

Draft strategy skeleton for the development process of a Western Indian Ocean Information Management System:

Feedback Recommendations

Note:

This is a shared and living document which **can be edited by multiple persons** at the same time. Please **use caution not to delete/modify other contributions.**

Feedback Guideline:

- Please **write your initials or name in the comment boxes you use to comment sections of the text**
- If you would ask for major revisions for parts of the text, please highlight the section in question and make a comment with your suggestions for change
- Please be constructive and recommended alternatives to the sections you want modified / deleted.

Core Strategy:

1. Introduction

- a. Vision:** "To use information in the Western Indian Ocean to its fullest potential by making it available in a timely manner and in an accessible form(at) to Nairobi Convention member states"
- b. Overall Objective:** "To develop a comprehensive and integrated ocean information management system, transparently serving the broad and diverse governance needs of Nairobi Convention member states ."
- c. Definition of Data, Information and Knowledge**
- d. Strengths and Weaknesses of current situation**
 - i. Support evidence-based decision-making
 - ii. Harmonise data and information collection process
 - iii. Support regional processes for data collection
 - iv. Regional cross-learning and capacity development
 - v. Proper coordination and integration of efforts
 - vi. Enhance regional monitoring and comparability of data and information
 - vii. Increases ease of communication across member states and between stakeholders
 - viii. Ownership and acceptance-most of these systems are owned by individual institutions and with this comes the issue of trust etc
 - ix. Lack of interoperability standards-this makes data exchange difficult or limited

- e. Principles of the IMS:**
 - i. Value information as a decision-making asset
 - ii. Actively promote the sharing of information and collaboration on information sharing
 - iii. Provide high quality, timely and relevant information services
 - iv. Build an IMS that supports accountability and compliance
 - v. Provide a trusted source of information to relevant roles
 - vi. Promote standardisation and consistency in IM
 - vii. Ensure data sovereignty and ownership
- f. Mandate for the IMS process**
 - i. NC-COP, SDGs and other regional commitments
 - ii. Brief acknowledgment of other existing initiatives, programmes, etc.

2. Core components

- a. Information / Data governance**
- b. Information / Data ownership and stewardship**
 - i. Access rights
 - ii. Server location and administration
- c. Information / Data collection**
 - i. Regional focus topics
 - ii. Regulations on data collected in the region (also by foreign institutions)
 - iii. Collection standards
- d. Data and metadata quality management**
 - i. Relevant standards
 - ii. Application and implementation of ISO19115 to all data. Develop a minimum metadata standard based on ISO19115.
 - iii. Regional agreements
 - iv. Information flow diagrams
 - v. Details regulated in technical annexes
- e. Technical data security**
 - i. Infrastructure
 - ii. Access (protection)
 - iii. Data maintenance (by the owner)
- f. Analytical tools and visualization for policy support and management decisions**
 - i. Automated reporting
 - ii. GIS integration
- g. Data sharing and retention**
 - i. Technical requirements
 - ii. Relevant policies and regional agreements
 - iii. https://docs.google.com/document/d/1S9qqCyJaABRbA3_FtgMZ-g7eoSkjJpBh/edit?usp=sharing&oid=107455747843258888661&rt=pof=true&sd=trueDOIs
 - iv. Data embargoes

- v. Data disposal
- h. Open data principles**
 - i. FAIR
 - ii. CARE
 - iii. TRUST
- i. Capacity development**
 - i. Human capacity to collect, manage, analyse and disseminate information/data in the region increased
 - ii. Institutional capacity to deal with increasing amounts of information and information (big data) governance
 - iii. Political capacity to incorporate increasing amounts of information into decision-making → adaptive ocean governance

3. Strategy Implementation

- a. Establish coordination networks for technical dialogues and alignment of policies
- b. Identification of **financing opportunities** - including sustainable budgets for long-term operation
- c. Specification of the means to **monitor and report** on the IM system development, implementation and operation
- d. **Capacity exchange and development** pathways identified (training of personnel, T3 server facilities)
- e. Determine feasible and sustainable IT infrastructure renewal cycles

Annex and Supporting Documents

4. Technical guidelines for system implementation

- a. Training manuals data management
- b. Technical manuals on data sharing (APIs, chosen standards)
- c. Policy documents on data sharing (regional agreements to be developed)

■ **Dedicated human capacity and resources**

■ **IT infrastructure renewal cycles**

■ **Tier 3 server facilities**

d.

5. Acknowledgment of existing national and/or regional Activities, Initiatives and Developments

Regional:

- a. Nairobi Convention Clearing House Mechanism
- b. WIO-Symphony
- c. CEDARE
- d. MASPA-WIO
- e. ODINAfrica
- f. Regional Resource Hub (BIOPOAMA)
- g. To be continued

National:

- h. National legislations
- i. OCIMS
- j. NODC
- k. SibMOZ
- l. To be continued

6. Regional challenges, needs and opportunities regarding information management – Full analysis

Regional information management and data sharing are critical for effective ocean governance of the Western Indian Ocean. The Western Indian Ocean region is home to a diverse range of marine ecosystems and abundant resources, while it is simultaneously faced with a range of challenges, including climate change, overfishing, and pollution. Effective ocean governance in this region requires access to accurate, up-to-date information on the state of the ocean and the activities that are taking place within it. However, there are several challenges that organizations face when it comes to sharing and managing ocean-related information in this region. Those challenges were identified through consultation processes with Nairobi Convention Focal Point representatives and other state and non-state actors during events facilitated by the Nairobi Convention Secretariat.

One of the **key challenges in regional information management and data sharing is data silos and lack of institutional harmonisation**. Without standardization and interoperability in data systems, it can be difficult for different organizations to find, share and access ocean-related data. This can hamper coordination among organizations and access to relevant information that is needed for effective ocean governance. To overcome this challenge, organizations must promote data standardization and interoperability by encouraging the use of common data standards and protocols for marine and ocean data.

Another challenge is **data quality**. Ensuring the quality, accuracy, and completeness of ocean-related data is crucial for effective decision-making. However, maintaining data quality can be challenging, particularly when data is being shared across different organizations with different systems and processes. Organizations must establish rigorous quality control procedures to ensure that the data they are using is accurate, complete, and relevant.

Data security is also a critical challenge in regional information management and data sharing. Data sharing between organizations can increase the risk of data breaches and unauthorized access to sensitive information. Organizations must develop and implement robust data security measures, including encryption, authentication, and access control, to protect ocean-related data from unauthorized access and data breaches.

Legal and regulatory compliance is another challenge in regional information management and data sharing. The Western Indian Ocean region is made up of several countries with different laws and regulations. Organizations must navigate these different laws and regulations to ensure that they are complying with all the relevant requirements when sharing ocean-related data.

Data ownership and control is another important challenge in regional information management and data sharing. Determining who owns and controls the ocean-related data being shared, and how it can be used, can be a challenge. Organizations must establish clear policies and procedures for data ownership and control to ensure that ocean-related data is used ethically and legally.

Data governance is a key challenge in regional information management and data sharing. Effective data governance is crucial for ensuring ocean-related data is managed effectively, and that data policies, procedures, and standards are adhered to. However, data governance can be complex, particularly when data is being shared across multiple organizations. Organizations must establish effective data governance frameworks that include policies, procedures, and standards for managing ocean-related data throughout its lifecycle.

Setting up the **technical infrastructure** to support such information management systems on both national and regional scales can additionally pose challenges in terms of the actual IT infrastructure, as well as human capacities and the necessary strategy to support and maintain such systems overall. As contracting parties to the Nairobi Convention are at different stages of setting up their national infrastructure, regional exchanges on best practices and capacity are suggested to harmonise efforts across the WIO region.

7. Information needs – Full analysis

Key stakeholder consultations conducted in 2022 revealed several priority areas in terms of a harmonized information management system for the Western Indian Ocean. We also asked for the type of information that would enable contracting parties and other stakeholders to gain an extensive overview into the state of the Western Indian Ocean and its coastal waters. Addressing those key information needs can also garner support for a system collecting and handling those types of information on a regional level.

Fisheries:

It is crucial to have access to timely and accurate information in order to effectively manage the fishery resources in the area. We identified several critical information needs that must be met in order to ensure sustainable and responsible fisheries governance:

First and foremost, **stock assessments** are essential in determining the status and sustainability of fish populations. This information helps to ensure that the fishing pressure on these populations is appropriate and does not lead to their decline.

In addition, it is important to **monitor catch data** in order to track changes in fish populations and assess the impact of fishing on these resources. This data helps to determine if the fishing practices are sustainable and if measures need to be taken to reduce the impact of fishing on the environment.

Fishing effort data is also critical in evaluating the impact of fishing on the ecosystem. This information allows experts to assess the fishing pressure and make recommendations for optimizing fishing gear types and minimizing bycatch. In that regards gear selectivity information is equally important as it helps to optimize fishing gear and minimize the impact of fishing on non-target species. This information is crucial in ensuring that fishing practices are sustainable and do not lead to the decline of other species in the ecosystem.

Moreover, **economic and social data** is also essential in understanding the impact of fishing on coastal communities. This information helps to assess the economic benefits of fishing, as well as its impact on the livelihoods of local people.

Climate change is also a major factor in the western Indian Ocean region and it is important to understand its impact on fishing and fish populations. This information is crucial in helping experts to develop strategies to mitigate the impacts of climate change on fishing and to ensure sustainable practices in the long-term.

A profound knowledge and monitoring of **Market information** is also critical in understanding the demand for fish and identifying market opportunities. This information helps to ensure that fishing practices are economically viable and can support the livelihoods of coastal communities.

In conclusion, **compliance and enforcement data** are also essential in monitoring compliance with fishing regulations and enforcing conservation measures. This information helps to ensure that fishing practices are sustainable and that conservation measures are effectively enforced. Overall, these key information needs are critical in ensuring responsible and sustainable fishing practices in the western Indian Ocean region.

Tourism:

The tourism sector is a key industry in many countries of the Western Indian Ocean and of key interest in sustainably development and income alternative. A, especially in rural areas. While it can provide those important livelihood alternatives it is also important to recognise the negative impacts excessive tourism development can have both on local communities and the environment. A regional information management system with harmonised

data collection and visualisation protocols can support a sustainably managed tourism sector in WIO region.

First, understanding the **impact of tourism on the natural environment** is critical. This requires conducting environmental impact assessments to identify any negative impacts that tourism may have on the region's ecosystems and natural resources. This information can help inform policies and regulations to mitigate these impacts and promote sustainable tourism practices. On a regional level it will be crucial to harmonise those efforts to produce compatible and comparable datasets across boundaries.

It is also equally important to **understand and manage the impact of tourism on local communities and cultures**. Socio-cultural assessments can help identify any negative impacts on local cultures and ways to mitigate these impacts, preserving the region's cultural heritage, areas of cultural significance and supporting the well-being of local communities.

Additionally, **monitoring socio-economic factors** of tourism is critical in understanding and quantifying the economic benefits and costs of tourism to the region. This information can help policymakers make informed decisions about how to best allocate resources and support sustainable tourism practices.

Finally, **involving local communities and other stakeholders** in the tourism planning process is critical to ensuring equitable benefits and sustainability. They often possess a vast knowledge of the local environment and areas of cultural importance, thus their wisdom is of great value in decision-making processes. Stakeholder engagement and a sound information basis can ensure that the needs and concerns of local communities are considered and addressed in the development of sustainable tourism practices.

All that combined **information can streamline the development of effective tourism policies and regulations** to ensure sustainable tourism practices. This includes measures to reduce the negative impact of tourism on the environment and local cultures, as well as ensuring compliance with these policies and regulations.

Maritime Security:

Ensuring maritime security is a crucial national and regional responsibility. Effective policies and strategies for maritime security require access to key information that can inform decision making and guide resource allocation.

Up to date situational awareness is critical to effective maritime security. This requires access to **real-time information on shipping traffic**, e.g. vessel type, flag, cargo, and destination. This information can help to identify potential security threats and support planning efforts, risk assessment and decision-making.

Understanding the **threats to maritime security** is critical to developing effective policies and strategies. This requires access to intelligence on criminal and terrorism-related activities, including the flow of illicit goods, human trafficking, piracy, and illegal fishing. Having a combined regional information basis helps to inform the development of policies and strategies

to address these threats and promote maritime security in the Western Indian Ocean.

From an economic perspective it is important to have **data on maritime resources and assets**, including information on the location and condition of ports, harbors, and other coastal resources and infrastructure. This information can help to assess the vulnerability of these assets and inform policies and strategies to protect them from threats to maritime security.

Climate Change:

Addressing the impacts of climate change and providing meaningful mitigation measures will be a key priority in the near future, as especially the island countries in the Western Indian Ocean will be strongly affected by the climate crisis. To make informed decisions and allocate resources effectively, decision-makers need access to key information on these complex and interrelated issues. In this context, a harmonised and accessible information management system can collate and provide essential information from Nairobi Convention member countries. A solid data foundation will also make more accurate predictions on future developments possible. Stakeholder consultations revealed a few focus areas when it comes to concrete information needs in terms of climate change impacts and mitigation measures:

Understanding the **impacts of climate change on the ocean and coastal communities** is essential. This requires access to data on relevant ocean variables, including temperatures, pH, sea level rise, and the impacts of these changes on marine ecosystems, including coral reefs, mangroves, seagrasses, fish populations, and coastal communities. This information can help develop scenarios for future developments and to inform policies and strategies to improve mitigation efforts and promote climate resilience in the region.

It is important to have **information on the emissions of greenhouse gases**, both locally and globally, as well as the impacts of these emissions on the region. This requires access to data on the energy consumption and production, transportation, and land use patterns of the region and their contribution to global emissions. In the context of **carbon credits or offsetting schemes** knowledge of land-use cover and ecosystem types can establish the potential for such schemes in the region.

A unified information management system can also assist in **monitoring and tracking the implementation of international climate agreements**, such as the Paris Agreement, is critical to ensuring effective action on climate change. This requires regional access to data on the implementation of these agreements, including information on the progress of countries towards their Nationally Determined Contributions (NDCs). This process would be greatly simplified with shared system based on international standards.

Finally, **stakeholder engagement and participation** is critical to effective action on climate change. This requires engaging with communities, industry, and other stakeholders to understand their perspectives and concerns and to involve them in the development and implementation of climate policies and

strategies. In that regard the envisioned system could act as an information and outreach tool for interested stakeholders and citizens.

Pollution:

With growing economies and an expanding tourism sector many countries in the Western Indian Ocean face the issue of increased pollution of coastal and marine waters. To initiate concerted, regional efforts a sound information basis is needed. The proposed information management system can provide the necessary platform to collect, collate and synthesise existing information and provide harmonised protocols for the collection of new data. It can also assist in visualising existing information and connect it to e.g. changes in ecosystem status. Some key information to be collected, visualised and shared through the proposed information management system could include:

Monitor and disseminate key types of pollutants which threaten coastal ecosystems in the WIO region. Combined with the status of key ecosystems this could help inform coastal development and management decisions. Additionally georeferenced **sources of pollutants** could be monitored across the region to assist designate protected areas or tourism zones.

Ecosystem services and conditions of key ecosystems:

Understanding the **current status and health of key ecosystems** in the WIO region, such as mangroves, seagrass beds, and coral reefs, is essential in many aspects of coastal and marine governance. A regional information management system can facilitate decision-making by providing access to data on the extent and distribution of these ecosystems, as well as their structure, function, and biodiversity. This information can inform the development of policies and strategies to protect and conserve these ecosystems and ensure their ecological integrity. Combining this information with other data collected in the information management system also allows for the visualisation of synthesized maps including several parameters connected to ecosystem status.

It is also important to have information on the **impacts of human activities on these ecosystems**, including fishing, coastal development, and pollution. This requires access to data on the intensity and extent of these impacts, as well as their effects on the structure and function of the ecosystems. This information can inform the development of policies and strategies to reduce these impacts and promote sustainable use of these ecosystems. Within the scope of the planned information management system this data could also be used to inform the interested public, either directly through portal applications or by supporting outreach campaigns.

Another use case of the planned IM system is monitoring and tracking the regional implementation of conservation and protection measures, which is critical to ensuring the effectiveness of these efforts. Examples are cross-boundary conservation areas or MPAs spanning several countries. This requires access to data on the implementation of conservation and protection

measures, including the effectiveness of marine protected areas, the progress of conservation initiatives, and the status of enforcement efforts.

Stakeholder engagement, participation and outreach are again critical to effective conservation and protection of key ecosystems. This requires engaging with coastal communities, industry, and other stakeholders to understand their perspectives and concerns and to involve them in the development and implementation of conservation and protection policies and strategies.

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1.1. **Data users and providers**

1.2. **Capacity needs**

- Dedicated personnel specialised in data curation, data management, system administration, frontend developers, database administrators etc.
- data sharing and management skills
- data collection tools
- training for data center employees
- communication skills for outreach and awareness activities