

**A Western Indian Ocean  
Information Management Strategy (IMS)**

**January 2024**

## Information Management Strategy for the Western Indian Ocean region

### Executive Summary

The **overall goal** of the Information Management Strategy (IMS) is to provide a framework on how marine related information in the Western Indian Ocean (WIO) can be best collected, stored and analysed for evidence-based decision making from the local to the regional level. The **vision** is to make information from a wide set of local and regional initiatives available and improve settings for data sharing, harmonizing policies and legislation where relevant and access to existing databases.

**Background of the IMS:** The WIO countries, committed to generate information to support decision-making for governments and other stakeholders, initiated the Knowledge Management Strategy and Clearing House Mechanism in 2006. The heightened demand for marine and coastal governance further led to the collaboration between the Nairobi Convention (NC) Secretariat and the German Society for International Cooperation (GIZ) under Western Indian Ocean Governance Initiative (WIOGI) project to support the development of the Information Management Strategy(IMS).

The **IMS development process**, led by a multi-stakeholder working group, unfolded through dynamic participation in technical webinars, with support from the Collective Leadership Institute (CLI) and Leibniz Centre for Marine Tropical Research (ZMT). The IMS reflects co-creation through vibrant interactions of regional experts in technical dialogues and dedicated writeshop workshops. The final draft is set for adoption at the 11th Conference of Parties (COP) in Q2 2024, underscoring the commitment to inclusivity and stakeholder-led prioritization in shaping the strategy.

**Linking to the Regional Ocean Governance Strategy (ROGS)**, the IMS plays a pivotal role, aligning strategically with ROGS and establishing a synergistic link between scientific insights and policy development. Together, they create a cohesive framework for responsible and sustainable ocean governance and management.

The **content of the IMS**, meticulously structured, includes: **(1) An introduction** presenting the background and vision; **(2) Core components** on governance, standards, regulations, the WIO data platform, and capacity development; and **(3) Strategy implementation** milestones. Central to the IMS, **the WIO data and information platform** ensures FAIR handling of content, fostering transparency and reliability. **Capacity development** is also crucial, targeting human and institutional capabilities, with a focus on political capacity through summaries and awareness programs. The IMS recognizes the interconnectedness of economic, social, and earth systems, aligning with the broader goals of the ROGS, and aiming for a harmonious relationship between economic activities, societal well-being, and environmental sustainability through responsible management.

- **Technical Infrastructure and Security:** IMS proposes a secure, centralized database infrastructure with a versatile framework able to accommodate data storage at both national and regional levels, promoting data exchange and ensuring the reliability of datasets.
- **Governance and Oversight:** The IMS suggests the establishment of a Regional Steering Committee with balanced representation from WIO countries, ensuring knowledge transfer and transparency.
- **Data access and Licensing:** Acknowledging the varying sensitivity of datasets, the IMS suggests implementing user authentication mechanisms on the WIO data platform. The IMS recognizes the importance of data sovereignty and ownership, respecting the rights of states, communities, and individuals over their data.
- **Capacity development:** The IMS underscores the significance of human, institutional, and political capacities for the successful implementation of the strategy. The goal is to empower stakeholders with the skills necessary to navigate the intricacies of the IMS, ensuring its sustainable and effective implementation.

**Lessons learned** in developing the IMS<sup>1</sup> emphasize the pivotal roles of political will, a clear mandate, and sustained capacities in effective regional processes. The comprehensive narrative highlights the nuanced understanding of the WIO IMS, its participatory development, and strategic integration with ROGS, aspiring to establish a trusted information repository for the region, fostering transparency in ocean management.

---

<sup>1</sup> Available at: [Co-creating an Information Management Strategy for the Western Indian Ocean through a Multi-stakeholder Working Group | PANORAMA](#)

## List of Abbreviations

BMZ	German Federal Ministry of Economic Cooperation and Development
CARE	Data principle: Collective benefit, authority to control, responsibility, ethics
CLI	Collective Leadership Institute gGmbH
DOI	Digital Object Identifier
EAF	Ecosystem Approach to Fisheries
FAIR	Data Principle: Findability, Accessibility, Interoperability, Re-Usability
FARI	Forum of Academic and Research Institutions
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
IMS	Information Management Strategy
IOC-UNESCO	Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization
ISO	International Organization for Standardization
IUCN	International Union for the Conservation of Nature
MEDA	Marine Ecosystem Diagnostic Analysis
MSWG	Multi-Stakeholder Working Group
MUHAS	Muhimbili University of Health and Allied Sciences
NC	Nairobi Convention
ROGS	Regional Ocean Governance Strategy
SSL/TSL	Secure Sockets Layer/Transport Layer Security
TRUST	Data Principle: Transparency, Responsibility, User Focus, Sustainability, Technology
WIO	Western Indian Ocean
WIOMSA	Western Indian Ocean Marine Science Association
ZMT	Leibniz Centre for Tropical Marine Research GmbH

## Table of Contents

<b>1. Introduction - towards a common information management in the WIO region</b>	<b>6</b>
1.1 Vision and Objective	6
1.2 Data and Information in the WIO region	6
1.3 Guiding Principles of the IMS	7
1.4 Mandate for the IMS development process	8
<b>2. Core Components of WIO regional information management - Where to start</b>	<b>9</b>
2.1 Governance and Stewardship	9
2.1.1 Developing a governance structure	9
2.1.2 Stewardship and team organization	10
2.1.3 Regional Focus Topics	10
2.2 Standards and Regulations	10
2.2.1 Securing Data & Information Ownership	10
2.2.2 Regional Data Collection Standards and Regulations	11
2.2.3 Regional Data Sharing Agreement	11
2.2.4 Metadata Quality Management	12
2.3 WIO data and information platform	13
2.3.1 Technical Requirements	13
2.3.2 Secure Technical Infrastructure	13
2.3.3 Levels of Access	14
2.4 Capacity Development	14
2.4.1 Fostering human capacity through regional management and networks	14
2.4.2 Strengthening Institutions and supporting political decision-makers	15
<b>3. Strategy Implementation - The Way Forward</b>	<b>17</b>
3.1 Visualization of key milestones for IMS Implementation	17
3.2 Critical focus topics for the IMS implementation	18

## 1. Introduction - towards a common information management in the WIO region

### 1.1 Vision and Objective

The collection of marine and coastal scientific data and information is a costly and demanding process. Preventing data loss, securing adequate and timely storage, maintenance and exchange on national and regional level to inform ocean governance is an ongoing challenge. To adequately assess the status of data and information quality for the purposes of robust decision-making and management of coastal and marine ecosystems in the Western Indian Ocean, we need to gather and manage timely, accurate and high-quality information from a broad range of sources. Additionally, there is a need to establish mechanisms for exchange of data, following established international standards and experiences to foster interoperability. This can be achieved through a review and implementation of policies and technical data management standards, storage, analysis, presentation, exchange, restitution, as well as through continuous dialogues, coordination and communication among all relevant stakeholders in the region.

The Vision...	The Overall Objective...
...is 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.	...is to develop a comprehensive and integrated ocean information management system, transparently serving the broad and diverse governance needs of Nairobi Convention member states.

### 1.2 Data and Information in the WIO region

In the context of the Information Management Strategy (IMS) document, data and information are understood as follows:

**Data:** In the context of coastal, marine and ocean governance or research, data refer to various raw observations or measurements collected from the coastal and open ocean ecosystems of the Western Indian Ocean using standardized scientific methods. It could include data on sea surface temperature, salinity, dissolved oxygen levels, nutrient concentrations, fish population counts, composition of ecological communities, pollution levels in a particular region of the ocean, and further data on the human coastal population, livelihoods, fisheries, tourism, shipping, and other marine-related economic activities.

**Information:** Turning the data into meaningful information involves processing, organizing, and analyzing the collected data. For instance, researchers might analyze the collected data on sea surface temperature, salinity, and nutrient concentrations to identify patterns or trends. They may categorize the information into different regions or time periods, analyze the relationships between different variables, or create maps and graphs to visualize the data. Information can also include international and national regulations, and policies related to ocean governance, conservation, and management when it is necessary for compliance and decision-making.

Drawing on the mutually supportive  
**Regional Ocean Governance and Information Management Strategies**  
(ROGS & IMS), diverse, multi-stakeholder and multi-level WIO actors can  
help enhance...

---

- ... Ocean Governance **decision-making** processes
- ... Enable a more **inclusive and equitable ocean governance**
- ... Identify **key areas and data gaps** for information needs to support policy processes & strategies' implementation
- ... Setting baseline and **tracking progress** toward shared information management & ocean governance goals

### 1.3 Guiding Principles of the IMS

At the heart of this Strategy lie key guiding principles, each instrumental in shaping our approach to improved ocean governance in the Western Indian Ocean.

**1) Actively promoting data and information sharing and collaboration** lies at the core of this Strategy. The IMS encourages regional information exchange among all stakeholders, acknowledging the power of synergy in achieving the shared objective of effective regional ocean governance<sup>2</sup>.

**2) Information is a vital decision-making asset.** This strategy recognises the value of evidence-based, data-informed policies and decision-making processes, and it therefore places a premium on the standardized and secure regional management of high-quality data and information.

**3)** The strategy encourages providing **high quality, timely, and relevant information services**, ensuring that decision-makers have access to the best possible data at the right time, and that these data are meaningful and actionable in the context of their specific needs.

**4)** The IMS has been designed to **support accountability and compliance** with the proposed data and information management team poised to center metadata standards, quality assurance and policy guidelines, in accordance with the **FAIR<sup>3</sup>, CARE<sup>4</sup> and TRUST<sup>5</sup> principles**. The strategy allows for robust oversight of governance actions, encouraging transparency and responsibility in the management of the region's precious marine resources.

---

<sup>2</sup> see Regional Ocean Governance Strategy (ROGS) for the Western Indian Ocean

<sup>3</sup> see <https://www.go-fair.org/fair-principles/>

<sup>4</sup> see <https://www.nature.com/articles/s41597-021-00892-0>

<sup>5</sup> see <https://www.nature.com/articles/s41597-020-0486-7>

**FAIR Principles** focus on technical aspects of data storage and emphasize the capacity of machine-actionability with stored content.

**F** Findability  
**A** Accessibility  
**I** Interoperability  
**R** Re-Usability

**CARE Principles** specify that Indigenous data should benefit Indigenous communities that are related to the origin of the data.

**C** Collective Benefit  
**A** Authority to Control  
**R** Responsibility  
**E** Ethics

**TRUST Principles** relate to the ability of digital repositories to provide a trustful and long-term service to their users.

**T** Transparency  
**R** Responsibility  
**U** User-Focus  
**S** Sustainability  
**T** Technology

5) This strategy aims to facilitate **a trusted source of data and information for all relevant roles, from policymakers and scientists to local communities and industries.**

6) The strategy recommends promoting **standardization and consistency in data and information management and making use of data management plans.** This ensures compatibility and comparability of data across different domains, geographical areas, and time periods, thereby facilitating integrated and cohesive governance.

7) Finally, the strategy **recognizes the importance of data sovereignty and ownership.** It respects the rights of states, communities, and individuals over their data, and it implements mechanisms to ensure that these rights are safeguarded.

Through these guiding principles, the IMS seeks to foster an environment where data and information are leveraged to their full potential, thereby facilitating efficient and effective ocean governance in the Western Indian Ocean.

#### 1.4 Mandate for the IMS development process

The Nairobi Convention Contracting Parties have on several past decisions recognized that knowledge derived from the accessible data and information will enable stakeholders in the WIO region to inform policy decisions, such as designating marine protected areas or implementing regulations to mitigate the impacts of human activities on vulnerable marine species. This knowledge empowers stakeholders in ocean governance and research to gain valuable insights and actively contribute to informed decision-making and sustainable practices in the marine environment.

In 2004 the Nairobi Convention Contracting Parties in decision COP 4/8 tasked the Convention's Secretariat with the responsibility of establishing an information system to meet their needs in implementing the Convention. This led to the development of a Knowledge Management Strategy in 2006 which designated the Clearinghouse Mechanism (CHM) as the regional mechanism of disseminating information of project activities, initiatives, collaborations and stakeholders.

Building on these earlier efforts, at the [10th Conference of Parties](#)<sup>6</sup> held in November 2021, the Contracting Parties recognized the importance of and made a commitment to develop an

---

<sup>6</sup> <https://www.nairobiconvention.org/nairobi-convention/who-we-are/conference-of-parties-cops/10th-conference-of-parties/>



Information Management Strategy (IMS) for the Western Indian Ocean (WIO) region under Decision CP.10/5.

The Nairobi Convention Secretariat is partnering on a project implemented by GIZ on behalf of the German Federal Ministry of Economic Cooperation and Development (BMZ), titled the “Western Indian Ocean Governance Initiative” ([WIOGI](#)<sup>7</sup>), with the support of the Centre for Tropical Marine Research (ZMT) and the Collective Leadership Institute (CLI) through collaboration.

WIOGI’s approach in developing the IMS is participatory, regional, multi-sectoral and multi-stakeholder. **One of the primary components of WIOGI is the development of two strategies – a regional ocean governance strategy (ROGS) and an information management strategy (IMS).** The process of developing the IMS consisted of a series of stakeholder engagements and dialogue, accompanied by technical guidance on information and data management, and its relevance in ocean governance.

## 2. Core Components of WIO regional information management - Where to start

Regional experts discussed in multi-stakeholder working group meetings the main components which will be necessary to consider and establish in order to reach the goals and vision presented in the introduction. This section will present these core competencies and their interdependencies. These components are valuable for the development of an information management system for the WIO region, and can also be seen as areas of support for future projects in relation to data and information management.

### 2.1 Governance and Stewardship

Comprehensive data and information governance and stewardship are crucial for the future of the WIO countries in today’s data-driven world. A trustful governance structure is necessary to establish trust. Based on a transparent multi-stakeholder approach, it will encourage data sharing, promote data standards and collaboration. Effective stewardship is key to providing long-term professional and informative support.

#### 2.1.1 Developing a governance structure

To address these goals, a **multi-level governance approach** should consider a differentiation of responsibility on regional, national and local levels (see *fig. 1*). A regional mandate for data and information governance is necessary for overview of existing workflows and standardized approaches towards data and information management. The governance body can be a **regional steering committee that ensures balanced representation from all WIO countries**. In compliance with the IMS guiding principles (see 1.3), this committee would oversee the regional development and implementation of standardized workflows in the data and information management. The Nairobi Convention Secretariat is most suitable to host the governance body permanently, as a regional institution that is trusted by all WIO countries.

**Trust** is the foundation of successful data sharing and utilization. Mechanisms must be prioritized to ensure trust of all involved stakeholders towards the established information management system. The governance structure needs to apply **FAIR, CARE and TRUST** principles, and aim for reliability, accuracy, and ethical use of shared data and information.

---

<sup>7</sup> <https://www.giz.de/en/worldwide/86750.html>

Protocols should verify data sources, guarantee security, and protect ownership and usage rights.

### 2.1.2 Stewardship and team organization

A transparent and trusted **data and information stewardship** is vital for the successful regional information management system. Established stewardship can facilitate the implementation of the guiding principles ([see 1.3](#)) while keeping the IMS vision and regulations (see 1.1) in focus.

The **stewardship** should be **established as long-term positions at the level of the WIO region** within the structure of the Nairobi Convention. This will ensure the **sustainability of the information management system**. The WIO stewards should, on the one hand, cooperate with the regional steering committee for data and information governance, and on the other hand, coordinate the operationalization of the regional data and information management in practice. They will be responsible for implementation and updating the **quality and standardization** of the data and information management workflows. Supporting reporting mechanisms through Focal points and national institutions can be valuable in order to empower national data centers to validate data quality on national level before data is shared regionally.

The WIO data platform (see 2.3 for details) will **require reliable and consistent technical development and support, and data curation**, therefore a team covering the tasks of technical engineering and a data curation should be established to support the activities coordinated by the data stewards with their expertise.

### 2.1.3 Regional Focus Topics

Research and sustainable resource management in the WIO region require a comprehensive data and information catalog with a targeted focus on **key data sources**. Available data and information on ecological, social and economic aspects are **essential for all WIO countries, and** therefore the regional information management needs to develop linkages to primary data collectors. Collective interest is based in the **shared use of the same ecosystems and blue economy**. Hence, the main focus lies primarily (but not exclusively) in the collection, curation and referencing data and information within **coastal, marine and ocean-related topics**. Beyond, the information management system should be flexible to integrate various types and topics of data and information originating from the WIO.

## 2.2 Standards and Regulations

### 2.2.1 Securing Data & Information Ownership

It is important to ensure **protection of ownership rights of WIO local data collectors, while simultaneously enhancing collaboration with partners** within and outside the WIO region. Ownership rights need to be clearly stated for all entries (datasets and information files) listed on the WIO platform ([see 2.3](#)). Depending on the nature and sensitivity of the data, levels of access and rights for different users should be defined by data collectors/owners when sharing their data and information on the WIO platform. **Copyright and licensing** are essential for

safeguarding data and information. Legal and policy frameworks that **protect owner rights** and ensure proper attribution need to be adopted by the WIO stewardship and enforced with the support of the steering committee. **WIO stewards should promote and support the FAIR publication of data and information** in suitable **TRUSTed** long-term repositories, which will enhance acknowledgement of data ownership by assigned DOIs to datasets.

### 2.2.2 Regional Data Collection Standards and Regulations

Data and information collection is the base for data analysis and knowledge development: Investment in human resources and capacity development including training on standardized methods in the region is necessary.

Collected data needs to comply with existing **standards for data collection methods and practices**. Necessary for this goal is: a regional data management plan monitoring the planned and executed (short and long-term) data collection activities, including necessary metadata standards, harmonization of reporting metrics, and provision of adequate storage facilities for collected datasets. The IOC-UNESCO and EAF-Nansen survey protocols can serve the steering committee as best practices for the overview of the WIO collection standards. Existing regulations, such as the *IUCN Red List*, or the *Principles for ecosystem restoration to guide the United Nations Decade 2021–2030*, can serve as valuable frameworks and be applied as regulations within the WIO information management system when suitable for the key data topics.

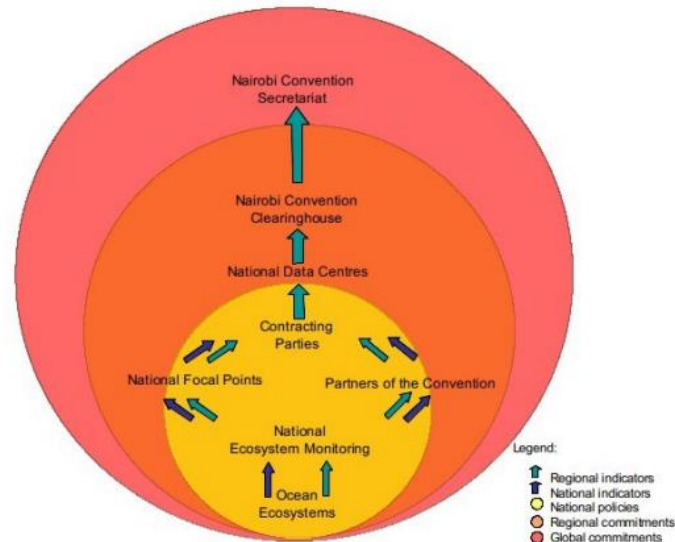
### 2.2.3 Regional Data Sharing Agreement

A **data sharing agreement regulating the terms of use and the sharing of data, information and metadata within the WIO region** ideally needs to be in place. Its task is to provide transparency on how the content in the WIO data and information platform (see 2.3) will be handled and **build trust with data owners as well as data users**. For the development of the data sharing agreement, the steering committee and the data management team can start with the following points and include further aspects:

- information on which content is stored by the WIO platform
- what users' data is stored during the user registration process (if this should be introduced)
- information about the backup and security of the WIO platform
- information on where the servers with the stored content are (country level)
- information about which content (of harmful nature) is not to be stored on the platform
- information on ownership, information on how the platform processes the data (visualization in a catalog, storage)
- differentiation of cases requiring full data and metadata storage and cases requiring metadata storage with reference to the data storage facility
- information on data access levels and user authorization process/user roles

The specific WIO regional data sharing agreement can draw from existing policies concerning the WIO region, i.e. the [ZMT Policy Brief 2021/01 on Marine Biodiversity Data Sharing](#)<sup>8</sup>, [Madagascar's MEDA](#)<sup>9</sup>, or the [Data Sharing Policy](#)<sup>10</sup> from MUHAS in Tanzania.

While working towards developing a regional data sharing agreement, data-sharing protocols at the national level could also be used as they are easier to develop and implement.



An example of flow of monitoring data obtained through national ecosystem monitoring programmes and its relationship with national policies, regional and global commitments from the Regional Framework for Ecosystem Monitoring in the Western Indian Ocean<sup>11</sup>.

Further, Collaborative arrangements with regional/national institutions could be used to protect the organizations involved in data and information gathering and sharing to regulate the relationships between the parties. These agreements spell out the responsibilities of both parties, particularly with regard to allocation of responsibilities, financial implications and exploitation of products or data required for use/storage<sup>12</sup>.

#### 2.2.4 Metadata Quality Management

Datasets shared within the digital structure of the regional information management must meet existing metadata standards to allow full interoperability. The information management system should aim for the introduction of standard metadata templates to support data collectors and ensure a high-quality of shared data.

Existing guidelines provide valuable resources for adapting metadata quality standards and providing templates suitable for the FAIR handling of WIO data. Essential attributes to be included for the metadata quality assessment are: methodology, data source,

<sup>8</sup> [https://www.leibniz-zmt.de/images/content/pdf/Policy\\_Briefs/2021\\_01\\_Fostering\\_Biodiversity\\_Data\\_Sharing\\_in\\_the\\_WIO\\_Policy\\_Brief\\_English.pdf](https://www.leibniz-zmt.de/images/content/pdf/Policy_Briefs/2021_01_Fostering_Biodiversity_Data_Sharing_in_the_WIO_Policy_Brief_English.pdf)

<sup>9</sup> <https://www.nairobiconvention.org/madagascar-launches-process-to-update-its-marine-ecosystem-diagnostic-analysis/>

<sup>10</sup> <https://www.muhas.ac.tz/wp-content/uploads/2021/09/MUHAS-DATA-SHARING-POLICY-2020.pdf>

<sup>11</sup> [WIO Ecosystem Indicator Monitoring Framework.pdf \(nairobiconvention.org\)](#)

<sup>12</sup> UNEP, Nairobi Convention (2020) Overview of Oceanographic data and research for improved ocean governance in the Western Indian Ocean region, published under SAPPHIRE project.

ownership/authorship, data format, location, spatial and temporal resolution, time(stamps) of data collection and publication. Depending on the type and topic of data, different sources containing useful details need to be considered. The **main structure of the metadata quality management schema can be based on the ISO19115** and any other metadata standards relevant for regional information management systems.

These can be implemented in the development of the Nairobi Convention Clearinghouse Mechanism for the quality management practices, as well as in the choice of regionally relevant data sources in general. They can support the process by defining the international needs for information on ecological, social and economic issues, and therefore focus relevant metadata quality indicators.

## **2.3 WIO data and information platform**

The **WIO platform** hosted by the Nairobi Convention Secretariat will provide an **overview of the existing information and datasets from the WIO countries** to ensure a FAIR data utilization. It will be built on the existing Clearing House Mechanism (CHM). This platform will be the entry point to all stakeholders interested in WIO data and information, by providing the service of data and metadata hosting, and functioning as an informative source on all topics related to WIO regional information management. Datasets alongside their metadata should preferably be hosted on the regional level in the WIO platform. When this is not possible, they can provide only the metadata to the platform and continue to be hosted within individual countries and institutions. The following paragraphs cover details that should be considered when establishing, managing and securing such a platform.

### **2.3.1 Technical Requirements**

The **technical set-up should ensure a FAIR handling of contents on a system that is aligned with the TRUST principles**. The key to successful implementation in terms of willingness to data sharing is transparency on how the provided content is stored, secured and made available on the platform.

The platform should include on the data users' side the services of an understandably searchable catalog with all relevant metadata information, including geoportal functionality with geospatial visualization of dataset location (in the accuracy defined by the data owner), and clear specification on how a dataset/information entry must be cited. On the data owners' side the service needs to include a central submission form including all mandatory metadata entries and optional fields for different topics, and a data sharing agreement (next chapter). The platform needs to be technically accessible in its full functionality on all common devices in the browser, without needing to download and install individual software. The implementation of the platform should aim for open-source based architecture running established software solutions fitting the needs of the platform. However the final decision on the actual systems should also consider other aspects like the option of integration into existing (regional) datahubs.

### **2.3.2 Secure Technical Infrastructure**

A secure technical infrastructure for the WIO data and information platform is essential for the successful long-term implementation of an information management strategy in the WIO region. Most challenging in the field of infrastructure for the WIO region is a lack of centralized secure formal databases, leading to invisibility of existing datasets when data are stored

informally on laptops or external hard drives, and to data loss due to technical issues, illegitimate use, or cyber-attacks. The technical infrastructure of the WIO data and information platform needs to address these challenges.

Regarding data storage security, the WIO platform needs to include a robust **back-up strategy with parallel storage servers**. Server choice should be done aiming for long-term and secure location: With cloud servers the system would not need to regularly replace, or regulate the environment and temperature control of its own physical servers. However, the choice for cloud servers should consider the location of these, and prioritize trustworthy cloud server providers in the WIO region.

The technical infrastructure of the WIO data platform should include maintenance mechanisms for regular security checks. These need to be coordinated and implemented by the technical engineer, and can include regular human verification requirements for logging in, the implementation of SSL/TSL certificates, and the export of regular automated bugs/security reports to the technical engineer (who can react in a timely manner to security threats).

### 2.3.3 Levels of Access

Data and information in the WIO platform will have different levels of data access limitations, and licenses. While some datasets will have open data sources, others will be more sensitive and confidential. Or while some information should be available to anyone, others might be restricted to user groups permanently or during a moratorium phase or in embargo cases. Such **distinctions in access to the WIO platform's content should be managed by the introduction of user authentication mechanisms to the WIO data and information platform**. User roles with different access rights can be defined and assigned upon a registration. However, the WIO platform should give access to open datasets when possible.

## 2.4 Capacity Development

Capacity development of human, institutional and political capacity will be crucial for a successful implementation of the IMS. It should aim at harmonization of processes, tools utilization and necessary knowledge regarding components presented in this strategy document.

### 2.4.1 Fostering human capacity through regional management and networks

In terms of thematic and organizational knowledge, expertise in the region exists widely in various areas related to the IMS. This strategy document proposes a structure for a regional information management based on regional expert experience as a key factor in **human capacity** development. It emphasizes the need for a long-term system and service. To achieve this, the **WIO regional information management needs to have a secure and sustainable financial plan to fund positions in the fields of data stewardship, data curation, technical implementation, as well as infrastructure and training costs**. The regional data and information management will be successful if trust and lasting relationships can be established between all WIO countries and the responsible regional governance body and the data and information management team.

The data stewards should assess the needs and coordinate a training program with regular sessions on different topics connected to data and information management, and the utilization of the platform. Regional interest lies for example in training on handling and automated processing of big data, training on data collection tools and techniques (e.g., digitization), and fostering understanding of data ethics and principles of prior informed consent.

The program should be developed in cooperation with regional institutions, and incorporate existing training facilities and workshops on topics of interest, in priority to creating new and

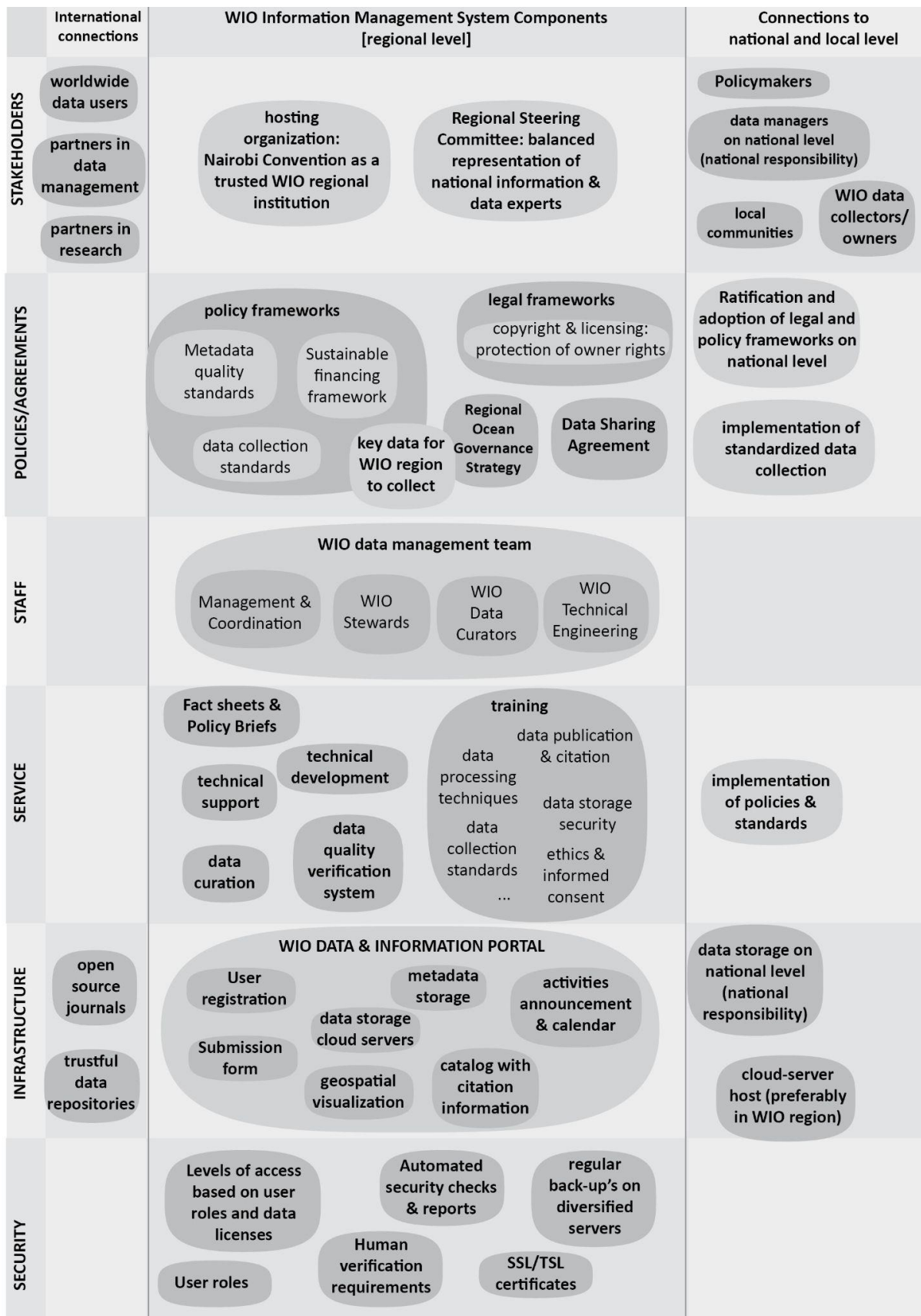
possibly parallel offers. In return, it can function as an information hub on existing training options in the region on multiple levels. **By mobilizing increased resources and leveraging existing programs and development partners, the IMS can be implemented in a centralized, cost-effective, and sustainable manner**, thereby fostering a culture of data sharing, collaboration, and informed decision-making at the political level.

#### **2.4.2 Strengthening Institutions and supporting political decision-makers**

Strengthening **institutional capacity** involves improving the equipment, tools, and technologies used for data and information management. There is a need to address the lack of equipment and outdated technology in many organizations. Opportunities to enhance institutional capacity can be found in existing capacity development initiatives, such as the WIOMSA MASMA program and IOC-UNESCO training courses among others.

The WIO stewards should **evaluate the capacity of national institutions of Contracting Parties relevant for the data and information flow into the WIO information management system, and coordinate the networking of research activities and training opportunities**, aiming for standardization of knowledge and data collection methods, and for providing data replication opportunities for the whole WIO region.

**Political capacity** development plays a vital role in promoting decision-making processes that prioritize the implementation of the IMS. To strengthen these processes, it is important to produce **summaries, such as factsheets and policy briefs, that are targeted toward decision-makers**. These summaries will enhance the uptake of information and **increase awareness among policymakers**. Additionally, targeted sensitization and awareness programs should be developed to engage policy and decision-makers, ensuring they understand the value and benefits of the regional data and information management structures.



Overview of the main WIO Data and Information Management Components.

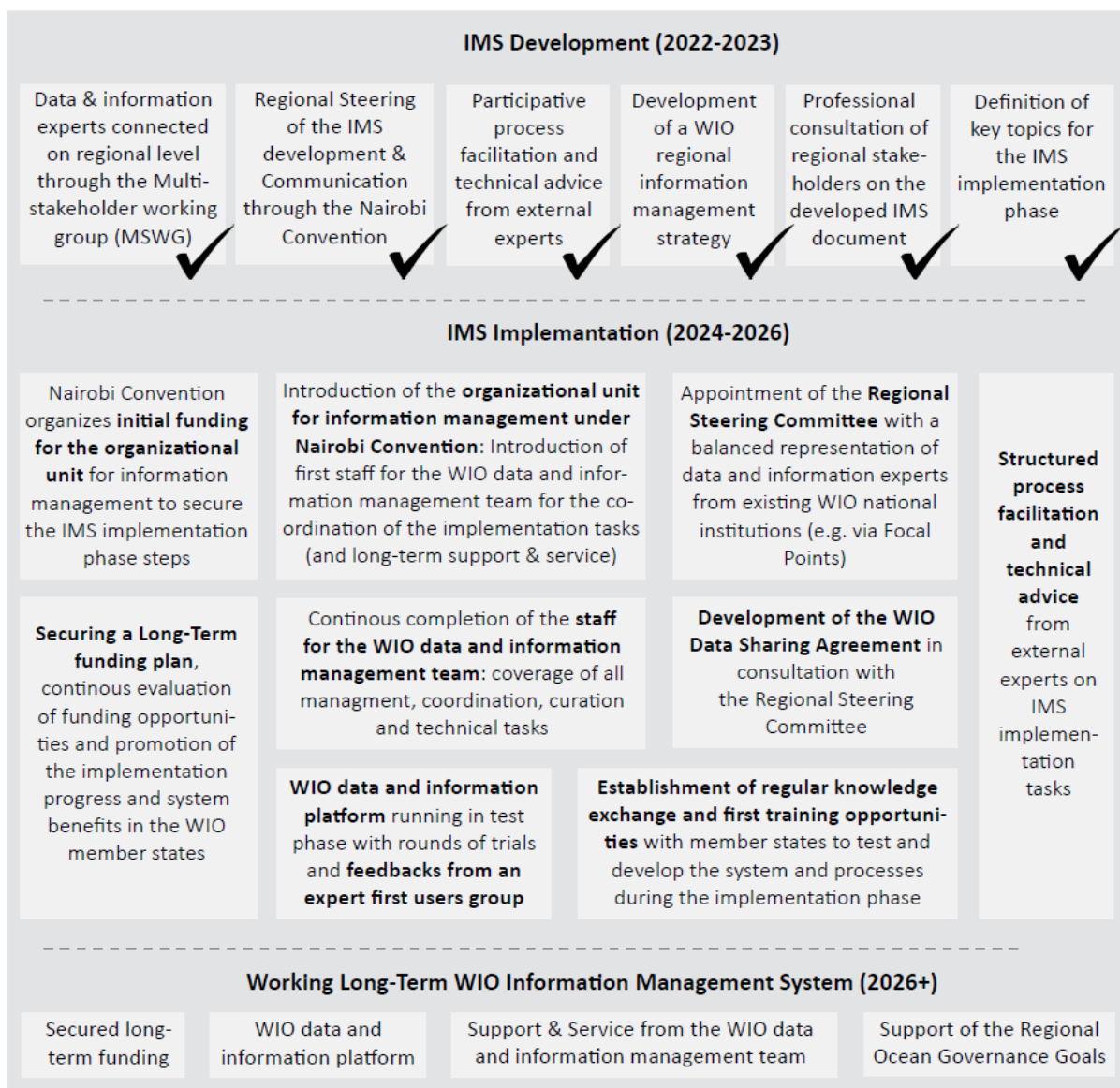


### 3. Strategy Implementation - The Way Forward

A main requirement for a successful implementation of the strategy is an iterative and interactive process of planning, monitoring, and revision at increasing levels of detail according to evolving needs as the implementation progresses.

#### 3.1 Visualization of key milestones for IMS Implementation

This process should be guided by the WIO data and information management team in collaboration with the consulting Regional Steering Committee. They will define a roadmap with concrete actions and timelines to implement the strategy in the WIO region drawing from the visualized central goals:



### 3.2 Critical focus topics for the IMS implementation

To achieve the successful implementation of the IMS and introduce a complete working long-term WIO Information Management System, the implementing parties will need to tackle these critical initial elements, among others:

**1) Involve necessary stakeholders for the IMS implementation phase.** The coordination should be led by the WIO information and data management team, which will function as an own organizational unit within the Nairobi Convention Secretariat. The governance body of the regional steering committee can be appointed based on existing regional structures, such as Focal Points or FARI. The network of the multistakeholder working group involved in the IMS development phase should be addressed in an advisory role and as expert users during the implementation process.

**2) Develop an implementation timeline with details for reaching the key milestones** drawing from main steps presented in the graphical summary. This initial outline of tasks and milestones will go hand in hand with modalities to monitor and report on the information management system development, implementation and operation. Planning steps at this stage must also include mechanisms to critically assess needs to adapt, as technologies evolve or new ones emerge.

**3) Establish coordination networks for technical dialogues and alignment of policies.** The implementing team will convene technical and policy support groups of experts to develop guidelines supporting the strategy implementation in finer detail. This includes technical guidelines on the implementation of the needed infrastructure, on data sharing (APIs, sharing standards as well as related policy documents, such as regional sharing agreements). The expert groups will also determine feasible and sustainable IT infrastructure renewal cycles, maintenance programmes as well as review and update cycles on infrastructure, guidelines and policies. They should consult previous experience of the Clearing House mechanism and check for components applicable for the developing system.

**4) Identify critical products related to ocean governance, coastal and marine management.** Areas and topics of particular interest to WIO member countries need to be identified, guided by the in parallel developed regional ocean governance strategy. Those could include, but are not limited to, emerging topics such as the development of ocean accounts systems or a sustainable blue economy strategy. In that regard, critical data and information gaps to address those WIO ocean governance challenges need to be identified.

**5) Financing opportunities** and national resource needs need to be identified, including sourcing sustainable budgets for long-term operation. The implementation phase needs funding for a foreseeable period - however, one important point of the implementation phase is to secure long-term funding, as this will allow for the continuous service of the WIO data management staff and the WIO platform beyond the implementation phase. The success of a regional information management system relies on the continuous availability of funds to support the operation, meeting of the mentioned infrastructure renewal cycles and personnel in both IT infrastructure and data stewardship. An infrastructure needs-assessment needs to be carried out for each member country to identify potential gaps in IT infrastructure. While we acknowledge successful public-private partnerships in those undertakings, we recommend a Voluntary Fund established by the contracting parties to the Nairobi Convention to guarantee long-term funding for this crucial undertaking.

**6) Identify relevant capacity exchange and development** pathways. We recognise that the WIO member states have different strengths and weaknesses when it comes to human capacity, administrative set-ups and available IT infrastructure. The implementing parties will

address those differences through inter-regional capacity exchanges and the development of training materials and training capacities in the WIO region, where possible through already existing programs or institutions. It will be crucial to have dedicated and well-trained staff working as regional IT experts and data stewards working on the information management system from technical and administrative points of view. Therefore standardized, regular training and development opportunities and consultation in legal and administrative processes are critical to maintain a high level of professionalism.

**7) Develop a communication and outreach strategy.** Implementing a region-wide information management strategy will take the concerted efforts of all parties involved. It is therefore important to have a well-designed and adaptive communication strategy in place from the beginning. Through this strategy, buy-in for the implementation of the system can be encouraged by raising awareness of the critical importance of data and information in a timely, well-informed and adaptive ocean governance. Creating a clear understanding of the added value and benefits of investing in such a system can also ensure continuous support by the involved partners through the implementation of the IMS and running phase of the introduced system and support services.

**Editors**

Hauke Kegler (ZMT)

Alexandra Nozik (ZMT)

**Authors - The Information Management Strategy is a collective effort, with special acknowledgment to the Multi-Stakeholder Working Group, who not only contributed extensively to its drafting but are also esteemed co-authors of this document**

**Multi-Stakeholder Working Group (Contributors)**

<b>Name</b>	<b>Expertise &amp; Designation</b>	<b>Country</b>
Kamal Thabiti Soudjay, Ph.D	Researcher	Comoros
Mrs. Susan Auma Otieno	Fishery Expert & Assistant Director Fisheries, Ministry of Agriculture, Livestock, Fisheries and Irrigation State Department for Fisheries, Aquaculture and the Blue Economy	Kenya
Dr Arshad Rawat	Director - Oceanography / Marine Geosciences Unit Prime Minister's Office Department for Continental Shelf and Maritime Zones Administration and Exploration	Mauritius
Dr. Abdikarim Hersi	Climate change, environmental governance, Food security and livelihood and fisheries sector development.	Somalia
Dr Abdulqadir Omar Ziyad	Marine Science Department	Somalia
Mr. Masumbuko Semba	Oceanographer and Data Scientist The Nelson Mandela African Institution of Science and Technology (NM-AIST)	Tanzania
Nassor Abdalla Nassor	Head of ICT and Fisheries Statistics, Ministry of Blue Economy and Fisheries, Department of Fisheries Development and Marine Resources-Zanzibar	Zanzibar
Lauren Williams	Scientist (Geospatial): Oceans Research Department of Forestry, Fisheries and the Environment	South Africa
Julien Barde, PhD	IT Research Engineer at IRD and Expert in Data and Fisheries Science	France

Mr Ranaivosoa Rija Mamitiana Olivier	Head of Unit of the Spatial Reference Information System, National Office for the Environment (ONE) of the Ministry of the Environment and Sustainable Development	Madagascar
Mr. Justin Prosper	Ag. Director General of the Climate Change Division	Seychelles
Ms Sofia Chambe	Geomatic Studies	Mozambique
Dr Shannon Hampton	Ocean Governance, Fisheries, Pollution, Invasive Species	South Africa
James Mbugua	CORDIO EAST AFRICA/ GIS and data management	Kenya
Siajali Pamba	University of Dar es Salaam/ Dr. Physical Oceanography	Tanzania
Naly Rakotoarivony	Blue Ventures/ Head of policy and partnership / Marine conservation	Madagascar
Mathias Igulu	USAID	Tanzania
Harrison Ong'anda	Kenya Marine and Fisheries Research Institute/ Marine ecology, data management, GIS & Remote Sensing	Kenya
Peter Manyara	IUCN / International Union for Conservation of Nature/ Regional Program Manager of Coastal and Ocean Resilience	Kenya
Mr Edson Anselmo Jose	RARE/ Senior manager for data and monitoring	Mozambique
Ednah Onkundi	Kenya Marine and Fisheries Research Institute/ Marine ecology, data management, GIS & Remote Sensing	Kenya
Edmond Kuto	Wetlands International/ Geographic Information System	Kenya
Emmanuel M. Mpina	TNC/ The Nature Conservancy (US International organization)/ Marine Spatial Planning	Tanzania
Doreen Simiyu	SWIOTUNA/ Tuna Fisheries	Kenya
Maafaka Ravelona	WWF Madagascar/ Technical Officer	Madagascar
Tanguy Nicolas	FFI/ Programme Manager	Seychelles
John Ngatia	IOC-UNESCO/ Programme Assistant	Kenya

## Editors

Name	Expertise & Designation	Country
Sean Fennessy	Oceanographic Research Institute	South Africa
Joëlle Rahantarivelo	Blue Venture	Madagascar

## Nairobi Convention- Technical and Funding Support through SAPPHIRE and EU-MEAs projects

Name	Expertise & Designation	Country
Theuri Mwangi	National Project Officer	Kenya
Agnes Mukami Muriuki	Programme Assistant	Kenya
Melisa Wandia Mureithi	Communication Assistant	Kenya
Abel Kiprono	Programme Assistant	Kenya

## Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) – Technical and Funding Support through the Western Indian Ocean Governance Initiative Project

Robin Farrington- Programme Manager  
Yvonne Waweru-Senior Advisor  
Carol Mutiso- Program Officer

## Collective Leadership Institute gGmbH - Strategy development process facilitation

Douglas F. Williamson  
Mai ElAshmawy

## Centre for Tropical Marine Research (ZMT) - Technical Advice & Strategy Development

Hauke Reuter  
Rebecca Lahl  
Hauke Kegler  
Alexandra Nozik