

Data and Information Management Plans

TANZANIA



July 2010

TANZANIA DATA AND INFORMATION MANAGEMENT PLANS

Working document

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0. Introduction

The Tanzania National Data and Information Plans is a working document which details both short and long term strategies and mechanisms for management of the new data that will be generated by the ASCLME project. These national plans have been developed within and in accordance to the ASCLME Regional Data and Information Plans.

The activities within the ASCLME Project are focused on filling the significant coastal and offshore data and information gaps for these LMEs by capturing essential information relating to the dynamic ocean-atmosphere interface and other interactions that define the LMEs, along with critical data on artisanal fisheries, larval transport and nursery areas along the coast. The overall objective of this data capture will be to deliver a Marine Ecosystem Diagnostic Analysis (MEDA) for Tanzania which will feed into a regional Transboundary Diagnostic Analysis (TDA), and Strategic Action Programme (SAP) for the Agulhas Current LME, and the Somali Current LME.

1. National D&I Coordinators

Institutional and coordinator contact details

Data and information management within the framework of the ASCLME in Tanzania will be coordinated by the selected host institution and a national coordinator as follows.

Host Institution: Institute of Marine Sciences
University of Dar es Salaam
P O Box 668
Mizingani Road
Zanzibar, TANZANIA

National Coordinator: Prof. Dr Desiderius CP MASALU

2. Specialists for the MEDA

Development of the MEDA (Marine Ecosystem Diagnostic Analysis) is a primary activity of the ASCLME project. The MEDA is a product document that will feed into TDA and SAP. Thus it is vital that the MEDA is careful and well prepared using experts in the relevant themes. For Tanzania the final list of specialists for MEDA is as follows.

Table 1: List of MEDA specialists

s/n	EXPERT	Host Institution	THEME
1	Dr Razack Lokina	UDSM-IRA	1 COUNTRY OVERVIEW
2			2 BIOPHYSICAL ENVIRONMENT
3	Dr Yohana Shaghude	UDSM-IMS	2.1 Description of the coast and distinctive features
4	Dr Yohana Shaghude	UDSM-IMS	2.2 General description of the climate
5	Dr Yohana Shaghude	UDSM-IMS	2.3 Marine and coastal geology and geomorphology
6	Dr Yohana Shaghude	UDSM-IMS	2.4 Freshwater resources and drainage, including rivers, estuaries, deltas and coastal lakes
7	Mr Shigalla Mahongo	TAFIRI	2.5 Physical Oceanography Currents (Coastal hydrodynamics and offshore current systems) Tidal regime and waves Sea level change Ocean temperature Salinity patterns

			Ocean-atmosphere interaction
8	Dr Sadri Said	UDSM-IMS	2.6 Chemical and Biological Oceanography 2.6.1 Nutrients 2.6.2 Persistent organic / inorganic pollutants 2.6.3 Primary production 2.6.4 Secondary production
9	Mr Vedast Makota	NEMC	2.7 Coastal zone and continental shelf 2.7.1 Description and extent of coastal and marine habitats 2.7.2 Productivity of the coastal zone (corals, mangroves, seagrass beds)
10	Daniel Abel Shilla	UDSM-DASF	2.8 Microfauna and meiofauna
11	Mr Winfried V Haule	Fisheries Division - Dar	2.9 Macrofauna (state of biological knowledge) 2.9.1 Invertebrates 2.9.2 Fish and fish resources 2.9.3 Mammals 2.9.4 Reptiles 2.9.5 Birds 2.9.6 Exotics and invasive species
12	Mr Shigalla Mahongo	TAFIRI	2.10 Long term predicted atmospheric changes
13	Dr Razack Lokina	UDSM-IRA	3. HUMAN ENVIRONMENT 3.1 Coastal and island populations – current status and trends 3.2 Sites of religious or cultural significance 3.3 Human health 3.4 Infrastructure
14	Mr Vedast Makota	NEMC	6 PLANNING AND MANAGEMENT 6.1 National disaster management plans 6.2 Environmental sensitivity mapping 6.3 Coastal management / development plans 6.4 Areas under special management 6.5 Monitoring, Control, Surveillance

3. Institutional sources of information for national MEDAs and their thematic areas of responsibility

Table 2: Sources of data and information

	Name of Institution	Address	Area of Responsibility
1	Tanzania Petroleum Development Corporation (TPDC)	P. O. Box 2774, DAR-ES-SALAAM, Tanzania Phone: 255-51-21499/26452 Fax: 255-51-29663/20775	Petroleum development and exploration
2	Department of Botany (DoB) University of Dar es Salaam	P. O. Box 35060 Dar-es-salaam, Tanzania	Training and research in botany including marine plants
3	Department of Aquatic Sciences and Fisheries (DASF) University of Dar es Salaam	P. O. Box 35064, Dar-es-Salaam, Tanzania Phone: 255-51-43400 Fax: 255-51-43038	Training and research in aquatic sciences and marine resources
4	Institute of Resource Assessment (IRA) University of Dar es Salaam	P. O. Box 35097, Dar-es-Salaam, Tanzania Phone: 255-51-43393 Fax: 255-51-43393	Training in resource management including coastal resources of Tanzania
5	WWF - Country Program (WWF)	P. O. Box 63117 Dar-es-Salaam, Tanzania	Coastal and marine resource use and protection
6	National Environmental Management Council (NEMC)	P. O. Box 63154 Dar-es-Salaam, Tanzania Phone: 255-51-11324/5/6 34603 Fax: 255-51-34603	Environmental management
7	Institute of Marine Sciences (IMS) University of Dar es Salaam	P. O. Box 668,Zanzibar, Tanzania Phone: 255-24-2232128 Fax: 255-24-2233050 Email: director@ims.udsm.ac.tz URL: www.ims.udsm.ac.tz	Research and Training Institution
8	Dar-es-Salaam Maritime Institute (DMI) Ministry of Communication and Transportation	P. O. Box 6727, Dar-es-Salaam, Tanzania	Research and Training Institution
9	Mbegani Fisheries Development Centre (MFDC) Ministry of Natural Resources and Tourism	P. O. Box 83, Bagamoyo, Tanzania	Research and Training Institution
10	Tanzania Harbours Authority (THA)	P. O. Box 9184 Dar-es-Salaam, Tanzania Phone: 255-51-29158/21212 Fax: 255-51-46925	Development of ports and shipping
11	The Society for Environmental	P. O. Box 9473Dar-es-	inventories of marine resources

	Exploration - Tanzania (FRONTIER)	Salaam, Tanzania Phone: 255-22-2781354 (Carol: 0744-463734) Fax: 255-22-2781354 Email: frontier@twiga.com	
12	Tanzania Fisheries Research Institute (TAFIRI) Ministry of Natural Resources and Tourism	P. O. Box 9750 Dar-es-Salaam, Tanzania	Research and Training in fisheries resources and management
14	Mangrove Project - TANGA (MMP-N) Ministry of Natural Resources and Tourism	P.O. BOX 1449, TANGA Phone: 027-2642684	Mangrove management
15	Division of Fisheries (DoFs) Ministry of Natural Resources and Tourism	P.O. Box 2462 Dar-es-Salaam, Tanzania Phone: +255 - 22 – 2122930 Fax: +255 - 22 – 2110352 Email: fisheries@twiga.com	Fisheries resources management and statistics
16	Division of Forestry (DoF) Ministry of Natural Resources and Tourism	P.O. Box 2426 Dar-es-Salaam, Tanzania Phone: +255-22-34845	Forest management and development
17	Tanzania Commission for Science and Technology (COSTECH)	P.O. Box 4302 Dar-es-Salaam, Tanzania Phone: +255-22-275155/58 Fax: +255-22-275313	Coordination of science and technology in Tanzania
18	Tanga Coastal Zone Resource Centre former Tanga Coastal Zone Conservation and Development Programme (TCZCDP)	P.O. Box 503, Tanga, TANZANIA Phone: 255-27-47463/4 Fax: 255-27-47465	Integrated coastal zone and resource s management
19	Division of Environment (DoE-Tz)	P.O. Box 7227, Tanzania Phone: +255-22-110043 Fax: +255-22-110043	Policy development for environment management
20	Sub-Commission of Fisheries (SCF-SMZ)	P.O. Box 774 Zanzibar, Tanzania Phone: +255-24-31252 Fax: +255-24-31252	Fisheries resource management in Zanzibar waters
21	Division of Environment (SMZ) (DoE-SMZ)	P.O. Box 811 Zanzibar, Tanzania Phone: 255-54-232394/230269 Fax: 255-54-30982	Policy development and fisheries resources management in Zanzibar
22	Tanzania Association of Women Leaders in Agriculture and Environment (TAWLAE)	P.O.Box 76498, Dar es salaam, ARI - Mikocheni	Socio-economic empowerment of women

		Phone: 22 2700085 Fax: 22 2700090 Email: tawlae@udsm.ac.tz	
23	Kinondoni Integrated Coastal Area Management programme (KICAMP)	Dar es Salaam	Integrated coastal area management
24	Economic and Social Research Foundation (ESRF)	51 Uporoto Street, Ursino Estates P.O Box 31226, Dar es Salaam. Ph: +255 22 2760260/2760751/2760752/2760758 Mob: +255 754 780133 Fax: +255 22 2760062 Email: esrf@esrf.or.tz OR info@esrf.or.tz	Socio-economic research
25	Research on Poverty Alleviation (REPOA)	157 Mgombani Street, Regent Estate P.O. Box 33223, Dar es Salaam Phone: +255 (22) 2700083 / 2772556 Mobile: +255 (0) 741 326064 E-mail: repa@repa.or.tz Fax: +255 (22) 2775738	undertakes and facilitates research, conducts and coordinates training, and promotes dialogue and development of policy for pro-poor growth and poverty reduction

4. List of national state of the environment reports (or similar) that have been produced over the past 50 years.

Tanzania like many of the developing states was late to start preparing annual reports on the state of the environment. This was apparently due to the lack of awareness on environmental issues. Through the TCMP program which included intensive environmental awareness activities Tanzania produce her first ever state of the environment report in the year 2001. It is hoped that this activity will continue as appropriate. So far only two state of the environment have been produced as shown below.

- (1) A. Whitney, T. Bayer, J. Daffa, C. Mahika, and J. Tobey, (2003), Tanzania State of the Coast Report: the National ICM Strategy and Prospects for Poverty Reduction, Tanzania Coastal Management Partnership, Dar es Salaam
- (2) Ngusaru, A.S., J. Tobey, and G. Luhikula, (2001), Tanzania State of the Coast 2001: People and the Environment, Coastal Resources Center, University of Rhode Island, Narragansett, RI USA

5. List of marine and coastal projects currently underway or recently completed that may be related in some way to the ASCLME project, through direct collaboration, data exchange, or as interested parties in the TDA/SAP process.

Table 3: Ongoing and recently completed projects in Tanzania

S/No.	Project name:	Thematic area:	Description of the project including its duration and relevance to the MEDAs, TDA and SAP
1	Coral Reef Targeted Research & Capacity Building for Management (CRTR)	Coral reef management	<p>Relevance</p> <p>1 Data and information review 2 National and regional data handling, storage and synthesis focal centres are established</p> <p>Description</p> <p>The Coral Reef Targeted Research (CRTR) Program is seeking to fill the critical gaps in our global understanding of what determines coral reef ecosystem vulnerability and resilience to a range of key stressors. The first and current five-year phase (2004-2009) involves three components:</p> <ul style="list-style-type: none"> ▪ Addressing knowledge and technology gaps ▪ Promoting learning and capacity building ▪ Linking scientific knowledge to management and policy
2	Marine and Coastal Environment Management Project (MACEMP)	Sound management of the EEZ, coastal marine environment	<p>Relevance</p> <p>1 Data and information review 2 National data handling, storage and synthesis focal centres are established</p> <p>Description</p> <p>The project has four components as follows: (i) Sound management of the exclusive economic zone; (ii) Sound management of the coastal marine environment; (iii) Coastal community action fund; and (iv) Project implementation support.</p>
3	The Tanzania Coastal Management Partnership (TCMP)	Integrated coastal management	<p>Relevance</p> <p>1 Data and information review 2 National data handling, storage and synthesis focal centres are established</p> <p>Description</p> <p>The TCMP goal is to establish a foundation for effective coastal governance in Tanzania</p>
4	Transboundary networks of marine protected areas (TRANSMAP)	Integrated conservation and sustainable development	<p>Relevance</p> <p>1 Data and information review 2 National and regional data handling, storage.</p> <p>Description</p> <p>The goal of TRANSMAP was to develop a scientific basis for the creation of transboundary networks of MPAs along the coast of East Africa. The project focused on the generation of scientific knowledge that can modulate the design of conservation units, which together, and irrespective of political borders, can maintain ecological functions, sustainable resource-uses and expected future socio-economic development.</p> <p>Core research merged biophysical, socio-economic and governance sciences each generating complementary data a final conservation scenario.</p>
5	Genetic connectivity and its implications for the design and management of marine protected areas	Coral reef fish	<p>Relevance</p> <p>1 Data and information review 2 National and regional data handling, storage.</p>

	in the East African Ecoregion (WIOMagnet project)		<p>Description The goal of WIOMagnet was to study genetic connectivity of coral reef fish (<i>Scarus ghobban</i> and <i>Siganus sutor</i>) and hard coral (<i>Pocillopora darmiconis</i>) within the Western Indian Ocean ecoregion for the design of Marine protected areas. This was a three years project completed in December 2009. It provided first genetic information on coral reef fish found within WIO region.</p>
6	Shoreline Changes in Tanzania and Kenya, Their Socio-economic Impacts and Mitigation Options	Shoreline changes and its impacts	<p>Relevance 1 Data and information review 2 National data handling, storage and synthesis focal centres are established</p> <p>Description This project was funded by the Marine Science for Management (MASMA) Programme of the Western Indian Ocean Marine Science Association (WIOMSA). The focus of the project was to study and document shoreline changes and its impacts in Tanzania and Kenya and recommend mitigation measures.</p>
7	Sustainable Environmental Management through Mariculture Activities (SEMMA)	Socio-economic empowerment of coastal communities	<p>Relevance 1 Data and information review 2 National data handling, storage and synthesis focal centres are established</p> <p>Description SEMMA project worked to conserve biodiversity along the Tanzanian coastline through the sustainable development of profitable mariculture enterprises. SEMMA's principal objectives were to</p> <ul style="list-style-type: none"> ▪ establish and strengthen conservation enterprises that generate increased and equitable benefits from the sustainable use of natural resources ▪ strengthen the capacity of small-scale mariculture producers to practice participatory landscape-scale conservation ▪ facilitate the application of policies and laws that integrate conservation and development by all stakeholders in the mariculture subsector
8	Peri-Urban Mangrove Forests as Filters and Potential Phytoremediators of Domestic Sewage in East Africa (PUMPSEA)	Wastewater treatment in East Africa	<p>Relevance 1 Data and information review 2 National data handling, storage and synthesis focal centres are established</p> <p>Description The goal of the project was to demonstrate the ecosystem service performed by mangroves when filtering discharged wastewater, and thereby limiting coastal sewage pollution, and to examine its ecological and socio-economical effects. The PUMPSEA project started in February 1st 2005 and lasted for 3 years. The project was funded by the</p>

			European Commission.
9	Rufiji Environment Management Project (REMP/MUMARU)	Environmental management and biodiversity conservation	<p>Relevance 1 Data and information review 2 National data handling, storage and synthesis focal centres are established</p> <p>Description The overall goal of the project is to promote the long-term conservation through “wise use” of the lower Rufiji forests, woodlands and wetlands, such that biodiversity is conserved, critical ecological functions maintained, renewable natural resources are used sustainably, and the livelihoods of the area’s inhabitants are secured and enhanced.</p> <p>The main objectives are:</p> <ul style="list-style-type: none"> i) to promote the integration of environmental conservation and sustainable development through environmental planning within the Rufiji delta and floodplain; ii) to promote the sustainable use of natural resources and enhance the livelihoods of local communities by implementing sustainable pilot development activities based on “wise use” principles; iii) to promote awareness of the values of forests, woodlands and wetland and the importance of “wise use”, at village, district, regional and central government levels and to influence national policies on natural resource management – emphasizing the non-sectoral, multi-biome, integrated approach to the environment. <p>The project has operated since late 1998.</p>
10	Kinondoni Integrated Coastal Area Management Programme (KICAMP)	Sustainable development of the Kinondoni Municipality	<p>Relevance 1 Data and information review 2 National data handling, storage and synthesis focal centres are established</p> <p>Description KICAMP was implemented by the Kinondoni Municipality and was focused at promoting sustainable development through physical planning, increased awareness and improved livelihoods.</p>

6. Archiving and long-term data management of new ASCLME data in national data centres

Tanzania is a member of the IOC of UNESCO and thus the IODE. In the year 2002 Tanzania established her fully fledged National Oceanographic Data Centre (NODC) by upgrading the Institute of Marine Sciences of the University of Dar es Salaam from the Designated National Agency (DNA) status to full NODC status. Following the establishment of the NODC Tanzania has adopted a distributed ocean data management system whereby dedicated/specialized (according to their mandate) institutions manage their respective ocean data and information but are required to keep the NODC updated of all new inventories. The NODC has the responsibility of ensuring that data are properly kept and managed at satellite data centers to ensure their easy accessibility and safety. Additionally, the NODC is the ultimate final custodian of all oceanographic data in Tanzania. All satellite data centres who may find they no longer need or are not able to continue keeping certain data types are supposed to deposit such data to the NODC for long-term (permanent) storage. The Tanzania NODC is an active member of the IODE network and as a matter of principles operates in accordance to the IOC Data Exchange Policy. The ASCLME Data and Information Management Policy has

been developed to be in line with the IOC Data and Information Exchange Policy, and to be complimentary to NODC activities. All new oceanographic data and information from the Tanzanian waters and coastal areas will be archived at the TzNODC. ASCLME scientists and/or groups of scientists may keep their own copies of the new ocean data and information but are obliged to deposit a copy of the same to the TzNODC for long-term archiving.

Examples of data categories are:

6.1 Specimens from ASCLME expeditions

Specimens from ASCLME expeditions in Tanzania will be stored or kept at specialized satellite institutions to ensure their proper storage particularly where that capacity is not available at the TzNODC at the material time.

6.1.1 Fish specimens

Fish specimens will be curated at mainly two institutions depending on the specialist or group of scientists working on them. These are:

- (1) Institute of Marine Sciences (UDSM) and
- (2) Department of Aquatic Sciences and Fisheries (DASF-UDSM)

However, as mentioned above detailed description of all specimens should be provided to the TzNODC.

The two institutions have a limited capacity in terms of personnel, equipment and supplies. It is therefore recommended that this gap in capacity be addressed to ensure better storage of specimen.

6.1.2 Invertebrate specimens

All invertebrates specimens will be curated at the two institutions as detailed above in 6.1.1

6.2 Oceanographic data from ASCLME expeditions

As detailed in the preamble of this section all new oceanographic data from ASCLME expeditions shall be deposited at the TzNODC. Scientists and/or groups of scientist shall keep own copies for working on. The TzNODC shall keep the data in accordance to the ASCLME data management plan which is in line with the IOC Data and Information Exchange Policy, during the life-span of the project. Thereafter, the data will be managed in accordance to the IOC data exchange policy.

6.3 Fisheries data from ASCLME expeditions

Fisheries data from ASCLME expeditions will be submitted to the respective Fisheries Divisions i.e., (i) Fisheries Division – Dar es Salaam as well as (ii) Fisheries Division – Zanzibar, depending on the area they come from. The two Fisheries Divisions are satellite data centres charged with the management of fisheries statistics.

7. National metadatabase

Efforts for capacity building in ocean data and information management in Tanzania were spearheaded by the UNESCO-IOC-IODE through a project known as ODINAFRICA (Ocean Data and Information Network for Africa). Selected software were used for data and information management including metadata management. For data management several software FileMaker software, ODV (Ocean Data View) and MEDI (Marine Environmental Data Inventory) systems were used for data as well as metadata management. For information management InMagic and D-Space systems were used for bibliographic management and sharing.

UNEP also has played a key role in building capacity in the Western Indian Ocean region for information sharing including sharing of metadata. In particular, the Nairobi Convention Clearinghouse Mechanism project has brought more advances in ocean data and information sharing in the WIO region, including Tanzania, by establishing a network of geoportal clearinghouses which are fully Internet-based.

Tanzania recommends the use of the Nairobi Convention Clearinghouse Mechanism (NC-CHM) which runs an ArcGIS geoportal server for data management and the D-SPACE system for extended bibliographic management. Expertise for adapting these two systems can be easily gotten from UNESCO-IOC and UNEP.

Furthermore, the two systems have proved to be stable and already provided some baseline data to start with. All countries in the region who are participating in the ASCLME project have access to the systems and have been provided with the basic capacity training on managing the systems. The descriptions as well as the adaptability of the systems in terms of flagging, access controls, and requirements for modifications are summarized in Tables 4-7 below in the respective sub-sections below. These Tables summarize all software the systems implemented at the Tanzania NODC. In addition, specific detail descriptions of the systems being used to support the ASCLME project are provided.

7.1 General description of the software

(i) The ArcGIS Geoportal Server helps organizations manage and publish metadata for their geospatial resources. It also gives users the ability to discover and connect to these resources. It supports standards-based clearing house and metadata/service directory applications. The Geoportal server can help users:

- **Reduce time and redundancy** of data production by connecting geospatial data and service producers and consumers.
- **Maintain data integrity** by allowing organizations to easily share the authoritative version of data among its users ("one copy of the truth" in data).
- **Enable easy search and discovery** of existing geospatial data and services by allowing users to create and post metadata records (citations describing their geospatial resources) efficiently.

The key features of the geoportal server/system

The Geoportal server includes a **catalog service** and a **Web application**. The Geoportal server inventories all the metadata of geospatial resources in the geoportal. The geoportal does not create or duplicate these resources but only stores their locations and metadata. The Web Application is the primary interface for data producers to publish their resources to the geoportal. Also, visitors use it to discover and access published resources to use in their GIS workflows. In addition, the Geoportal extension offers unique features for the **administration, publishing, and discovery** of geospatial resources.

The Geoportal server helps maintain the quality, currentness, and availability of resources registered with the geoportal by providing tools to evaluate new entries, control access to metadata and resources, and integrate the geoportal with other enterprise systems.

Integrate the Geoportal with External Web Sites and Applications

The Geoportal server/system supports the following standards to integrate the geoportal with external Web sites and applications:

- REST API
- GeoRSS
- KML
- SOAP
- ATOM

Flexible Security

The Geoportal server/system supports simple authentication and user authentication with an external Lightweight Directory Access Protocol (LDAP). LDAP authentication can restrict record-level metadata access to one of the following access control policies:

- **Unrestricted:** All users can access all approved documents.
- **Public-Protected:** All users can access public documents, and only members of a specified group can see protected documents.
- **Restricted:** All users can access the unrestricted documents, but only specified groups can access restricted documents.

Harvest Resources from Existing Geospatial Repositories

The harvesting tool and service retrieves metadata from distributed catalogs and registers them with your geoportal, which makes it much easier to add, manage, and update large amounts of data. The Geoportal server includes simple tools to publish resources to the geoportal. Publishers can

- Directly create metadata in the Web application.
- Upload their existing metadata to the geoportal.
- Cut and paste in the URL of their resource for the geoportal to autogenerate metadata.

Support for Common Metadata Profiles

The Geoportal server/system supports and provides templates for several common metadata profiles, including

- Dublin Core
- Federal Geographic Data Committee (FGDC)
- International Organization for Standardization (ISO) including support for the North American and Infrastructure for Spatial Information in Europe (INSPIRE) profiles

Publish Directly from ArcCatalog

The Publish Client allows publishing of clients' geospatial resources to the geoportal directly from ArcCatalog, simplifying their workflow. The Geoportal server/system provides an easy-to-use interface to help users discover and gain access to datasets, analyses, tools, and Web services to use in their own projects. They can trust that they are using the most current, best quality resources available.

Simple and Effective Data Search

Search the geoportal by keyword and location. Smart matching—enhanced with a thesaurus service—and smart ranking quickly provide the best possible results.

Enhanced Search Options

The geoportal can focus searches to the geoportal, a registered external portal, or ArcGIS Online.

Streamlined Previewer

Allows previewing geospatial resources with a lightweight streamlined previewer or integration of own map viewer.

Simplified Data Access and Download

In addition to directly accessing live geospatial resources from the geoportal, use the Clip-Zip-Ship task to focus data downloads to the desired area and features.

- **Clip:** Draw a polygon, select features, and choose output format.
- **Zip:** The geoportal packages the selected data into a ZIP file.
- **Ship:** The geoportal e-mails the ZIP file to you.

Search Directly from ArcGIS Applications

The **CS-W clients for ArcGIS** to search the geoportal from ArcMap and ArcGIS Explorer and immediate accessing of the data

(ii) The D-SPACE software which is already implemented at the TzNODC will be used for information (bibliographic) management. D-Space preserves and enables easy and open access to all types of digital content including text, images, moving images, mpegs and data sets. D-Space open source software enables open sharing of content that spans organizations, continents and time. Specifically, the main reasons for choosing to use D-SPACE are:

1) **Largest community of users and developers worldwide**

D-Space has over 700 organizations that are currently using the D-Space software in a production or project environment. The most common use is by research libraries as an institutional repository;

however there are many organizations using the software to host and manage subject based repositories, dataset repositories or media based repositories.

2) **Free open source software**

The D-Space open source platform is available for free to anyone and can be downloaded from the sourceforge open source software repository. The code is currently licensed under the [BSD open source license](#). This means that any organization can use, modify, and even integrate the code into their commercial application without paying any licensing fees. Today there are more than 80 developers around the world contributing code, and there are fifteen lead developers (called committers) that work together to plan releases and integrate new features and bug fixes submitted by the community.

3) **Completely customizable to fit own needs** - Some of the key ways to customize the D-Space application to suit own needs are as follows:

User interface - You can fully customize the look and feel of your D-Space website so it will integrate seamlessly with your own institution's website and can be more intuitive for your users.

Ability to customize the metadata - Dublin core is the default metadata format within the D-Space application, however you can add or change any field to customize it for your application. D-Space currently supports any non hierarchal flat name space. However, it is possible to ingest other hierarchal metadata schemas into D-Space such as MARC and MODS. This requires using tools such as crosswalk and having some technical capability to map the transfer of data.

OAI-PMH compatible

Ability to configure Browse and Search - You can decide what fields you would like to display for browsing, such as author, title, date etc. on your D-Space website. You can also select any metadata fields you would like included in the search interface. All of the text within a given item and metadata associated with the item, are indexed for full text search if desired.

Configurable database -You can choose either Postgres or Oracle for the database which D-Space manages items and metadata.

Ability to choose the default language -The D-Space web application is available in over twenty languages so if English is not the local language you can customize.

4) **Used by educational, government, private and commercial institutions**

The platform is used by higher education institutions for whom the platform was initially developed, and in addition the software has shown broad appeal. The software has been used by museums, state archives, museums, state and National Libraries, journal repositories, consortiums, and commercial companies to manage their digital assets.

5) **Can be installed out of the box**

D-Space comes with an easily configurable web based interface, where any system administrator can install on a single Linux or Windows box to get started.

6) **Can manage and preserve all types of digital content**

The D-Space application can recognize and manage a large number of file format and mime types . Some of the most common formats currently managed within the D-Space environment are PDF and Word documents. JPEG, MPEG, TIFF files.

(iii) **Endnote system**

The Endnote system has been chosen as the main system for bibliographic database. The choice of this system was done after extensive consultations and research. Input were solicited from the IOC/UNESCO, Hasselt University Library, UNEP, ReCoMaP, WIOMSA and SAEON regarding the adoption of an existing system OR the development of a database specifically for ASCLME purposes. The use of WEBLIS by

SWIOFP and the resources in IOC portals (including OceanDOCs and AfriLib) and WIOfish were acknowledged and investigated.

The various bibliographic systems were assessed against a list of bibliographic information system requirements. Endnote was selected because it has all key features that were required as follows:

1. The Endnote system handles bibliographic information (article type, authors, title, publication name(s), editions, volumes etc) as well as at least eight customised keyword fields for searchable ASCLME-relevant keywords.
2. The Endnote system is stable and supported.
3. The Endnote system functions offline.
4. Apart of being supported offline, the Endnote system allows to have an identical copy of the software in each of the ASCLME countries, and it provides a simple way to merge the country databases.
5. Endnote records can be easily imported into Dspace (OceanDocs) which is supported by the IOC/UNESCO. Records will thus be available online via OceanDocs in addition to any national portals the countries would like to support.
6. The Endnote system supports full text (the attachment of electronic documents) and links to URLs.
7. The Endnote system is quick to use and no training is required.
8. The Endnote system is compatible with Word which allows in-text citation.
9. The Endnote system is compatible with other major bibliographic software and online repositories of documents and allows automatic *import* of records from other collections, and from literature searches online. It supports 20 import file formats including CSA, Refer, BibIX, ISI, Medline, Ovid, Pubmed, RIS, and SciFinder.
10. The Endnote system is compatible with literature management systems used by partner projects which will allow *export* of records to other systems, eg to Weblis of SWIOFP, OceanDocs of ODINAFRICA/IOC. The system supports 10 export file formats including BibTeX, BibIX, Medline, Refer, and RIS.

Table 4: Description

S/No.	Software	Management use	Location	Funder
1	FileMaker Pro	Database and/or metadatabase	Zanzibar, IMS-UDSM	UNESCO-IOC
2	MEDI	Metadatabase	Paris, UNESCO-IOC Zanzibar, IMS-UDSM	UNESCO-IOC, Downloadable
3	ODV	Database	Zanzibar, IMS-UDSM	Freely downloadable
4	GIS Geoportal	Database and/or metadatabase	Zanzibar, IMS-UDSM	UNEP
4	In Magic	Bibliography and metadatabase	Zanzibar, IMS-UDSM	UNESCO-IOC
5	D-SPACE	Bibliography and metadatabase	Ostende, Belgium	UNESCO-IOC

7.2 Field names and access controls

The geoportal system has a well established structure and supports many different types of formats as has been detailed in section 7.1 above. The system accepts data and documents in virtually all formats. The

geoportal system also supports entry of keywords that could be used to access/locate the documents/data in the system or online easily. The system also allows the creation of themes and that way allowing further organization of data/documents. The geoportal system has a set of standard field names and allows programming to user designed field names. Searching is supported using field names, themes, keywords and spatial area. The geoportal system needs some computer sciences skills as well as programming skills to implement and maintaining. Once implemented, it can be used easily by almost every one.

On the other hand, the D-SPACE system which is an elegant repository system can similarly be programmed to add new field names, themes, topics and create special location/area as required. It supports search based on the field names, keywords, field, topic and combinations. This system can be easily implemented but needs skills in programming. However, like the geoportal, once implemented can be easily used by any one.

Table 5: Field names and access controls capability

S/No.	Software	Field names	Access control
1	FileMaker Pro	Created by user	Depending on user design and programming
2	MEDI	Has some standard field names but can be programmed to add user desired field names	Can be search using key words, spatial search as well as temporal search
3	ODV	Has some standard field names but can be programmed to add user desired field names	Can be search using field names, spatial search as well as temporal search
4	GIS Geoportal	Structured into themes with key words	Can be search using key words and spatial search
4	InMagic	Created by user	Depending on user design and programming
5	D-SPACE	Created by user	Depending on user design and programming

7.3 Flagging system for ASCLME-specific metadata

As detailed sections 7.2 and 7.3 both the geoportal and D-SPACE systems support searching, and creation of topics/themes but require some advanced computer programming skills to program new field names. Similarly, both systems support flagging of entered documents/objects. The systems have some own standard flags however if a new flag is required, this will require advanced programming skills of the respective system to create.

Table 6: Flagging capability of the software

S/No.	Software	Flagging system for ASCLME metadata
1	FileMaker Pro	Needs programming as per user design
2	MEDI	Needs to be added in the pull down-list
3	ODV	Needs programming
4	GIS Geoportal	Needs programming
4	InMagic	Needs programming as per user design
5	D-SPACE	Needs programming as per user design

7.4 Requirements for modification for ASCLME purposes

The geoportal and D-SPACE systems support field names, and flagging for immediate accessing of specific documents/objects entered into the systems. Furthermore, they offer a possibility of creating themes/topics or special areas for specific documents as required. In addition, they also support search by key words. The systems have some own field names and flag; if new and specific field names and/or flags are required or desired, it requires programming the system to add them. This requires advanced programming skills. Similarly, the people who will do the job of populating the systems need a short training to guide them how to enter/upload the various objects in the systems properly. This is important to ensure that the objects are properly flagged and entered in correct field name, keywords and/or topics/themes to enable efficient location of the same. Otherwise, documents may be difficult to locate.

There are therefore two requirements to adopt the two systems for the ASCLME and to ensure that objects entered into them are efficiently located. These are:

- (i) Advanced training on programming the respective systems to some key persons so they can program their systems to implement the required field names and flags. This can be substituted with contracts to experts of the systems to do the required programming on behalf.
- (ii) Training of specific people who will populate the two systems to guide them how to do it properly to ensure that users can easily and efficiently locate/get what they are looking for from the systems if it exists.

Table 7: Requirements for modification

S/No.	Software	Requirements for modification for ASCLME purposes
1	FileMaker Pro	Training and/or contract to an expert
2	MEDI	Training and/or contract to an expert
3	ODV	Training and/or contract to an expert
4	GIS Geoportal	Training and/or contract to an expert
4	InMagic	Training and/or contract to an expert
5	D-SPACE	Training and/or contract to an expert

8. Meeting and reporting schedule

The implementation of national activities in support the MEDA development will take place for about one year in total. These activities will be implemented stage-by-stage to allow for review and evaluation of the implementation at each stage which will be done at a national workshop. The whole process of implementing the MEDA has been divided into three stages as shown in the Table below. Reporting will be done at the end of each implementation stage (MEDA month 4, MEDA month 6, and MEDA month 8) and in the indicated annual reports. Reporting may also be done as required and appropriate at national and/or regional meetings.

Table 8: Implementation of the MEDA

Dates	Activity/Deliverable
MEDA month 1	MEDA plan and TORs for thematic specialists complete
MEDA month 1	Countries identify MEDA specialists
27 February	National D&I plan v1 complete
MEDA month 2	Appointment of MEDA specialists
13 March	National D&I plan finalized
MEDA month 4	MEDA stage 1 complete

MEDA month 5	Dates set and submitted to the PCU for National meetings in support of the MEDA (from Sep to Dec)
MEDA month 6	MEDA stage 2 complete for review
MEDA month 8	MEDA stage 3 complete (MEDA National meetings and final draft of MEDA completed for review)
11 December	D&I Coordinators annual report due
December 2010	D&I Coordinators annual report due (Data product development and cruise DM)
December 2011	D&I Coordinators annual report due (Data product development and cruise DM)

9. Financial arrangements

Direct funding of the ASCLME project activities will come from the ASCLME project head quarters. In addition, other co-funding will come from UNEP through its Nairobi Conversion Clearinghouse Mechanism Project (NC-CHM) and from the UNESCO-IOC through the its ODINAFRICA Project which supports NODCs. The UNEP funds amounts to USD33000 while ODINAFRICA funds amounts to 63000. Tanzania being the host country will co-fund the activities by providing local personnel, office space and furniture for activities at the national focal points. In additional other local facilities like telephone, internet and others as required will be provided by Tanzania. Local funding will usually be directly assimilated within the local institution costs.

10. Time lines and reporting

Time lines and deliverables for reporting are outlined in the Terms of Reference for Data and Information Coordinators.