

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
(of UNESCO)

Sixteenth Session of the IOC Committee on International Oceanographic Data and Information Exchange (IODE, Lisbon, Portugal, 30 October – 9 November 2000

OCEAN DATA AND INFORMATION NETWORK IN AFRICA-PHASE-II
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1. INTRODUCTION

The utilization of available data and information for management and exploitation of the marine environment and resources is one of the major challenges facing African coastal states. The success of development strategies will depend to a great extent on the availability and use of scientific and technical information in a form that can be readily understood and applied.

Though several programmes initiated at the national, regional and global level have generated tremendous amounts of data and information, these have not been effectively used for national development. This has mainly been due to limited access to data collected in the framework of these programmes, and the lack of skills for analysis and interpretation of the data. There is a need to establish mechanisms for collection, quality control, analysis, interpretation and dissemination of data and information.

The ODINAFRICA-II project intends to address these problems by:

- Providing assistance in development of NODCs and establish their networking in Africa
- Providing training opportunities in marine data & information management applying standard formats and methodologies as defined by IODE
- Assisting in development and maintenance of national, regional and Pan-African meta data, information and data holding data bases
- Assisting in development and dissemination of marine data and information products responding to the needs of a wide variety of user groups using national and regional networks

The development of a network of functioning data and information centres which is envisaged by ODINAFRICA-II will also address concerns expressed in various regional and international programme as outlined below:

IOC's Regional Committee for the Central Eastern Atlantic (IOCEA)

IOCEA at its first session in 1987 requested assistance for development of marine information capabilities, including a regional centre. The second session in 1990

approved the establishment of a regional data centre in Conakry, Guinea. The need for the centre was reiterated at the third session in 1993, which also endorsed the implementation of a project on Regional Cooperation in Scientific Information Exchange in the Central and Eastern Atlantic (RECOSCIX-CEA). The fourth session of IOCEA stressed the need for continuous progress, and importance of inter-regional exchange.

IOC's Regional Committee for the Cooperative Investigations in the North & Central Western Indian Ocean (IOCINCWIO).

The second session of IOCINCWIO in 1987, recommended the implementation of the project on Regional Cooperation in Scientific Information Exchange in the Western Indian Ocean (RECOSCIX-WIO). The project was launched in 1989. The third session of IOCINCWIO identified the need for development of capacity for data management, and especially expressed concern that few institutions/scientists in the region have been able to access or analyse/interpret the data acquired from global programmes like TOGA and WOCE for use in national planning and development. These issues were again raised at the fourth session in 1997 which adopted a proposal for development of an Ocean Data and Information Network in Eastern Africa (ODINEA) as a step towards addressing these concerns. The implementation of ODINEA commenced towards the end of 1997.

PanAfrican Conference on Sustainable Integrated Coastal Management (PACSIKOM)

PACSIKOM which was convened in Maputo, Mozambique in 1998 as part of a region wide effort to give impetus to the management of the seas and coasts of Africa also reiterated the importance *of strengthening of the collection and dissemination of scientific information as a basis for effective management of coastal areas through:*

- *Collection, use and protection of indigenous knowledge;*
- *Supporting sustained routine and long-term measurements and monitoring of environmental variables as a basis for forecasting change;*
- *Use of appropriate information delivery mechanisms;*
- *Sharing of information, data and experience on intergrated coastal area management programmes and projects;*
- *Identification of common methodologies and harmonizing activities in information collection.*

PACSIKOM further highlighted the following specific recommendations of the technical committees concerning information and data management:

Provision of a sound information base for local and regional planning requires:

- a) formation of an Africa-wide network of national ocean data centres;
- b) ...
- c) creating a network of specialists trained in the use of data acquired by remote sensing from space satellites;
- d) facilitating the further implementation of modern electronic communication systems such as Internet connections and data transfer mechanisms.

In order to enhance the integration and sustainability of projects, it is essential:

- a) ...
- b) To enhance the quality and quantity of information transfer between the Government's institutions, their agents, international bodies and non governmental organizations interested in project implementation, through the use of information and communication technologies;
- c)

International Oceanographic Data and Information Exchange (IODE)

One of the initial tasks that were outlined for the Intergovernmental Oceanographic Commission of UNESCO when it was established in 1960, was the setting up of structure to co-ordinate international oceanographic data exchange. This led to the development of the International Oceanographic Data and Information Exchange (IODE) system whose primary goal is to enhance marine research, exploration and development by facilitating the exchange of oceanographic data and information between participating member states.

The IODE system comprises a global network of National Oceanographic Data Centres (NODCs), and Designated National Agencies (DNAs) which are centralized facilities for providing, on a continuing basis ocean data/information in a usable form to the wider user community, Responsible National Oceanographic Data Centres which are NODCs which have accepted additional special responsibilities like being in charge of specific data types or specific ocean regions, and World Data Centres which receive data and inventories from NODCs/RNODCs, marine science organizations and individual scientists. The WDCs also provide data and inventory of publications to NODCs/DNAs, RNODCs and international co-operative programmes in addition to monitoring the performance of the international data exchange system.

ODINAFRICA-II will enable participating member states to establish and strengthen NODCs and DNAs which will be part of the IODE system.

Global Ocean Observing System

GOOS is an internationally coordinated system for systematic operational data collection (measurements), data analysis, exchange of data, generation of data products, technology development and technology transfer. GOOS is implemented largely through nationally or regionally owned and operated facilities and services. During PACSICOM, a GOOS-Africa committee was established with the following terms of reference:

- a) develop GOOS-Africa strategy and action plans,
- b) link various modules of GOOS into regional and national GOOS committees,
- c) create a GOOS-Africa network as the basis for communication about GOOS,
- d) establish communications with appropriate GOOS and related bodies (eg IOCEA, IOCINCWIO, Indian Ocean Commission, CLIVAR-AFRICA etc),
- e) develop a biennial work programme and budget,
- f) through lobbying and by other means promote development and funding of GOOS activities in Africa.

ODINAFRICA can play a key role in archival and processing of the data collected within the GOOS programme.

United Nation's Conference on the Environment and Development (UNCED)

The need to develop capacity for collection, analysis, interpretation and distribution of data and information from the oceans and all seas was one of the issues addressed by Agenda 21 of the United Nation's Conference on the Environment and Development (UNCED) held in Brazil in 1992. This was to be done through:

- Strengthening of national scientific capabilities for data collection and analysis
- Creation of national databases
- Linking of these national databases to existing data and information services and mechanisms
- Cooperation with a view to the exchange of data and information and its storage and archiving through the regional and world data centers

NEEDS IDENTIFIED BY THE AFRICAN MEMBER STATES

From the foregoing, the data and information management requirements for Africa can be summarized as follows:

Requirement 1 Provision of Internet access to marine scientists in Africa;

Requirement 2 Providing assistance in the development and operation of National Oceanographic Data Centres and establish their networking in Africa;

Requirement 3 Providing training opportunities in marine data and information management applying standard formats and methodologies as defined by the IODE;

Requirement 4 Assist in the development and maintenance of national, regional and Pan-African marine metadata and data holding databases;

Requirement 5 Assist in the development of marine data and information products responding to the needs of a wide variety of user groups;

Requirement 6 Reinforce the RECOSCIX-CEA and RECOSCIX-WIO networks as mechanisms for the dissemination of marine data and information to various user groups in Africa;

Requirement 7 Assist in the development of linkages with other international projects with similar objectives (eg GOOS-Africa; Gulf of Guinea LME, etc)

2. CURRENT STATUS

Figure 1 shows the current status of IODE Data Centres in Africa. Whereas we now have 6 Data Centres for 7 Member States in the IOCINCWIO region (Kenya, Mauritius, Mozambique, Seychelles, South Africa and Tanzania) -not including Somalia-, we have only 5 (Ghana, Guinée, Morocco, Nigeria and South Africa) for 18 Member States in the IOCEA region. Furthermore of these 5 only a few are operational. There is an additional 1 data centre in Egypt.



Figure 1: Data Centres in Africa

IOCINCWIO REGION

Several projects developed by the IOC as far back as 1989 have, to some extent, contributed to responding to the needs included in the ODINAFRICA-II project objectives. The RECOSCIX-WIO and the ODINEA projects that were developed to cater for marine data and information needs in the region are discussed below:

Regional Cooperation in Scientific Information Exchange in the Western Indian Ocean (RECOSCIX-WIO)

The RECOSCIX-WIO project, developed by the IOC in 1989, following the recommendation by the region at IOCINCWIO-II (1987) and subsequently funded by SAREC of Sida through IOC (1989-1992, 1998-...) and Belgium (1992-....), has been extremely successful in developing marine information capacity as well as in providing services and developing products. RECOSCIX-WIO has ALSO received financial and material support from a number of countries and organizations including Canada, USA (NOAA), UNEP, IAMSLIC and the marine science institutions in the region, and libraries world-wide. The objectives of RECOSCIX-WIO were:

- ◆ provide marine scientists in the region with the necessary scientific information;
- ◆ enhance the use of indigenous scientific information in the region;
- ◆ promote and facilitate communication between the scientists, both intra- and inter-regionally;
- ◆ disseminate information on scientific research activities in the region.

To achieve these goals the project set out to develop a number of services and products such as:

- (i) provision of bibliographic search and document delivery services;
- (ii) provision of equipment and software to marine science libraries in WIO region;
- (iii) provision of training to staff of marine science libraries and documentation centres in the region;
- (iv) support for internet connectivity for marine scientists in the region;
- (v) development of the regional directory of marine scientists (WIODIR);
- (vi) development of a regional library holdings database (WIOLIB);
- (vii) publication of the newsletter WINDOW (Western Indian Ocean Waters);
- (viii) development of MASDEA (Marine Species Database for Eastern Africa);
- (ix) inclusion of indigenous scientific publications in ASFA through the regional ASFA input centre in Mombasa, Kenya;
- (x) publication of WIOBASE (integrated Western Indian ocean data and information sources CD-ROM).

To mark the tenth anniversary of the project, a workshop on 'RECOSCIX-WIO in the year 2000 and beyond' was held in Mombasa, Kenya between 14-17 April 1999. The participants evaluated the project's structure and activities and recommended actions that should be implemented to enhance the relevance of the project and improve on delivery of service to marine scientists in the region.

The workshop marked a departure from the tradition of previous RECOSCIX-WIO workshops and training courses where only information managers were invited. For this event each of the institutions participating in the project was invited to nominate both marine information managers AND scientists to attend. This was in recognition that scientists are the main users and beneficiaries of the RECOSCIX-WIO services and products, and therefore should be involved in the planning of the project's future.

Noting the achievements made by the RECOSCIX-WIO Project in the region, especially in the provision of information services and the development of useful marine information databases and other products, the participants recognized that the next phase of the project should strongly address the agenda of sustainability. Future activities must be tailored into a transition phase that would entail the development of a regional information and data exchange network utilizing the available electronic systems. The participants therefore urged the IOC and other donors to provide support for the implementation of this transition phase.

Recognizing further the need for a similar service to freshwater scientists, the participants resolved that ways should be explored to either develop a freshwater component of the project, or formally incorporate freshwater into the project.

Recalling that the project had provided hardware, software and training to the cooperating institutions in the region, the participants noted that with the rapid change in technology most of these equipment which are now out-dated should be replaced with new ones. The participants stressed the need for training and retaining personnel to manage the library and information centres in the institutions participating in the project. The participants noted that though the training workshops and the MIST course introduced librarians to various subjects, there is a need for more in-depth training. However, since most of the libraries have limited staff, extended training away from the institutions would adversely

affect their operations. Local training opportunities, and distance learning programmes should therefore be explored to strengthen the capacity of the libraries.

Ocean Data and Information Network in Eastern Africa

The third session of IOCINCWIO meeting in Vacoas, Mauritius in 1992 stressed the need to (i) strengthen the national data management capacities; and (ii) to develop a regional data and information network, noting that the RECOSCIX-WIO network could be adapted to serve these needs.

Subsequently a proposal for the development of ODINEA formulated by the region, and endorsed by IODE-XV was submitted to the government of Flanders for funding as part of the first phase of ODINAFRICA. The ODINAFRICA-I project, which incorporated RECOSCIX-WIO, RECOSCIX-CEA and ODINEA was implemented from 1998-2000.

ODINEA's main objectives can be summarized as follows:

- establish an operational data management structure, composed of a regional data centre as well as national data centres
- build and maintain regional human and infrastructural capacity to collect, quality control, archive, analyze, repackage and disseminate the data and information and the international, regional, national and local levels
- actively search, retrieve and archive historical ocean data sets in- and outside the region related to Eastern Africa
- provide access to the Internet for marine scientists in the Eastern Africa region
- ensure inclusion of scientific information produced in Eastern Africa (and South Africa) in the bibliographic database ASFA

By the end of the ODINAFRICA-I project we expect the following results:

- Operational National Oceanographic Data Centres (or Designated National Agencies) in Kenya, Madagascar, Mauritius, Mozambique, Seychelles, South Africa and Tanzania (**we mention that by September 1999 this has been achieved by all countries except Madagascar**);
- Operational regional data dissemination centre (Mombasa, Kenya)
- Trained data managers in the above mentioned data centres;
- Operational national and regional ocean meta databases for the IOCINCWIO region;

IOCEA REGION

Regional Cooperation in Scientific Information Exchange in the Central Eastern Atlantic (RECOSCIX-CEA)

During the ODINEAFRICA-I project substantial progress has been made in the development of the RECOSCIX-CEA products and services. The RECOSCIX-CEA objectives and expected achievements can be summarized as follows:

- provision of information retrieval service
- provision of document delivery service
- provision of Internet access support

- development of regional directory of marine scientists
- directory of marine libraries and information centres
- catalog of library holdings
- catalog of scientific and technical publications
- regional newsletter

Furthermore, an agreement was made between FAO, IOC and Cambridge Scientific Abstracts to provide, free of charge and for a period of not less than two years, free copies of the 'Aquatic Sciences and Fisheries Abstracts' ASFA, to African Member States.

In terms of data centres very little has been achieved in the IOCEA region. Due to lack of funds both at the local level and at the IOC no substantial efforts could be made to develop data management capabilities in the IOCEA region. The ODINAFRICA-I project's terms of reference did not include data management, only information management.

The existing data centres (Ghana, Guinée, Morocco, Nigeria, South Africa) have been formally established but most (except South Africa) are poorly equipped and are in need of equipment, operational support and trained manpower.

MEDITERRANEAN AND RED SEA AREAS

The IOC does not have a regional subsidiary body for the Mediterranean nor for the Red Sea area. Nevertheless countries from the Mediterranean region had an opportunity to participate in a number of IODE-related activities such as the 'Training Course on Management of Marine Data and Information for the Mediterranean Region, Malta, 10-21 April 1995'. Nevertheless only two data centres have been established in these two areas: Morocco and Egypt.

Though no RECOSCIX related activities have been implemented in these areas, the member states from the region have expressed strong support for the project.

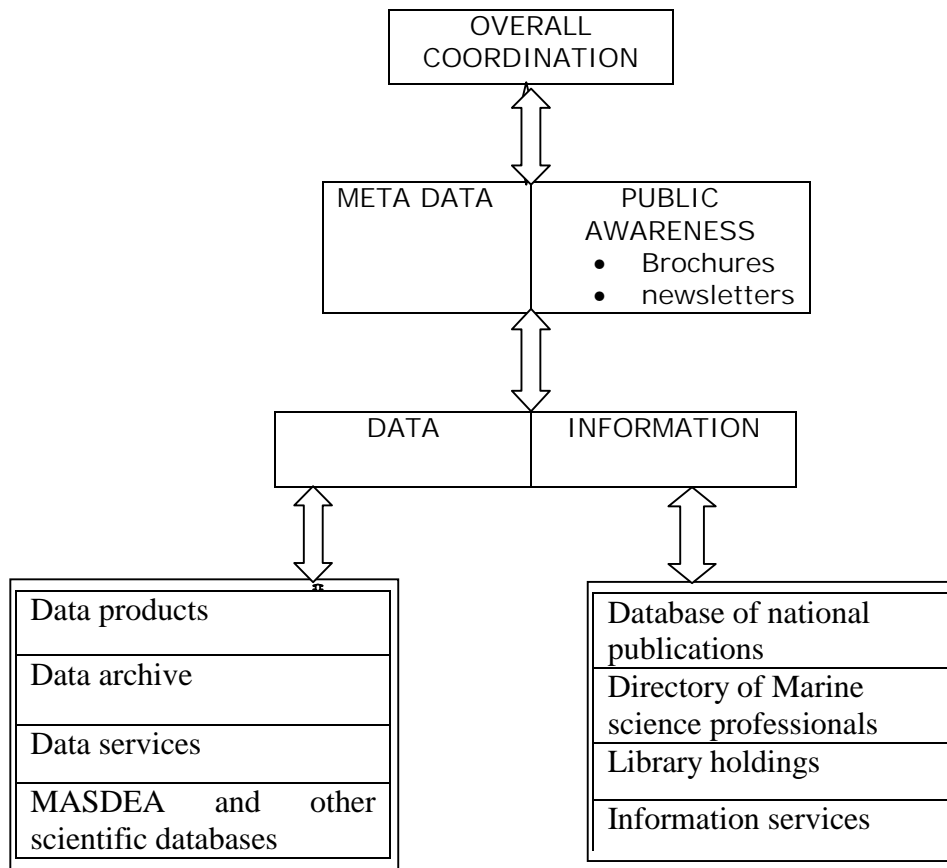
3. INTEGRATED MARINE INFORMATION SYSTEM FOR AFRICA (THE RECOSCIX NETWORKS IN ODINAFRICA-II)

The discussions during the RECOSCIX-WIO workshop, and subsequent consultations with researchers and other users of the RECOSCIX services show that the services of the project are still needed though changes in focus and delivery are necessary to address the changed circumstances in the region. Whereas the project initially focused on researchers, this should be changed to encompass a wider user base than at present. This will include policy makers, resource managers, educational institutions, NGO's and even private companies. The project will have to pro-actively develop information products addressing the needs of these new categories of users, while at the same time improving on delivery of its current core services and products.

In order to ensure that all these users know of the existence of the services and products an aggressive public awareness campaign must be implemented. The first phase of the projects did little to cultivate partnerships between the link institutions in each of the member states and other potential users in the member states. This will have to change in order to ensure that the project addresses the national data and information, rather than the priorities of the hosting institutions

only. This ties closely with Integrated Coastal Area Management, which is now the accepted approach for managing marine and coastal resources and environment.

On a regional basis a facility providing on-line access to an integrated information system including databases and products developed by the project and news from the region should be put in place to enable users to have easier access to the information. The current services and products offered by the project have to be reviewed to determine their continued relevance and see how they can fit in within this system.



The query handling service is now done by most of the cooperating institutions in-house since they have been provided with subscription to the ASFA CDROM. The advent of the Internet has provided immediate access to more up-to date information to the scientists, including access to ASFA database on-line. However problems with access in some of the member states has led to a disparity in access to information. The project should therefore explore mechanisms to improve access to the Internet where it is feasible and the incremental cost is reasonable.

The project should emphasis delivery of documents by electronic means to cut down on delays, which have plagued these services. The publication of WIO PUB and WIO LIB as part website will enable scientists to browse through the holdings of RDC and other libraries in the region and select required documents which can then be sent to them electronically. The cost of subscribing to a few popular journals for each of the institutions can also be explored as a way of providing documents closer to the users.

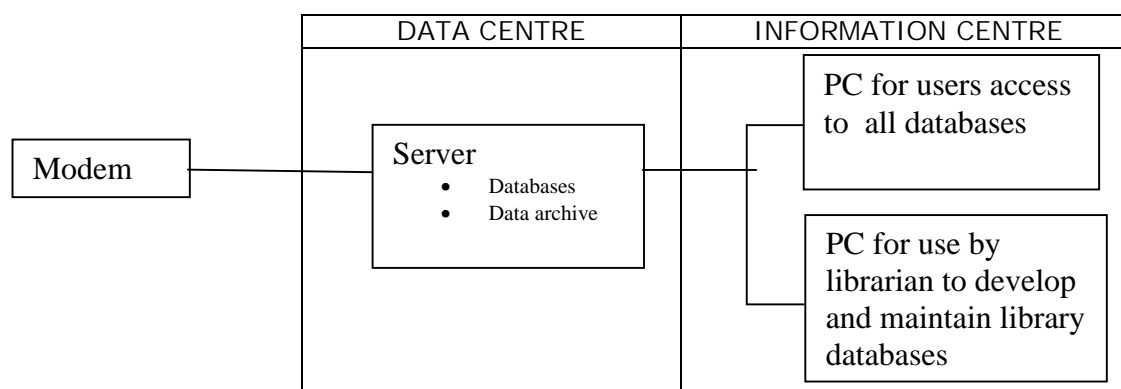
Other products developed by the national centers can be availed on their sites with link this the integrated information site. The availability of this information should be widely published so that users are aware of its existence.

The following are some of the information that will be availed on the web-site:

- Marine Science Country Profiles
- National Institutional profiles (links to their websites)
 - Facilities available (infrastructure, equipment)
 - Staff (linked to Professionals directory)
 - Library database, including list of journal subscription (linked to merged catalogue)
 - Activities and achievements
- NGO's
- Regional bodies (links to their website)
- International organisations operating in the region (links to their websites)
 - Focus on their activities in the region
- Marine Science Professionals
- Publications about/from the region
- Merged Catalogue of library holdings
- Marine Species Database for Eastern Africa
- Meta database
- On-going projects
- Results of major meetings/conferences
- Training opportunities in the region
- Relevant training opportunities outside the region
- News pages (Key issues of concern, including workshops, conferences, symposia)

National Coordination

In the first phase of the project, information and data were considered as separate entities, with different projects: RECOSCIX-WIO/RECOSCIX-CEA and ODINEA managing them. In view of the need to have a "one stop shop" for both data and information services/products, close linkages will be encouraged between the data and information components. National coordination workshops will be organised in the member states that have not yet established NODCs or DNAs. The support provided for operational expenses will cover both the data and information centre. The structure outlined below is proposed for adoption by the institutions participating in the project:



The participating institutions will have to set-up or strengthen internal computer networks to improve local access to data and information. Improved access to the internet will be important for exchange of information as most of the resources in this phase will be web based. The national institutions will also be expected to develop websites through which their products and services can be availed.

The host institution must see the data and information centre as a service centre rather than just an archive. It will be essential to involve potential users in the development of data and information products so as to ensure that the products have a market. This will ensure sustainability of the project beyond donor funding. To this end provision has been made for national workshops on data/information services/products requirements for the sustainable management of coastal resources and the coastal zone.

Regional Coordination

The following African member states of IOC have confirmed participation in ODINAFRICA-II: Benin, Cameroon, Comores, Cote d'Ivoire, Gabon, Ghana, Guinea, Kenya, Madagascar, Mauritania, Mauritius, Morocco, Mozambique, Nigeria, Senegal, Seychelles, South Africa, United Republic of Tanzania, Togo, Tunisia.

During the first ODINAFRICA-II Planning workshop held in Dakar, Senegal in May 2000, it was agreed that for easy coordination of the project activities, the participating member states would be grouped into two based on the IOC Regional Subsidiary bodies (IOCEA and IOCINCWIO):

IOCINCWIO and South Africa: Comores, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, South Africa, Tanzania (8).

IOCEA and North Africa: Benin, Cameroun, Cote d'Ivoire, Gabon, Ghana, Guinea, Mauritania, Morocco, Nigeria, Senegal, Togo, Tunisia (12)

The advantage of this structure would be that member states are within the same IOC regional subsidiary body (except for Tunisia) and can therefore synchronize their activities within ODINAFRICA with regional programmes. It will also be easier to organize data management for specific marine science activities being undertaken by the relevant regional subsidiary body. The environments being dealt with by member states in each group would be more or less similar. Hence it will be easier to source literature and data sets relevant to members of a group.

Tunisia agreed to become part of the IOCEA group but, in order to accommodate the specificity of the Mediterranean member states, decided to form an informal sub-group within the IOCEA group of which the purpose would be to promote the project in the Mediterranean region with the view of attracting more members states to the network. The sub-group could be up-graded at a later stage if and when a sufficient number of other Mediterranean member states will have joined the network.

Each of the groups would be headed by a regional coordinator, whose responsibilities would include: administrative management of the project, monitoring progress, organizing training courses and workshops, ensure effective follow-up to training activities, and promoting extensive communication and exchange of expertise between the project Partners. The regional coordinators will have to communicate regularly with each other, and with the National

Coordinators to ensure that the implementation of the project runs smoothly. A project management workshop will be held annually during the project so that the member states and donors can evaluate the progress, as well as discuss and agree on the work plan and budgets for the activities to be implemented in the following years.

International Linkages.

One of the key objectives of the project is to develop local capacity for data and information management that will be able to sustain the network beyond the project's life. External capacity building & training expertise will be required for this. Accordingly a number of universities and research facilities from outside Africa have been invited to participate as 'external expertise partners'. The following have responded positively: Australian Oceanographic Data Centre-AODC (Australia), Vlaams Instituut voor de Zee / Flanders Marine Institute-VLIZ (Belgium), Limburgs Universitair Centrum-LUC (Belgium), Vrije Universiteit Brussel-VUB (Belgium). These institutions have already participated in earlier phases of ODINAFRICA. Additional experts, from the partner countries in Africa or others, may be used on a contractual basis for specific tasks.

4. ODINAFRICA-II ACTIVITIES AND WORK PLAN

The cost of implementing the project over a 4-year period (2000-2003) is in excess of US\$4.3 million, with the Government of Flanders, Belgium contributing US\$2.3 million, and the remaining amount coming from the participating member states (US\$1.5million in kind), IOC, and the external expertise partners.

MAIN ACTIVITY 1: Project Management

- **Sub-activity 1.1: Annual Project Management Workshop**
Rationale: During the annual Project Management Workshop the Member States and the donors will evaluate the progress of the project, as well as discuss and agree upon the workplans and budgets for the activities to be implemented the following year(s).
- **Sub-activity 1.2: Project Staffing and Management**
Rationale: The project will be implemented by an NODC or DNA from each of the participating member states. Provision has been made for national coordination meetings to designate such a centre where one does not exist (see sub-activity 2.1, 2.2). The national project staff cost will be absorbed totally by the participating institutions. There are two regional coordinators covering IOCEA and IOCINCWIO regions respectively have been.

MAIN ACTIVITY 2: Development and operation of National Oceanographic Data (and Information management) Centres and establish their networking in Africa

- **Sub-activity 2.1: Organization of national coordination meetings to identify suitable host institutions for NODC/DNA (including information management)**
Rationale: in order to fully benefit from the IODE system and the project Member States will be requested to formally establish NODCs or DNAs (including information management centre) as per IODE guidelines.

Financial assistance (and expertise, where required) will be provided for the organization of national coordination meetings to decide on the most suitable host institution for the NODC/DNA.

- **Sub-activity 2.2: Formal establishment of NODC/DNA (including information management centre)**
Rationale: in order to fully benefit from the IODE system and the project Member States will be requested to formally establish NODCs or DNAs (including information management centre) as per IODE guidelines.
- **Sub-activity 2.3: Provision of Hardware and Software Package**
Rationale: in order to ensure that the data and information centres can fully participate in the technical aspects of the project (and in a harmonized way) a standard hardware and software package will be provided. This will also facilitate problem solving. Hardware will be provided for both the data and information centres.
- **Sub-activity 2.4: Provision of support for operational expenses data and information centre**
Rationale: support will be provided for day-to-day operational expenses required to operate the data and information centres (telecom, Internet access, office supplies, overtime,...). Emphasis will be placed on development of products and services leading to self-support of the data and information centres.

MAIN ACTIVITY 3: Providing training opportunities in marine data and information management applying standard formats and methodologies as defined by the IODE

- **Sub-activity 3.1: Development of ODINAFRICA/IODE Resource Kit**
Rationale: In order to ensure standardization of software, formats methodology as well as training curricula, and to enable students to self-study subsequent to group training courses, a comprehensive PC-based training package (CD-ROM) will be developed by a group of IODE experts based on the IODE Resource Kit. The ODINAFRICA Kit will include substantial data and information sets relevant to Africa. The kit will be updated annually.
- **Sub-activity 3.2: Regional Data Management Training Course**
Rationale: Three regional data management training courses will be organized covering all responsibilities and their technical aspects covered by NODC/DNA as well as data product development.
- **Sub-activity 3.3: Regional Data Management Training Course Follow-up and Support**
Rationale: In order to ensure that the trainees can make optimum use of the knowledge gained during the training courses and to ensure implementation of 'take home' tasks assigned during the courses a small team of experts shall be contracted to provide Internet-based follow-up and support.
- **Sub-activity 3.4: Regional Information Management Training Course**
Rationale: Three regional information management training courses will be organized covering all responsibilities of RECOSCIX cooperating institutions, as well as library management and library services.

- **Sub-activity 3.5: Regional Information Management Training Course Follow-up and Support**

Rationale: In order to ensure that the trainees can make optimum use of the knowledge gained during the training courses and to ensure implementation of 'take home' tasks assigned during the courses a small team of experts shall be contracted to provide Internet-based follow-up and support.

MAIN ACTIVITY 4: Assist in the development and maintenance of national, regional and Pan-African marine metadata, information and data holding databases

- **Sub-activity 4.1: GODAR Participation: identification, repatriation and digitization of Africa related datasets from outside (and within) Africa**

Rationale: a large amount of data relevant to Africa are archived throughout the world but are not available to African scientists. This sub-activity will assist in the identification, repatriation and digitization of these data, within the framework of the GODAR project.

- **Sub-activity 4.2: Development of national and regional meta databases**

Rationale: the MEDI format and MEDI software will be used to develop national and regional metadata bases covering national data holdings (describing also the data sets recovered under sub-activity 4.1). One volunteer data centre will host the regional (African) metadatabase on a WWW site.

- **Sub-activity 4.3: Development and maintenance of national and regional data archive**

Rationale: in order to ensure the easy availability of datasets for the preparation of data and information products a computerized database system will be developed at the national (and possibly regional) level.

MAIN ACTIVITY 5: Assist in the development and dissemination of marine data and information products responding to the needs of a wide variety of user groups using national and regional networks

- **Sub-activity 5.1: Support for national workshops on data/information service/product requirements for the sustainable management of coastal resources and the coastal zone**

Rationale: support will be provided for workshops at the national level to identify data and information product requirements based on national ocean programmes, ICAM plans and other relevant policy documents and policies.

- **Sub-activity 5.2: Support to the RECOSCIX networks**

Rationale: the RECOSCIX networks will be provided with support to continue their 'traditional' information services (query handling, document delivery), as well as to assist in the effective dissemination of information products to end users.

- **Sub-activity 5.3: Support for development of data and information products**

Rationale: As a follow-up to sub-activity 5.1 support will be provided for the development of specific data and information products.

- **Sub-activity 5.4: Support for public awareness creation on the project services and products**
Rationale: support for specific activities by the data and information centres to publicize the products and services provided/developed by the project and the centres. Emphasis will be placed on development of products and services leading to self-support of the data and information centres.

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