Value (Total)	-	Global	-	Ocean Wealth Atlas	-
Ecosystem services	Coral Reef Tourism Visitation Value (Total)	-	Global	-	Ocean Wealth Atlas	-
Ecosystem services	Coral Reef Tourism Value (On-reef)	-	Global	-	Ocean Wealth Atlas	-
Ecosystem services	Coral Reef Tourism Value (Reef-adjacent)	-	Global	-	Ocean Wealth Atlas	-
Ecosystem services	Coral Reef Fisheries: Modeled Fish Catch from the World's Coral Reefs	-	Global	-	Ocean Wealth Atlas	Coral Reef Fisheries
Ecosystem services	Mangroves fishing effort (fisher-days per year)	-	Global	-	Ocean Wealth Atlas	Mangrove Fishing Effort

Ecosystem services	Mangrove commercial fish productivity	-	Global	-	zu Ermgassen et al., 2025	data can be accessed here
FISHERIES						
Small-scale	Landing site	tabular	National	-	Ministries	Public
Small-scale	Landing site	spatial	National	-	Ministries	Request
Small-scale	Fishing grounds	spatial	National	-	TAFIRI	Request
Small-scale	Fishing grounds	spatial	National	-	ZAFIRI	Request
Small-scale	Potential fishing zones	shapefile	National	2022	TAFIRI	Request
Commercial	Potential fishing zones	shapefile	National	2022	TAFIRI	Request
Fish aggegating Devices	FAD locations	shapefile	mainland	2023	TAFIRI	Request
Commercial	Hotspot areas	shapefile	National	2022	DSFA	Request
MARICULTURE						
Finfish	Mkilfish	shapefile	Zanzibar and Pemba Channel	2022	WIOMSA/IUCN	request
Finfish	Tilapia	shapefile	Zanzibar and Pemba Channel	2023	WIOMSA/IUCN	request
Crusteans	Crab fattening	shapefile	Zanzibar and Pemba Channel	2024	WIOMSA/IUCN	request
Seaweed	seaweed farming	shapefile	Zanzibar and Pemba Channel	2025	WIOMSA/IUCN	request
Finfish and seaweed farming	both	tabular	national	2024	Heshimu Bahari	request
TOURISM						
Diving	sites	shapefiles	national	-	-	-
Dolphin and whale sites	sites	GPS track	national	-	Ministries	request
Sport fishing	sites	GPS points	national	-	-	request
Resorts	Hotels	shapefiles	national	-	MDAs	request
MARITIME						
Ports	ports	shapefiles	national	-	TPA and ZPA	request
shipping	shipping lanes	shapefiles	national	-	TASAC &	request

shipping	shipping lanes	shapefiles	national	-	IMO	Public
MINING AND RELATED ACTIVITIES						
Sand	Sand mining areas	Not available	-	-	-	-
Sand	Hard coral mining areas	Not available	-	-	-	-
Salt	Salt mining areas	Shapefile	-	-	-	-
OIL AND GAS						
Blocks	-	shapefile	national	-	PURA	request
Wells	-	shapefile	national	-	PURA	request
Pipelines	-	shapefile	national	-	PURA &EACOP	request
WASTE DISPOSAL						
Dumping	-	-	-	-	-	-
Sewage outfalls	-	-	-	-	-	-
OTHERS						
Renewable energy	-	-	-	-	-	-
Scientific research zones	Ocean Acidification sites	-	-	-	-	-
Military zones	-	-	-	-	-	-
Security zones	-	-	-	-	-	-
traditional fishing grounds	-	-	-	-	-	-
Climate resilience	-	-	-	-	-	-
COMMUNICATIONS						
Submarine cables	Internet infrastructure	-	-	-	-	-

5 Formulating Data Assessment Plan

+Implementing MSP is recognized as a complex, iterative undertaking rather than a strictly linear process. Success demands strategic planning, sustained stakeholder collaboration across all levels, the establishment of robust data foundations, adequate resource allocation, and an unwavering commitment to adaptive management informed by continuous monitoring and evaluation. Although MSP development considers key areas in the process, considering Tanzania's current legal and policy landscape and stakeholder needs, this roadmap directly builds upon the preceding analyses within this document, specifically the critical assessment of available marine spatial data (Section 3.2, Table 4.2). It proposes a strategic approach tailored to the Tanzanian context, aligning with international best practices, such as those illustrated in the MSP cycle, and national development aspirations.

+This plan clearly states the importance of data stocktaking and gap analysis, which are key in developing the MSP framework. This entails a comprehensive inventory and assessment of existing marine spatial data (ecological, socio-economic, cultural, jurisdictional), building upon the inventory presented earlier (Table 4.2). Data quality, accessibility, formats, and coverage will be evaluated against the needs defined by the MSP objectives and the data ranking framework (Table 4.1). A detailed gap analysis will pinpoint critical missing data essential for effective planning. Furthermore, a review of relevant legal, policy, and institutional frameworks will identify conflicts, overlaps, gaps, and opportunities for harmonization to enable an effective MSP process. Key outputs will be comprehensive reports on data inventory and assessment, critical data gaps, and legal/policy harmonization needs.

In essence, the conceptual framework in gant chart (Figure 5.1) provides a structured, step-by-step breakdown of the methodology for the data assessment phase. The findings in Table 4.2 and Table 4.1 explicitly link the Figure 5.1 to the inputs. The implementation detailed in the Gantt chart outlines a methodical approach for this data assessment phase, involving the following key steps:

1. Data Stocktaking and Inventory: Systematically compiling existing marine spatial data relevant to Tanzania's MSP needs, building upon the initial inventory presented.
2. Data Assessment: Evaluating the collected data based on quality, accessibility, format, and spatial/temporal coverage. This assessment is guided by the defined MSP objec-

tives and the previously established ranking criteria (Economic Value, Ecological Risk, Urgency).

3. Gap Analysis: Identifying critical data deficiencies by comparing the available data against the requirements for effective MSP.
4. Legal and Policy Review: Analyzing relevant legal, policy, and institutional frameworks to understand constraints, overlaps, and opportunities for harmonization that support data sharing and MSP implementation.

The schematic plan illustrated in Figure 5.1 provides a timeline and structure for these interconnected activities. Successfully completing this data-focused phase is positioned as essential for addressing current limitations and providing the necessary groundwork before moving into broader MSP development and implementation stages in Tanzania.

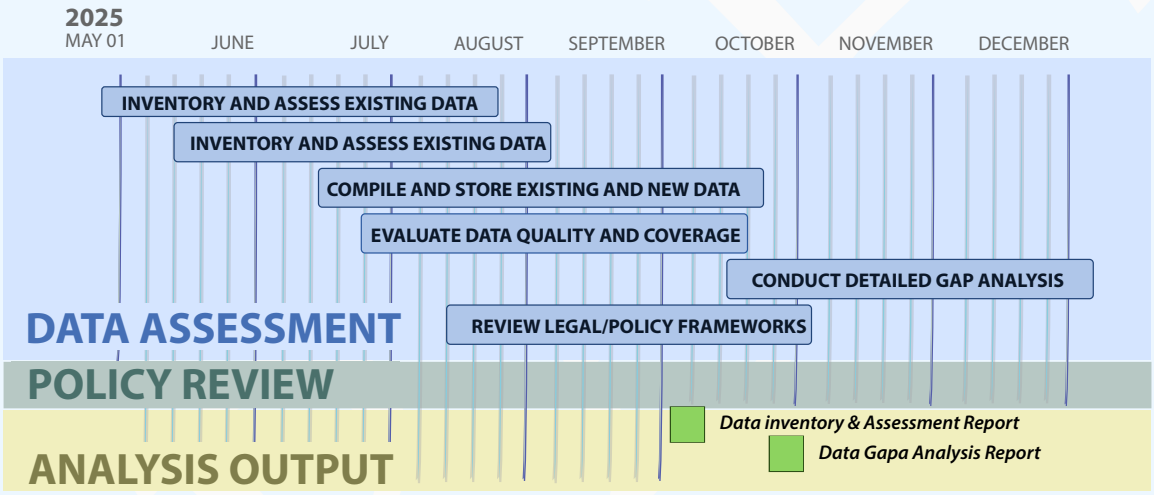

Figure 5.1: The timeline of marine data inventory, compilation, and data gap analysis for Marine Spatial Planning process in Tanzania

+In conclusion, this phase of the roadmap concentrates on establishing a robust data foundation through a structured assessment plan. By systematically undertaking data stocktaking, inventory, quality assessment, gap analysis, and a review of the legal and policy landscape, as outlined in the Gantt chart (Figure 5.1), critical data limitations may be addressed. Completing this work is important because it provides the essential evidence base and clarity required to effectively advance towards the subsequent, broader stages of Marine Spatial Planning development and implementation.

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