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POLICY BRIEF 2021/01

Fostering Marine Biodiversity Data Sharing for Decision-Making in the Western Indian Ocean Region

SUMMARY

This policy brief informs decision-makers about the benefits of effective marine biodiversity data sharing and proposes measures to encourage and improve sharing among stakeholders.

The oceans and coastal areas in Eastern African countries are home to an abundance of marine biodiversity, with immense ecological and socioeconomic value[1]. Stakeholders have varying interests concerning shared ecosystems. Transboundary conservation goals and harmonised coastal management strategies are of great value to sustain ecological services for future generations and to address potential conflicts about spatial use. For sound coastal governance, decision-makers require access to accurate, current, and comprehensive data on the status of marine biodiversity, to act on pressing environmental issues. However, marine biodiversity data may only be partially available due to a multiplicity of reasons, including inaccessibility of unpublished or restricted data, dispersed storage locations, or a general research gap[2]. Under these circumstances, effective data sharing is a most important issue and should be prioritized by policymakers and entities involved in research. Our recommendations are based on the outcomes of several expert workshops, qualitative interviews[3], and the extensive experience of involved partners in East Africa.

KEY RESULTS

- Data sharing and effective communication of research findings is indispensable for ensuring the sustainable management and protection of marine resources in the WIO Region.
- Currently, data is not effectively accessible due to enclosure and data loss, differences in methods and standards of data handling, insufficient sharing skills and capacities, compartmentalisation, a mismatch of research objectives and user needs, and restrictive or absent legislation.
- Comparison and integration of research findings in the WIO region may be complicated by incomprehensible or inaccessible data.

RECOMMENDATIONS

- Increase data visibility, i.e. using meta data declarations and standards for data handling
- Ensure due credit and acknowledgment for data collectors
- Encourage effective communication of research findings from scientists to stakeholders
- Finance sharing of infrastructure and capacity-building
- Harmonise legislation on data sharing in the WIO region
- Streamline data, increase sharing to national bureaus of statistics
- Strengthen alignment of research objectives with user needs

THE CONTEXT

Numerous actors, including government and research institutions, regional agencies and NGOs, in the Western Indian Ocean (WIO) region have recognised the importance of collaborative efforts to create common data sharing strategies and to make more data available on all levels of usage (local, national, and regional). Biodiversity data are additionally available through a number of data bases operating on national, regional or worldwide levels. The Nairobi Convention, as an important actor in this field, is a partnership between governments, the private sector, and civil society, working towards a thriving WIO region with healthy rivers, coasts and Oceans. It is a part of the United Nations Environment Programme (UNEP) Regional Seas Programme and provides its 10 Contracting Parties with a legal framework for regional cooperation, coordination, and collaborative action. The Clearinghouse Mechanism (CHM)[4] of the Convention intends to facilitate data sharing, providing a regional data reference centre for Contracting Parties to the Convention and their stakeholders.

Furthermore, the partnership project NeDiT (New Digital Technologies for Marine Biodiversity Data Handling in East Africa) led by the Centre for Tropical Marine Ecology (ZMT) and the Institute for Marine Sciences (IMS) has organised several workshops with local experts from Tanzania and Kenya, aiming to build a collaborative network of actors from research institutions and agencies to discuss the use of innovative digital technologies to inform decision-makers. Experts noted a more uniform approach and the necessity to foster sharing skills and capacities, as well as taxonomy training for people working with marine biodiversity data as key requirements. An enhanced management, analysis and flow of biodiversity data will also greatly benefit the general public, as it leads to increased information about and awareness for the general state of the environment and implemented management activities.

USING MARINE BIODIVERSITY DATA

Marine biodiversity data is collected regularly in the context of long-term studies, ecosystem monitoring, or marine spatial planning and includes information about the abundance and distribution of marine species or indicators of degradation within ecosystems. In the WIO region, this data is used for many different planning and management tasks by different users.

Resource managers, such as park/marine protected area authorities, need data for management decisions to cope with changes in species abundances and distribution in reaction to environmental or human impacts. They must react accordingly to avoid or mitigate damage (i.e. during coral bleaching events) and to supervise subsequent restoration and recovery. When small fishing communities manage parts of coastal areas, they frequently depend on fish stock assessments or data that inform their approach of ecosystem management. While these stakeholder groups may partly include or cooperate with scientists, they frequently will prefer to receive processed data.

Scientists need to be aware of existing research to avoid redundancy, waste of financial resources, and unnecessary disturbance of ecosystems and local communities. Moreover, access to data collected in other projects may help them to conduct additional analyses, long-term and meta studies, or validate previous findings. While processed data or metadata may be sufficient to support certain scientific endeavours, frequently researchers may be dependent on access to primary data.

Policy-makers generally receive processed data, presenting comprehensive and summarized information on biodiversity issues in their jurisdiction. Similarly to resource managers, they may require going through complex scientific studies but need condensed findings informing their decisions, to identify conservation priorities, address resource use conflicts, and shape legislation at local and national levels. On a regional level, policymakers use biodiversity data for regional ocean governance, i.e. creating strategies to manage and conserve transboundary marine ecosystems.

Types of Data

Data refers to pieces of information.

Raw or primary data is usually of a numerical nature, such as computer code or measurements on a spreadsheet, but also includes original field notes or interview transcripts and recordings.

Processed or secondary data has been manipulated, i.e. aggregated, summarised, interpreted, or analysed and then transformed into graphs, figures, tables, images, or full text.

Meta-data is information about data, i.e. where it has been collected, for which purpose, and under which method, usually not including original datasets.

RESULTS - CURRENT ISSUES IN DATA ACCESS AND SHARING

Enclosure and data loss

Competitive academic environments may encourage researchers to withhold data for prolonged periods of time, as early sharing entails the risk of having their work used by others without receiving due credit. As colleagues remain unaware of existing findings, scientific progress decelerates and research redundancy may occur. Additionally, there is severe risk of data loss due to technical failures, change in professional careers change and lost interest. Such patterns not only spend scarce intellectual and financial resources, but also prevent managers and decision-makers from receiving relevant and timely information on environmental issues.

Different data collection methods and standards

As there is no common protocol for marine biodiversity data handling in the WIO region at the moment, numerous approaches for data collection and processing are employed. The resulting variety of methodologies, formats, and analysis tools may further complicate data sharing and comparison of scientific findings.

Lack of data sharing capacities and skills

Some actors may not possess the training or technical capacities to share their data in a format that is appropriate to their audience. This may include a lack of information and communications technology (ICT) skills, inadequate electronic devices, and the absence of functional online databases.

Restrictive rules or lack of regulations

Data collection for scientific purposes in the WIO region may be subject to strict rules concerned with sharing research findings. Transboundary projects and organisations working in several countries often must deal with differing legislation and requirements for data handling and sharing (i.e. sharing data across borders). On the other hand, data might not be shared voluntarily in the absence of sharing rules or contracts.

Compartmentalisation

As data is collected and processed by a variety of actors, it is often stored or held in various places with different levels of access. Local scientific departments or government ministries usually maintain their own specialised databases, and international organisations or research teams may not communicate data collected in the region to the appropriate channels (e.g. national databases).

Mismatch of research scope and user needs

Local communities and their traditional knowledge are seldom involved in research design and thus usually receive information, which they cannot apply, without having much power to influence research activities taking place on their territory or within ecosystems they depend on. Shared data may not be useful if the scope and objectives of the research do not fit the needs and goals of other data users not directly involved in the project.

Comprehensibility

Scientific data must be understood by its intended audience to be effective. In cases where the form of sharing, type of content, or level of complexity do not meet the recipient's expertise and capacities, the benefit of sharing data is greatly reduced. Findings that fail to engage the audience with a compelling narrative may lessen the degree of actions taken and could lead to more lenient environmental measures than required to meet conservation objectives.

POLICY RECOMMENDATIONS

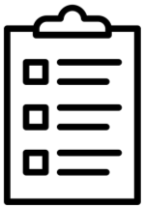
Increase data visibility

Sound and public meta data declarations could provide a better overview of existing data and help reducing research redundancy. Their use could be encouraged through internal data policies or by tying them to funding agreements and approvals of fieldwork.

Ensure due credit and acknowledgement

Data papers should be promoted as a reputational and viable alternative to traditional scientific papers, rewarding scientists for publishing data directly. Online platforms and data repositories should provide transparency and safeguards against data misuse, along with feedback mechanisms for data contributors.

Create standards for data handling



Scientists and other actors working with marine biodiversity data should develop common methods and standards for data collection and sharing strictly based on international best standards and practices. A premier work would be to create a database of experts and identify and register a review body on research methods; followed by rigorous testing of such methods for regional acceptance and replication. Scientific associations in the region should advocate for such standards, which should be adhered to by regional institutions as well as international research teams and organisations collecting data in the WIO region.

Encourage effective communication

Efforts and incentives towards effective data communication are needed to increase the comprehensibility of research findings. Workshops could train scientists and data collectors in effective sharing methods, i.e. compelling narratives, visual tools, field trips, or storytelling techniques.

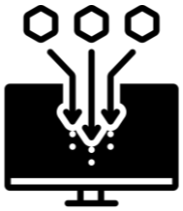
Finance sharing infrastructure and build capacities

Investments in functional online databases and other sharing infrastructure are needed to increase sharing capacities in the region. Furthermore, extensive training and capacity-building in taxonomy and Information and Communication Technology (ICT) skills should be funded and provided for individuals and entities handling marine biodiversity data. Governmental institutions and third parties funding research activities should consider these aspects in their budget allocation. They should further provide financial incentives, i.e. through the sponsorship of training programmes or specific grants for the development and maintenance of sharing tools.

Harmonise legislation

Political leaders in the WIO region should foster data exchange across country borders through harmonised regulations on data sharing. The Nairobi Convention encourages the creation of regional data sharing protocols and national data sharing policies.

Streamline data



In addition to political instruments, formal sharing agreements with governments and project donors could make timely data sharing a provision for issuing research permits or granting funds, to increase reporting to national bureaus of statistics, local communities, or other data users.

Align research objectives

Research institutes should strengthen alignment of research priorities with the needs of local communities and stakeholders, i.e. through a collaborative co-design of studies and dialogue about appropriate and preferred forms of sharing. A pre-research work should be promoted and included in funding schemes, to gather inputs from data users. Scientific data on pressing environmental issues needs to be made available on time for related managerial decisions. We propose to anchor an exchange-platform for those initial dialogues at a regional institution such as the Nairobi Convention and establish this as a mandatory process for collaborative initiatives.

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ABOUT THIS POLICY BRIEF

This Policy Brief is part of a series aiming to inform policy-makers on the key results of the ZMT research projects and provide recommendations to policymakers based on research results. The series of ZMT Policy Briefs can be found at https://www.leibniz-zmt.de/en/research/publications/policy-briefs.html. This publication was commissioned, supervised, and produced by ZMT.
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