

IAMSLIC

International Association of Aquatic and Marine Science
Libraries and Information Centres

**Proceedings of the
2nd Africa Regional Group Conference
Accra - Ghana**

13th – 15th September 2005

Theme

**Coping with the Digital Age in Aquatic and
Marine Science Libraries in Developing Countries**



IAMSLIC

**International Association of Aquatic and Marine Science
Libraries and Information Centres**

**Proceedings of the 2nd Africa Regional Group Conference
Accra - Ghana 13th – 15th September 2005**

**Theme
Coping with the Digital Age in Aquatic and Marine Science Libraries in Developing
Countries**

BAY VIEW HOTEL - ACCRA

**Edited by
Richard Y. Kofie
&
Sematorr K. Yiborku**

**Sponsored by
Technical Centre for Agriculture and Rural Cooperation
(CTA) and IAMSLIC**

PREFACE

Welcome to the Proceedings of the 2nd Conference of the Africa Regional Group of the International Association of Aquatic and Marine Science Libraries and Information Centres (AFRIAMSLIC) held in Accra, Ghana, 13th–15th September 2005. This conference was originally scheduled to be held in Zanzibar, Tanzania, however this could not be, due to circumstances beyond our control.

This year's conference had as its theme, **Coping with the Digital Age in Aquatic and Marine Science Libraries in Developing Countries**. It was hosted by the Water Research Institute (WRI) of the Council for Scientific and Industrial Research (CSIR). The venue of the conference was the Bay View Hotel. The objectives of the conference were to:

- develop a working document which will serve as a reference tool for AFRIAMSLIC,
- discuss the design of a website and establishment of an Information Resource Centre,
- operationalise the network strategies for AFRIAMSLIC,
- discuss the linkage of AFRIAMSLIC and the existing networks dealing with aquatic and marine science in Africa, and
- discuss sources of funding for the group.

The conference attracted 20 (twenty) delegates. Seven of these came from different parts of Africa - some participating in an AFRIAMSLIC conference for the first time.

Coping with the Digital Age was chosen as the conference theme because we were interested in accessing the effect of digitilisation in the works of libraries in developing countries. Many of the papers and country reports presented were closely linked to developments so far achieved in this area. The tone set by the Guest Speaker, Mr. C. Entsua-Mensah, Director, CSIR-Institute for Scientific & Technological Information and the Keynote Address by Dr. Charles A. Biney, Director, CSIR-Water Research Institute were stimulating enough. Twelve papers were presented in all, but eleven of these were available for publication in this proceeding.

The Technical Centre for Agricultural and Rural Co-operation (CTA) continued its strong support for AFRIAMSLIC by sponsoring 6 (six) of the delegates from Guinea, Kenya, Malawi, Nigeria, Senegal and South Africa. We also had a delegate from Seychelles who was sponsored by the Seychelles Fishing Authority. We are very grateful for this support that enabled us achieve what we had hoped for.

We are very grateful to the Director of the Water Research Institute for agreeing to host this year's conference once again and for the Institute's support for a successful conference.

I would like to thank all the presenters for their contribution to the conference as well as the editorial team for editing the proceedings. I hope that you will find the proceedings informative and stimulating.

December 2005

Marian A. Jiage,
Conference Convenor,
Chair, AFRIAMSLIC

ACKNOWLEDGEMENT

We sincerely credit the success of the 2nd AFRIAMSLIC Conference and the publication of this report to many individuals and organizations. In this regard, we will like to express our gratitude to the Water Research Institute (WRI) of the Council for Scientific and Industrial Research (CSIR) for hosting the conference for the second time and in particular the Director of the Institute, Dr. C.A. Biney who gave the keynote address to the conference. We extend our greatest thanks to the Guest Speaker, Mr. C. Entsuah-Mensah, Director of the Institute for Scientific and Technological Information (INSTI) of the CSIR , whose address provided much food for thought for the Conference.

Many people facilitated the overall process of the conference. These include, Dr Emmanuel Adjei of the Department of Information Science of the University of Ghana who chaired the opening ceremony, all contributors, participants, presenters and resource persons. To them all we extend our hand of gratitude.

Our special gratitude goes to Dr Richard Y. Kofie and Mr. Sematror K. Yiborku of INSTI and the CSIR Head Office respectively for once again accepting the honourous responsibility for compiling, editing and preparing the conference proceedings.

We wish to place on record our appreciation to our sponsors, the Technical Centre for Agricultural and Rural Co-operation (CTA) Netherlands and IAMSLIC for funding the conference.

TABLE OF CONTENTS

	Page
Preface	3
Acknowledgement.....	4
List of Acronyms.....	7
Communique.....	9
Welcome address by Marian Jiagge..... Chairperson, Africa Regional Group (AFRIAMSLIC)	10
Address by Guest Speaker..... <i>Mr Clement Entsuah Mensah</i> Director, CSIR Institute for Scientific & Technological Information	12
Keynote Address	15
<i>Dr Charles Biney</i> Director, CSIR Water Research Institute	
1. Artisanal Fisheries in Ghana..... <i>Dr Mamaa Entsuah-Mensah</i>	17
2. Environmental Information Management: Challenges and opportunities of the Digital Age. A case study of Ghana Environmental Protection Agency (EPA) Library	27
<i>Agnes Adjabeng</i>	
3. Access to Electronic Literature: An answer to document resources constraints in Africa.....	36
<i>Arame G. Ndiaye Keita</i>	
4. Electronic Information in Aquaculture and Fisheries Science: Opportunities and Challenges in Malawi.....	40
<i>Geoffrey F. Salanje</i>	
5. An Overview of the Seycheles Fishing Authority Documentation Centre.....	45
<i>Denise Mathiot</i>	
6. The Impact and Benefits of the Digital Age on the SAIAB Library aand the Challenges for the Librarian, libray users and resource sharing in the region.....	51
<i>Margaret Shaw</i>	
7. IAMSLIC (AFRIAMSLIC) Membership benefits and challenges	67
<i>Marian A. Jiagge & Mac-Anthony Cobblah</i>	

8. The Relevance of the Librarian in the development of Digital Libraires in Africa.....	71
<i>M.O. Ibeun</i>	
9. Togo National Oceanographic Data Centre.....	76
<i>Dometo Kokoe Kouevi Akue</i>	
10. Access to Marine Information Specialists in Africa (AMISA) Project.....	84
<i>Kaba Fode Karim</i>	
11. Improving access to fisheries and aquaculture grey Literature in Kenya.....	87
<i>James Macharia</i>	
12. Group Discussions.....	91
13. Appendix I.....	97
14 Appendix II.....	98
15. Appendix III.....	102

LIST OF ACRONYMS

ABAFR	Aquatic Biology, Aquaculture and Fisheries Resources
AEIN	African Environment Information Network
AFRIAMSLIC	Africa Regional Group of the International Association of Aquatic and Marine Science Libraries and Information Centres
AFRILIB	Africa's Library Holdings
AGORA	Access to Global Online Research in Agriculture
AIFA	Aquaculture Information Services for Africa
AMISA	Access to Marine Information specialists in Africa
ASFA	Aquatic Sciences and Fisheries Abstract
AU	Africa Union
CD-ROM	Compact Disk Read Only Memory
CSIR	Council for Scientific and Industrial Research
CTA	The Technical Centre for Agricultural and Rural Cooperation
DARPA	Defense Advanced Research Project Agency
DFID	Department of International Development
ECOWAS	Economic Community of West African States
EIFL	Electronic Information for Libraries
EPA	Environmental Protection Agency
EURASLIC	European Association of Aquatic Science Libraries and information Centres
FAO	Food and Agriculture Organisation
GDL	Glasgow Digital Library
GIS	Geographic Information Systems
HINARI	Health InterNetwork Access to Research Initiative
IAMSLIC	International Association of Aquatic and Marine Science Libraries and Information Centres

I

ICT	Information Communication and Technology
INFOTERRA	Global Environmental Information Exchange Network System
INSTI	Institute for Scientific and Technological Information
I'IRD	L'Institut de Recherche pour le Développement
I	Inter
MALICO	Malawi Library and Information Consortium
NASA	National Aeronautics and Space Administration
NEPAD	New Partnership for Africa's Development
NFPs	National Focal Points
NFS	National Science Foundation
NISCSA	National Inquiry Service Centre, South Africa
NOAA	National Oceanic and Atmospheric Administration
ODINAFRICA	Ocean Data Information Network for Africa
PERI	Programme for the Enhancement of Research Information
SADEC	Southern Africa Development Community
SAIAB	South Africa Institute of Aquatic Biodiversity
SDI	Selective Dissemination of Information
	Se
S	Secretariat o
TEEAL	The Essential Electronic Agricultural Library
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational Scientific and Cultural Organisation
V-SAT	Very Small Aperture Terminal
WRI	Water Research Institute

COMMUNIQUE

We the participants at the 2nd Africa Regional Group of the International Association of Aquatic and Marine Science Libraries and Information Centers (AFRIAMSLIC) conference held in Accra, Ghana from 13th -15th September 2005 under the theme, **Coping with the Digital Age in Aquatic and Marine Science Libraries in Developing Countries**, have observed that, to contend with the digital age in aquatic and marine science information generation, management and application, there is the need for increased support and collaboration among African countries.

1. To this end, the Association appreciates the level of funding from African governments. However, to cope with the digital age, governments are being called upon to support the development of appropriate infrastructural base for ICTs.
2. It is observed that the development of digital services is low due to the lack of qualified personnel. We therefore call for the adoption of ICT culture, training and encouragement for relevant personnel in our institutions.
3. The Association noted with appreciation the current level of assistance provided by our development partners and call for increase support in the areas of equipment, subscription to digital information and capacity building.

Finally, the conference:

1. Adopted a working document which will guide activities of AFRIAMSLIC
2. Identified strategies for networking among AFRIAMSLIC members and development partners.

LA COMMUNIQUE

Nous les participants à la 2^{ème} conférence du Groupe Régionale Africaine d'IAMSLIC (AFRIAMSLIC) qui à eu lieu à Accra du 13 au 15 septembre, 2005 sous le theme, **Faisant Face À L'ère Numérique Dans Les Bibliothèques De La Science Acquatique Et Marine Dans Les Pays En Développement**, avons remarqué que pour faire face à l'ère numérique dans la création, la gestion et l'application de l'information dans les domaines des sciences acquatiques et marines, il nous faut une augmentation du support et collaboration.

1. Dans ce dessein, l'association est reconnaissant du niveau de financement provenant des gouvernements africains. Cependant, pour fare face l'âge digitale, les gouvernements sont priés à sourtenir le développement du base d'infrastructure approprié pour l'informatique et la communication.
2. Il est également remarqué que le développement des services digitaux est minimal faute de personnel qualifié. Par conséquent, nous demandons l'adoption d'une culture d'informatique et de la communication aussi bien que la formation et l'encouragement du personnel appropriés dans nos institutions.
3. L'association à noté avec reconnaissance les niveaux actuels de soutient fournit par nos partenaires de développement et lance un appel pour une augmentation du soutien dans l'équipement, la souscription à l'information numérique et dans le développement des ressources humaines.

Finalement, la conference:

1. A adopté un document de travail qui serviront de guide des activités d'AFRIAMSLIC
2. A identifié les stratégies pour l'établissement d'un bon réseau entre les members d'AFRIAMSLIC et les partenaires de développement.

Welcome Address

Marian A. Jiagge (Mrs)

Chairperson, Africa Regional Group of the International Association of Aquatic and Marine Science Libraries and Information Centers (AFRIAMSLIC)

I have the greatest pleasure to welcome you all to the 2nd AFRIAMSLIC Conference with the theme “Coping with the Digital Age in Aquatic and Marine Science Libraries in Developing Countries”

Mr. Chairman, the International Association of Aquatic and Marine Science Libraries and Information Centers (IAMSLIC) is a professional organization and its members represent institutions from all over the world. The majority of its members work in well-developed libraries or information centers, where modern technology provides them with easy access to the widest range of international information resources.

Unfortunately, Mr. Chairman most IAMSLIC members representing developing countries, especially those coming from the African continent, are working in totally different environments. Library budgets are normally extremely limited (or non-existing) and due to lack of sufficient infrastructure, access to the Internet and everything it has to offer is severely limited.

Mr. Chairman the Africa Regional Group of IAMSLIC is committed to promoting the sharing of aquatic and marine information resources among its members, and regards it as being its task to develop the capacity of its members.

We are therefore gathered here today to deliberate on issues of common interest in the provision and application of aquatic and marine science information and to establish networks that will promote resource sharing in the sub-region.

Mr. Chairman, I would like to take this opportunity to welcome our local and foreign participants to this year’s conference which was originally scheduled for Zanzibar, Tanzania, (having held our first conference here in Accra in 2003,) unfortunately this was not possible.

Perhaps, this is God’s way of bringing back our foreign participants from Guinea, Malawi, South Africa, Senegal and Togo back to Ghana once again. You are most welcome.

To our participants from Seychelles, Kenya, and Nigeria who are visiting Ghana for the first time, I know you will find Ghana a nice place to be.

Mr. Chairman, the main objectives for this year’s conference are to:

- i. develop a working document which will serve as a reference tool for AFRIAMSLIC,
- ii. brainstorm on the implementation of network strategies for AFRIAMSLIC,
- iii. discuss the linkage of AFRIAMSLIC with other existing networks dealing with aquatic and marine science information provision in Africa and
- iv. discuss sources of funding for the group.

The papers, posters, institution and country reports, workshop reports and discussions during this conference will describe how our colleagues deal with some of the changes they have encountered

in managing collections, services, digital library projects, electronic journals, document delivery, resource sharing, access to information and technology related issues and bridging the digital divide in aquatic and marine science library services.

Finally, Mr. Chairman, I would like to take this opportunity to express our sincere appreciation to my Director, the Director of CSIR Water Research Institute for agreeing to host this conference again and grateful for our Institute's support in organising this conference. Our special thanks go to the Technical Centre for Agricultural and Rural Co-operation (CTA) based in the Netherlands for sponsoring our foreign participants once again and to the IAMSLIC Executive Board for supporting this year's conference.

We hope that the breadth of consideration of our theme "Coping with the Digital Age in Aquatic and Marine Science Libraries in Developing countries" proves stimulating and worthwhile.

Thank you.

Address by Guest Speaker
Mr. Clement Entsuah Mensah
Director, CSIR-INSTI

Mr. Chairman, Director of CSIR-Water Research Institute, Chairperson of the Africa Regional Group of IAMSLIC, Distinguished Invited Guests and Delegates to the Conference, Members of the Press, Ladies and Gentlemen, it is indeed an honour and a singular privilege to be invited by the Organizers of the 2nd African Regional Group of the International Association for Aquatic and Marine Science Libraries and Information Centres (IAMSLIC) to be the Guest Speaker for the opening ceremony of this conference which has as its theme “Coping With The Digital Age in Aquatic And Marine Science Libraries In Developing Countries”.

As an information scientist, I appreciate the enormous opportunities that the digital age offers, as well as the challenges it poses to the information profession. It is in this respect that I commend the organizers of the conference for providing a platform for its members to meet and deliberate on issues that are currently making significant impact on the profession.

Mr. Chairman, the proliferation of interactive and digital technologies in the past decade as a result of the information and communication technology (ICT) revolution has greatly transformed many lives. For example, in many parts of the world mobile phones have enhanced the way people communicate and do business. Again, new digital radio stations are reaching a wider public in interactive ways through call-in programmes. Furthermore, satellite television has expanded the range of programmes available to inhabitants of countries whose governments, until recently, have limited television reception to a few state-run channels. Finally, the computer has brought with it a burgeoning of digital developments that include computer games, graphics, animation, digitized information and images, etc., and the emergence of the internet has led to the creation of virtual platforms that enable researchers to collaborate in cyberspace.

Perhaps what needs to be pointed out is that from the knowledge gap hypothesis formulated by Tichenor, Donohue and Olien in 1970, each new medium increases the gap between the information rich and information poor, because of differences in access to the medium, and control over its use among other factors. This notwithstanding, the adoption of the new technologies remains a prime driver for organizations seeking to improve their short, medium and long-term performances, and people are gradually witnessing the emergence of electronic culture in every sphere of their lives.

Mr. Chairman, as far as the information revolution is concerned, what has never been in doubt is the immense potential that the ICT tools hold for knowledge management. Perhaps the most profound effect of the recent technological innovations in academia is what is being experienced in publishing. Everyone, from authors, publishers, librarians, readers, etc, have been challenged by the development of new means of creating and disseminating intellectual works.

Currently, one problem that confronts the information professional in the digital age has to do with “information overload” (i.e. the quantum of information that is available on the internet). Although the information professional has at his disposal the necessary materials that will enable him to meet the information needs of his clients, the issue of the authenticity and quality of some of these materials cannot be guaranteed. There is also the issue of some of the materials not only being morally offensive, but also not suitable for the consumption of children.

Mr. Chairman, from the theme of the conference “Coping with the Digital Age in Aquatic and Marine Science Libraries in Developing Countries,” it is important that we examine some of the challenges that the digital age portends. One of such challenges is the cost of bandwidth, which is very expensive in developing countries. In some cases it is about 100 times far more expensive in the developing countries than in the developed countries. The result is that many institutions are not able to subscribe to the internet, more so, to bigger bandwidth that will allow for high speed, broadband connectivity to support research, teaching and learning. Clearly, it is partly due to such limitations that the phenomenon now known as the digital divide has emerged.

The digital divide is the gap in opportunities that is experienced by those with limited accessibility to the technologies especially the internet. The divide is not only between countries, but also within countries in respect of the urban and rural areas as well as gender. The great divide between the computer literate and those whose circumstances have denied them access to the technologies (whether measured by telecommunication access paths or by internet hosts) is threatening to become wider as the technologies race on.

In the information work environment, especially in libraries, one of the challenges confronting the professionals is the gradual shift of the understanding of collection development from ownership model to access model. Libraries are not “purchasing to own” materials available in digital formats, but rather “renting to access” digital materials. This development requires sustaining an on-going subscription (much like a periodical subscription) whereby the library licenses the materials from vendors and publishers. The result is that unlike print periodical subscription where the library retains ownership for the periodicals once they are paid for, libraries lose access to the digital materials if the subscription is not paid for each year. Thus, a library can have access to a full-text database that covers numerous journals only when the annual fee is maintained. What happens if the license fee is not paid is that the library loses access to all the content, even the earlier ones that had been licensed and paid for.

The implications of this for libraries in developing countries which are hard-pressed for money to pay for their subscription on regular basis is that the digital age may not after all hold the key to solving all their problems. The reason being that as more materials become available in digital format most of them invariably become inaccessible to the end-users in libraries in developing countries, especially those located in the rural communities where information infrastructure do not exist.

Mr. Chairman, one way that libraries in the developing countries can cope with the digital age is for the librarians to support the open access initiative such as open access publishing and open access archives. The other is through the development of institutional repositories. There are benefits to be derived from supporting these activities. For example, open access publishing and building institutional repositories make research outputs from research institutions in the developing countries more visible to other researchers elsewhere.

In building institutional repositories, the issue of content development should be of prime concern for the information professional and this should be taken very seriously. It is important that the information professional initiates programmes that seek to promote the deployment of ICT to provide access to information generated within the institution that s/he works. In so doing, the information professional will not only be assisting in addressing the oft-repeated phrase that “Africa is not visible on the web”, but also contributing towards providing an appropriate platform to strengthen knowledge exchange for the benefit of the scientific community.

For the information professional working in a scientific institution in Africa, access to relevant, reliable and up-to-date information is paramount as far as the work of the research scientist is concerned. After all, this is the main reason why you go the extra mile to source for information materials from databases located in the developed countries to support their work.. To be appreciated by the international community as contributing towards the promotion of knowledge exchange among the global scientific community it behoves on you also to capture all the knowledge that is generated in our institutions and process them for inclusion into the international information systems. It is in this regard that i will urge you as members of iamslic to:

- Strive towards establishing networks that will link not only you the information professionals, but also research scientists and institutions to facilitate collaborative activities that will help improve access to the new knowledge generated;
- Be actively involved in assessing and evaluating the extent to which the knowledge that have been generated by the research scientists have been captured by the international information systems; and
- Examine the cost-effective means of digitizing these materials for wider distribution.

To survive the 21st century it is increasingly becoming important that information professionals in the developing countries do not only become proficient in using the ict tools, but also to be part of the critical think tanks that support the development of the global information infrastructure. To be able to do that effectively requires that the information professional should constantly upgrade his knowledge base through participation in capacity building programmes. For, it is only through such programmes that one can constantly keep abreast with developments in the digital age.

In concluding, Mr. Chairman, I wish to take this opportunity to wish you a successful conference and hope that you will use the three days to deliberate on strategies that will help you to cope with the digital challenge.

Thank you.

Keynote address

Dr. Charles A. Biney

Director, CSIR-WRI

I deem it a great honour to make this keynote address at the Opening Ceremony of the 2nd Conference of the International Association of Aquatic and Marine Science Libraries and Information Centres (IAMSLIC), which is to be held in Accra for the next three days.

Ladies and gentlemen, I also deem it an honour, because I was associated with your first conference, which was held in Accra about 2 years ago. At that time I was invited to give the Welcome Address.

Mr. Chairman, water is essential for the socio-economic development of every society. Until recently, there was the false perception in Ghana, and I am sure as well as in many parts of Africa, that considerable inexhaustible and pollution free water resources were available. However, with the ever-expanding population and intensification of agricultural and industrial activities, the demand on both the quantity and quality of water resources is now a major concern on this continent. It is a reality that the freshwater resources of Africa are very vulnerable and are dwindling per head of population in the face of unreliable rainfall, rising temperatures and pollution of water bodies from human activities. This is exemplified by the fact that, the population of Ghana rose from 6.7 million in 1960 to 18.9 million in 2000. With this trend, there is therefore the urgency for proper conservation, management and efficient utilization of our fresh waters to ensure sustainable use and development.

The same processes are taking place in the coastal and marine areas, Mr. Chairman. Population pressure, particularly the growth of urban areas, combined with the rapid expansion of industry and tourism in coastal areas and extensive exploitation of marine resources has created a worldwide concern about sustainable development of these areas and their natural and environmental resources. The harmful impacts of these human activities are visible all over the coastline of Africa. Also, because coastal areas are today attracting population faster than inland areas, competition is increasing over the allocation and use of coastal and marine resources, including space.

In order to control the above trend of development and manage our aquatic and marine resources sustainably, the right information is required at the right time. It is therefore encouraging to note that this 2nd IAMSLIC Conference in Accra intends to bring together information specialists to discuss ways and means of providing continuing support to users of aquatic and marine science information.

I must however indicate that most users of aquatic and marine science information are not yet in tune with the digital age. There is even still a category of scientists, researchers, teachers and policy makers for whom the computer is a no-go area, not to talk of going on-line. A lot of data that have been collected and are still being collected are only stored in paper form. Even for those with the requisite facilities and familiarity with the digital age, there are still problems with finding the relevant information.

Information specialists like you, therefore have a lot of work to do. I would like to urge you to be more proactive in your activities by actually devising ways and means to encourage users of aquatic and marine science information to make use of the available information. This implies that you should also come up with packages that are attractive and simple to use.

Mr. Chairman, with respect to providing the right information, may I also advice that in your practice, you should as much as possible highlight current events in Africa. For example, Ghana and many African countries have recently developed Water Resources Policies and Integrated Coastal Zone Management Plans for the sustainable development of aquatic and coastal environments. In addition, two or more countries share the major rivers of Africa, and trans-boundary water resources management problems are therefore on the increase. Furthermore, all African governments are currently working towards the attainment of the Millennium Development Goals, of which water is a cross cutting issue. Information provided on these and other relevant issues will go a long way towards promoting the sustainable development of our countries.

Mr. Chairman, aquatic and marine science information and data are collected by many institutions in Ghana. Some are commercial or service agencies such as the Ghana National Petroleum Corporation, Meteorological Services Department and Survey Department. Others are regulatory or research agencies and include the Environmental Protection Agency, University Departments and CSIR Institutes. I therefore welcome the choice of Ghana for this conference once again, and it is my hope that it will come out with clear recommendations on your target objectives.

On this note, I extend the traditional Ghanaian welcome of *Akwaaba* to our foreign guests to Accra. I also wish to extend my special gratitude to the sponsors and organizers of this important event.

Now, it is with the greatest pleasure and honour that I formally declare this 2nd Conference of the International Association of Aquatic and Marine Science Libraries and Information Centres open.

May you have successful and fruitful deliberations.

Thank you for your attention.

ARTISANAL FISHERIES IN GHANA

Dr. Mamaa Entsua-Mensah
Senior Research Scientist
CSIR-WRI Accra, Ghana

Abstract

Artisanal fisheries are small-scale fisheries carried out by people who rely on fishing to support their families and other local people. Artisanal fishers can be distinguished by gear type, type of fisheries, professional category, and sources of income, migratory status, gender, culture and nationality. In Ghana artisanal marine fisheries are the backbone of the fishing industry. The small pelagic fish stocks, which form a large component of the artisanal and marine fisheries in Ghana, cover a wide range of species and are the most abundant marine resources in Ghanaian waters. It is important to collect fishery data cover all information that may be used to estimate fishery performance and other sustainability indicators, including information on the environment and ecosystems, the conduct and economics of fisheries, participation in fisheries and methods used to manage the fisheries.

Introduction

Artisanal fisheries are small-scale fisheries carried out by people who rely on fishing to support their families and other local people. Artisanal fishers can be distinguished by gear type, type of fisheries, professional category, and sources of income, migratory status, gender, culture and nationality. It is difficult to define the term ‘artisanal fisheries’ but for this paper it would be fisheries that uses passive and active gears as well as vessels which consist of relatively large canoes with or without outboard engines, sometimes with ice on board, which may stay on the lake or seas for several days. The owners, crew, fish processors and fishmongers may come from the same community and are often though not always related. The catch is used for subsistence, the internal market and sometimes for export

West Africa has had a long period of marine fishery, and along the coast of West Africa, Ghanaian fishers are among the best. The artisanal fishery in Ghana started close inshore, using dugout canoes made from the *wawa* tree (*Triplichiton sclerexylon*) propelled by oars and sails and applying simple gears to catch the fish. Later in the late 1950’s and early 1960’s the canoes began to be mechanized with the introduction of outboard motors, which enabled canoes to fish farther out from the coast and also to make bigger catches. Conditions surrounding small-scale fishers and their communities have changed in the last four decades. The advent of motorization and the introduction of highly productive gear such as trawls and purse seines have changed the face of the fisheries sector. Two fundamental changes are those relating to the impact on the resource base and those having to do with the increased importance of urban fishing ports such as those in Tema, Sekondi, Axim, Apam and Elmina. Both changes have affected the ability of small-scale fishers in rural areas to earn a living from the sea.

The Fisheries

Artisanal fishing in Ghana goes on along the shores of the Volta Lake, in the rivers, in the lagoons and in the sea. Artisanal fishing is very important in Ghana. In Ghana, each fishing village or landing site has a Chief Fisherman. He is in charge of fisheries matters at either the community or the landing site level and represents the local fishers at the fishers association at the regional and national level. He works with a council of elders. The Chief Fishermen are elected but generally

come from a certain clan or family. Women fish processors and traders have a parallel leader and organization.

The Rivers

The type of fishing method chosen for use in the rivers is determined by the nature of the fish stocks, the form of the river and the degree of development of the fishing community living along the banks of the river. There is also a seasonal deployment depending on the flow regime. In the low water period, gill nets, seine nets, cast nets, hook and line, baited long lines, traps and barrages are used. In the high water period, seine and gill nets are used. In flood rivers, the seasonal expansion and contraction of the water area can separate settlements from the main course of the river by many kilometers in the dry season though they may be at the waters edge during the flood. In response to the fluctuations in the ecosystem fishermen have to alternate with other occupations or they themselves migrate.

In the big rivers such as the Oti, White and Black Volta river fisheries play a major part in the lives of the rural communities that live around them. Some depend on the fish caught for their livelihood. Unfortunately there is hardly any data on the catch from these rivers apart from the comprehensive studies undertaken during the Onchocerciasis Programme by the Institute of Aquatic Biology (Entsua-Mensah, 2004). The Fisheries Department also collects data from some landing sites.

Some of the major fishes found in the rivers in the Volta Basin are species from the following families; Polypteridae, Bagridae, Mochokidae, Cyprinidae, Characidae, Mormyridae, Schilbeidae, Cichlidae, Anabantidae, Clariidae, Clupeidae and Distichodontidae.

Volta Lake

Fishing activities are predominant in the Lower Volta River, the Volta Lake and Kpong Head pond and tributaries of the Volta Lake and Upper Volta system (Asafo, 1999). Fishing in the Volta Lake contributes about 90% of the total inland fishery production in Ghana. There are about 80,000 fishers and 20,000 fish processors and traders engaged in this fishery (MOFA, 2004). Only planked canoes are used in the Lake Volta fisheries, thus the fishery is solely artisanal. There are about 17,500 such canoes fishing in the Lake Volta (MOFA, 2004). The gears operated in the Lake include cast nets, gillnets, hook and line and traps. The fish species list for the entire lake shows 27 families, 67 genera and 138 species (Braimah, 1999). The top ten species in terms of landings are as follows;

Tilapia (38.1%),
Chrysichthys sp. (34.4%),
Synodontis sp. (11.4%),
Labeo sp. (3.4%),
Mormyrids (2.0%)

Other species of commercial importance are *Clarias* sp., *Schilbeids*, *Odoxathrissa* sp. and *Bagrus* sp.

According to Braimah (1999), in the 1970's and 1980's the dominant fishing gears were gill nets, (which produced about 80% of the catch), cast nets, hook and lines and traps. There has been the recent introduction of more efficient and illegal fishing gears such as purse seines, beach seines and bamboo pipes. The Integrated Development of Artisanal fisheries (I and II), which became operational in 1989 has developed a management system on a scientific basis for the Volta Lake. The IDAF Project at Yeji is to be commended for introducing revenue generating activities such as draw-down farming, development of woodlots and orchards, shea butter extraction and gari processing. This would help the rural fishing economies.

The Fisheries of Coastal Lagoons

Fishing in all the lagoons is carried out through small scale operations. Due to the shallow nature of the lagoons most of the fishing was done without the use of fishing crafts like canoes. The major fish caught in the lagoons is the black chin tilapia *Sarotherodon melanotheron*.

Lagoon fisheries are undertaken by four groups of people (Willoughby and Entsua-Mensah (1998). These are;

- Fishers (male) who are commercial fishermen. Some of them operate solely within the lagoons, others are primarily marine fishermen, but fish in the lagoon when the weather is too bad for fishing, or when there are prohibited marine fishing days
- Fishers (male) with small quantities of gear (e.g. cast net and traps) who are operating barely on subsistence level.
- Fishers (female and children) who use small scale gear or gleaning techniques to supplement the family diet, usually fish for shellfish rather than catching fish for sale
- Recreational fishers (mainly male) who are paid in employment elsewhere, but use spare time to fish for pleasure and the family table.

Fishing gears

Gears used for fishing in the lagoon include passive gears like gillnets, basket traps, bottle traps and 'acadja'. Active gears include cast nets and drag nets. The cast net is the main gear used in the lagoons.

Economic importance of lagoon fisheries

The coastal wetland habitat forms an integral part of the marine fishing industry. This is because the lagoon environment provides important spawning and nursery grounds for many marine and freshwater fin fish species as well as shellfish. Human settlements, industrial development and salt winning activities, are factors that prevent marine fish and shellfish from benefiting from lagoon resources. Of the 20 fish species recorded in 3 RAMSAR sites in 1998, 40% were typically marine species and included economically important species like flat fish, grouper, snappers, jack mackerel and bonga shad (Koranteng et al, 1998). Lagoon fishermen fishing can make about 10,000 cedis a day (dry season) and 30, 000 cedis a day (wet season). They earn less than marine fishermen but whilst that of marine fishers is seasonal, lagoon fishers have a more sustainable income. Women and children also engage in the collection of shellfish for food and to sell. The fish from the lagoon is fried, smoked or sun dried and sold in the markets. Fishing in the lagoon sustains a lot of coastal families and the loss of the lagoon to salt winning is adversely affecting their livelihood.

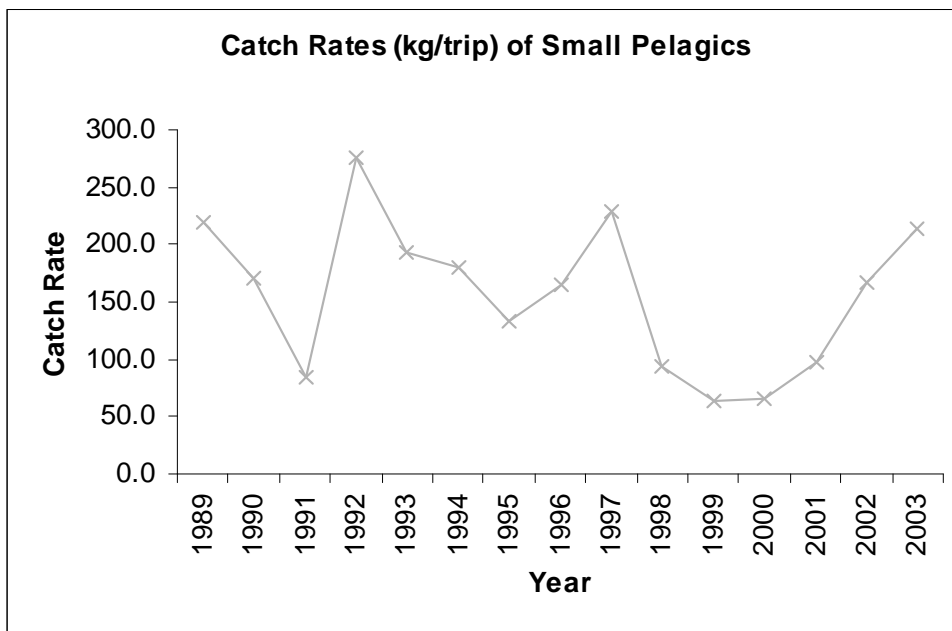
Artisanal Marine Fisheries

In Ghana artisanal marine fisheries are the backbone of the fishing industry. The small pelagic fish stocks, which form a large component of the artisanal and marine fisheries in Ghana, cover a wide range of species and are the most abundant marine resources in Ghanaian waters. Four species that are of high economic value are the round sardinella (*Sardinella aurita*), flat sardinella (*S. maderensis*), anchovy (*Engraulis encrasicolus*), and chub mackerel (*Scomber, japonicus*). These species usually account for over 80% of total landings of the small pelagic resources annually. The potential annual yield is about 200,000Mt (Entsua-Mensah and Virdin, 2005). Fishing for *Sardinella aurita* is concentrated in Cape Three points and Cape St. Paul on grounds between 18 and 50 m deep and the fishery is seasonal, coinciding with the main upwelling period (late June to September/October). *Sardinella maderensis* is fished through out the year.

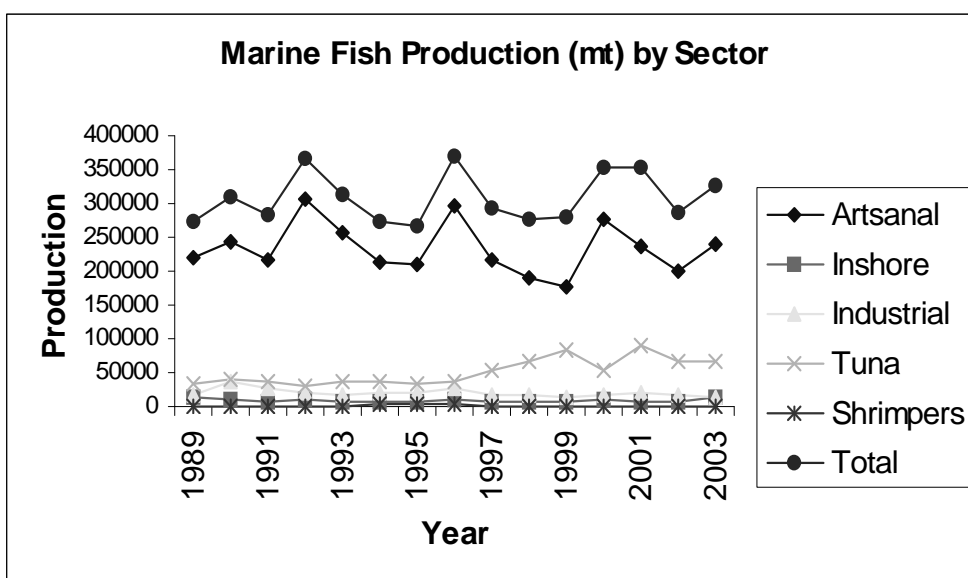
The Marine Fisheries sector in Ghana contributes about 3% of the nation's gross domestic product (GDP) and 5% of the Agriculture GDP. Fish is the preferred and cheapest source of animal protein and about 75% of total production of fish is consumed locally. The per capita consumption of fish

is estimated at about 25 kg per annum; representing 60% of animal protein intake by the Ghanaian populace. Fish is now the country's most important non-traditional export. The country earned over US\$95 million from export of fish and fishery products in 2002 (MOFA, 2004).

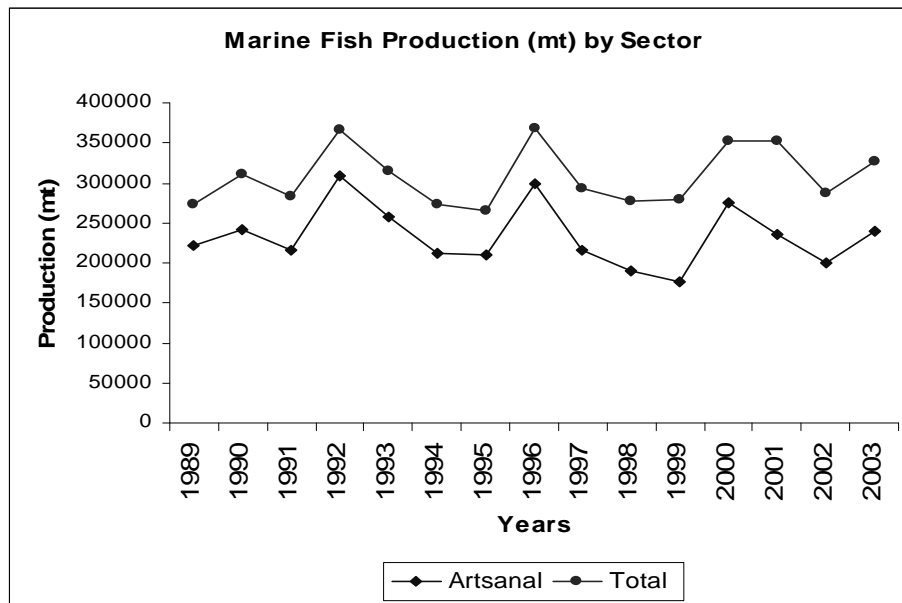
The fishing industry in Ghana is based on resources from the marine and to a lesser extent, inland (freshwater) and aquaculture sectors. The Volta Lake, reservoirs, fishponds and coastal lagoons are the main sources of freshwater fish. The nearly 13,000 dug out canoes used in the in the artisanal sector in Ghana operate from 334 landing beaches in 195 villages. The number of artisanal fishermen was put at over 124,000. (Canoe frame Survey, 2004). Sail or outboard motors power the canoes and most canoes undertake daily trips, some of which have iceboxes to stay up to 5 days at sea. The artisanal sector contributes 73% of total marine fish landings annually.



Source: Marine Fisheries Research Division, MOFA



Source: Marine Fisheries Research Division, MOFA



Source: Marine Fisheries Research Division, MOFA

The various artisanal gears target different fish resources. The largest category of canoe in the Ghanaian artisanal fleet both in number and size is the *Ali/Poli/Watsa* type. These local names refer to the type of net operated. The *Ali* is a sardinella drift /surround net, while the *Watsa* and *Poli* are purse seines. The main difference between the two being the twine and mesh size used in their manufacture. The *poli* has a much smaller mesh size and it is used extensively in the capture of anchovy, the *Watsa* mainly used for larger sized pelagic species.

The artisanal purse seine gears and beach seines are the main exploiters of the small pelagic resources. The purse seine gear exploits adult sardinellas and chub mackerel during the upwelling periods (late June to September/October when these species move into coastal waters to spawn). During the non-upwelling periods, the purse seine gear targets the anchovies and juvenile sardinellas, which are in coastal waters. The beach seines operate from the beach and exploit adult sardinellas during the upwelling periods and anchovies and juvenile sardinellas during the non-upwelling periods. The beach seine also exploits shrimps mainly *Parapeneopsis atlantica* and *Penaeus kerathurus* (both adult and juvenile) and juvenile *Penaeus notialis* as they move from the estuaries into marine waters. During the sardinella season the fishers make a lot of money. There are also set nets, (tenga) drift gill nets and hook and line canoes.

The coastal small pelagics are migratory stocks and shared between several countries and their abundance is closely tied to fluctuating environmental factors, thus it is difficult to estimate the current level of depletion in Ghanaian waters. It is possible, however to estimate whether or not these stocks are depleted based on trends in catch and effort. As much as 70% of the artisanal landings of small pelagics were made using purse seine nets. The total catch and catch rate of vessels using these gears has declined significantly in recent years even while fishing effort has stayed at relatively constant levels. According to Entsua-Mensah and Virdin (2005) in 2003, the proportion had decreased to about 45%.

Problems facing Artisanal Fishery in Ghana

Some of the driving forces affecting the artisanal fisheries are the inherent open access nature of these fisheries for artisanal operators, and the difficulties Government and stakeholder institutions have had managing the use of these common property resources, increased local demand for fish,

the improvements in fish-catching technology, the widespread use of destructive fishing practices, the short-term mindset of fishers that has helped drive the overcapitalization of the coastal fisheries and the increase in fishing effort and capacity.

One of the major problems in the artisanal fisheries sector in Ghana is over fishing. Over fishing is directly impacting on fisheries livelihood through income and profit reduction, increasing competition and conflicts over fishing grounds, fishery resources and markets. Also, the effects of the structural Adjustment Programmes introduced in the 1980's have impacted on artisanal fisheries (DFID/FAO, 2001). The devaluation of the cedi, reduction of subsidies and other macro-economic measures have caused prices for imported goods (including fishing inputs) to rise and prices for local goods to fall. The trade liberalization policies have meant that national products have come into competition with international ones and rising inflation has affected fisheries livelihoods. Fuel, particularly is rising in cost, irregular in supply and may run out during the fishing season.

In reaction to increasing prices of inputs, increasing competition and reduced profitability of fishing activities, some fishers have reduced the number of canoes they operate, others buy second hand canoes instead of new ones, repair old engines, buy cheaper types and save on fuel. Some crew in order to bring in maximum catch with relatively low effort, have resorted to destructive fishing practices such as dynamite and light fishing.

Crew

To own a canoe is considered a sign of respectability showing the owner to be a man of substance and is considered credit worthy to provide a livelihood for other people. The crew is usually composed of relations and /or friends. There are no formal labour contracts. The skipper or captain does not receive a higher share of the proceeds, however, if he is also the canoe or boat owner or net owner he receives the share going to these items. With Fanti fishermen, there seems to be the existence of some form of specialization amongst crew members (Vercuijsse, 1979). They are:

- Henwura*- boat owner
- Eboawura* – net owner
- Kapem* – Captain
- Gyampanyi*- steer man
- Hentunyi* – helmsman
- Bosu* – boatswain
- Henkonyi* –net caster
- Hankanyi* –engine driver
- Edziekyir* – owner's representative

In a situation where differentiation is at the lowest, the boat and net may be owned by one person, commonly referred as the 'bosu' who leads his crew and in that respect acts as the captain. He is also likely to lead with the sharing and to deal with buyers and creditors himself so that there is no 'edziekyir'. Several situations may also arise;

- The boat and net owner may be different people
- The boat owner or net owner does not go to sea but delegates the leadership of the crew to a 'Gyampanyi' or steers man. The Gyampanyi acts as the 'bosu's representative and looks after his financial interests. This position is interchangeable with those of 'Kapem' (Vercuijsse, 1979)

Financial Arrangements

Fishermen do not receive a fixed monthly or weekly wage. The wages they receive depend entirely on the value of the fish they land. This is referred to as profit and loss sharing; 40% of the gross value of the fish caught goes to the crew, 20% goes to pay the fuel and the remaining 40% is

considered as payment for the canoe, motor, net and maintenance (Afful and Osafo–Gyimah, 1979). After every fishing trip crew members share equally amongst themselves fish of superior quality not caught in large quantities e.g. sole, barracuda, squid, some species of sparids (red fish). It can also be any fish considered superior to the main catch. Such fish is known as ‘*edzizanam*’, that is fish for eating, not selling.

Traditionally a fisherman gives his share of his catch to his mother or sister if he is not married or to his wife. The women either processed the fish themselves by smoking, drying, salting or frying and marketing them. If she could not do so, she sold it fresh to other processors. Many of these processors over a period of time succeeded in building capital to enable them finance the fishermen for the purchase, repair or replacement of equipment, thus enabling them to have a stake in the landings (Afful and Osafo-Gyimah, 1979). Now there are ‘Middlewomen’ who finance some of these trips, they may or may not be wives or relatives. Their function is to dispose of the fish that is landed.

Migration

Artisanal fishers in Ghana have had long history of migration. According to Bortei-Doku (1991) and Odotei (1991), there are three patterns of migration. These are:

- i) Seasonal movement of fishermen in pursuit of the fish during the sardinella season from July to September/October.
- ii) Migration that lasts longer than the fishing season. After the construction of the Volta Dam, some fishers migrated inland along the shores of the Volta Lake. The migrants became totally absorbed into the social structure of their new places
- iii) Migration to other West African towns. In this case the migrants tend to stay for a longer period culminating in permanent residency; there are ‘fanti’ fishermen in Monrovia, Liberia, and Azurretti and Imuna in Cote d’Ivoire.

Fishermen migrate for economic reasons, to escape from family obligations, and to gain recognition in society. They have to adhere to the rules and regulations of their host country and failure to do can give rise to conflicts.

Information needed for Artisanal Fishery Management

Fishery data is collected to cover all information that may be used to estimate fishery performance and other sustainability indicators, including more information on the environment and ecosystems, on the conduct and economics of fisheries, participation in fisheries and on the methods used to manage the fisheries. In 1998 FAO conducted an expert consultation on the development of FAO Technical Guidelines for the routine collection of Capture Fishery data. The Guidelines define fishery performance indicators within a framework as follows:

- Fishing and Operational Indicators
- Biological Indicators
- Economic Indicators
- Socio-Cultural Indicators

In January 1999, the FAO improved on these guidelines and developed a sustainable Development Reference system with indicators and four dimensions (Evans 2001). There were:

- Ecosystem (Environment and Resource)
- Social
- Economic
- Institutions / Governance

In addition different information is required at three general but interacting levels in the fishery management process: Level 1: policy-making Level 2: Formulation of Management Plans and Level 3: Implementation of Management Plans (Evans, 2001).

For each indicator, the Guidelines for the Routine Collection of Capture Fishery Information elaborates on data types and variables required for their estimation. It recommends methods for the development of data collection types and variables required for their estimation. It also recommends methods for data management and information system planning and implementation. The preparation and reporting of indicators now forms part of the required participation of states in the work of the Commission for Sustainable Development. The FAO also contributes to the CSD through the Inter-Agency Committee on Sustainable Development and has so far provided full description of the key indicator, Maximum Sustainable Yield.

Fisheries Management is the management of risk where uncertainties play a central role in making decisions. There are generally four groups of information required for the fishery management. These are data on 1) Resource, 2) Fishery 3) Socio-economy, 4) Monitoring, Control and Surveillance. In addition different information is required at three general but interacting levels in the fishery management process.

Table showing the interactions

Level	Resource	Fishery	Socio- economic	Monitoring, Control and Surveillance
Level 1	Policy	Policy	Policy	Policy
Level 2	Formulation and Management	Formulation and Management	Formulation and Management	Formulation and Management
Level 3	Implementation and Management Plans	Implementation and Management Plans	Implementation and Management Plans	Implementation and Management Plans

For Artisanal fishery management some of the information needed include:

FISHERY INFORMATION

<p>Level 1: Policy Making</p> <ul style="list-style-type: none"> • Summary of types of fishery and fleet and gear characteristics of each fleet • Number of fishing units for each fleet • Key fishing grounds and their characteristics • Summary of number and distribution of landing sites • The impact of fishing gear and practices on the environment and ecosystem • Details of the costs of fishery management
<p>Level 2: Formulation of Management Plans</p> <ul style="list-style-type: none"> • Gear used by different fleets and knowledge of its selectivity • Number of fishing units (vessels and fishers in each fleet) • Numbers and localities of landing sites and fishing units operating from or landing at each site • Total effort for each fleet • Relative fishing power for each unit • Area fished by each fishing fleet • Comprehensive data on catch per unit effort, depth fished, and other relevant data

Level 3: Implementation of Management plans

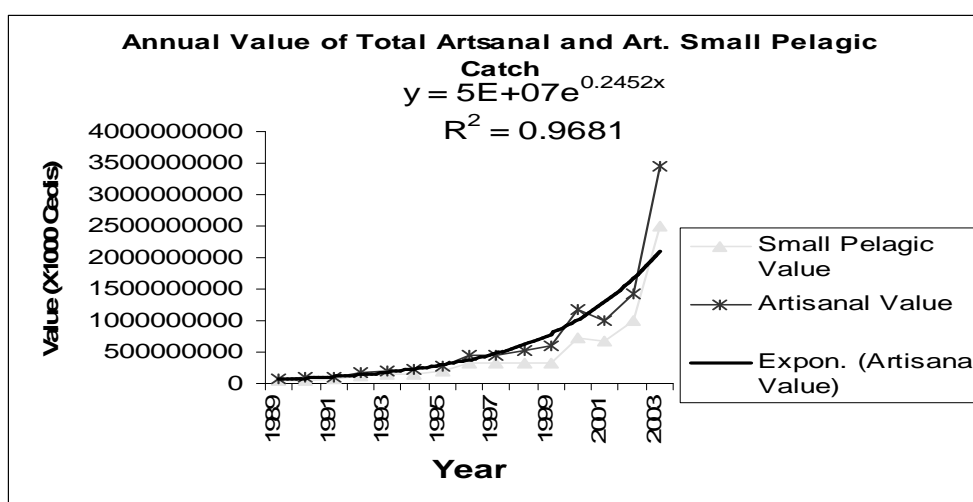
- Total catch and effort data for the fishery
- Changes in fishery or fleet composition which could impact on management procedures
- Unusual features of fishery or fleet behavior which could influence interpretation of stock indices used in the management procedure

Source: *FAO Guidelines for Responsible Fishery Management, Rome. 1997*

To find the existing economic structure and operation of the artisanal fishing industry, some of the information that needs to be gathered included the following:

- Production, mainly the amount of fish caught
- The marketing and processing of fish from the time it is caught until it reaches the consumer.
- The mode of financing both the fishermen and the processors of fish
- The business relationships between the different groups of people in the various sectors of the industry
- The forms of organization, which the various groups operate.

Information collected on the artisanal fisheries can be invaluable to policy makers and planners in the management of the fishery. To establish a relation between the artisanal value of the total artisanal fishery, a regression can be done to predict values and production. This helps in budgeting and planning.



They represent the value of the fish in cedis and the x is the year. One can predict the annual value of fish in cedis for a particular year. This regression shows that there is a high coefficient of determination for predicting the annual artisanal value (97%). Data of this nature is needed to estimate the contribution of fisheries to the national GDP. It is important to collect good data on prices and production.

Conclusion

Artisanal fisheries are the backbone of the fishing industry in Ghana especially the marine fishing industry. It is important to sustainably generate the necessary information for fishery management and livelihood choices. Thus making it easier for managers and policy makers to put in place the requisite plans and projections for the enhancement and sustainability of the industry.

REFERENCES

Afful and Osafo Gyimah. (1979) Economic Organization of the rural Fishing Industry. A Case Study of Elmina, Bantam and Miree Areas. Research Report Series No.19. CDS, University of Cape Coast.

Asafo C.K. (1999). The Role of the Fisheries Department of the Ministry of Food and Agriculture in the Volta Basin. *In: Gordon and Amatekpor (Eds).* The Sustainable Integrated Development of the Volta Basin in Ghana. Volta Basin Research Project, Accra

Bortei-Doku, (1991) Migrations of Artisanal Marine Fisheries among the Ga-Adangbe Fishermen and Women in Ghana, pg 180-207. IDAF/WP/36. Fishermen's' Migration in West Africa.

Braimah L.I. (1999). Management of Fisheries Resources of Lake Volta. *In: Gordon and Amatekpor (Eds).* The Sustainable Integrated Development of the Volta Basin in Ghana. Volta Basin Research Project, Accra.

Entsua-Mensah M, (2004). The Importance of Sustainable Fisheries in Rural Economies. *Paper presented at the basin Level Consultation on Research Priorities in Aquatic Ecosystems and Fisheries. 16-17th December, 2004*

Entsua-Mensah M, and J. Virdin. (2005). Managing Ghana's Large Natural Assets: Coastal Fisheries and Wetland Resources. Paper written for the World Bank, February, 2005

Evans, D.W. (2001) Status and Trend Reporting in Fisheries. FAO Fisheries Circular No. 967

Koranteng, K.A., Entsua-Mensah M., Ofori-Danson P.K., 1998. Comparative Study of the Fish and Fisheries of three Coastal Lagoons in West Africa. *International Journal of Ecology and Environmental Sciences 24: 371-382.*

MOFA (2004) Information on Fisheries in Ghana. The Directorate of Fisheries. Ministry of Food and Agriculture, 2004.

Odetei, I. (1991) Migrations of Fante Fishermen. Pg 168-179. IDAF/WP/36. Fishermen's' Migration in West Africa.

Vercuijsse, E 1(979). The Socio-Economic Structure of Canoe Fishing in Two Mfantse Communities. Research Report Series. Paper No. 20, Centre for Development Studies University of Cape Coast

Willoughby, N. and M. Entsua-Mensah (1998). Artisanal and Commercial Fisheries Development. Ghana Environmental Resource Management Project. Options for Coastal Wetlands. National resources international (nri) Vol. II.

ENVIRONMENTAL INFORMATION MANAGEMENT: CHALLENGES AND OPPORTUNITIES OF THE DIGITAL AGE. CASE STUDY OF GHANA ENVIRONMENTAL PROTECTION AGENCY (EPA)-LIBRARY

Agnes Adjabeng
Librarian
Environmental Protection Agency
Accra, Ghana
aadjabeng@epaghana.org

ABSTRACT

Environmental management is dependent on the availability of relevant, timely and reliable information. This is because of the strategic role that environmental information plays in the success of all strategic planning processes. The multi-disciplinary nature of environmental information however poses a problem to its gathering, storage, retrieval and dissemination. This paper looks at some of the unique problems associated with management of environmental information. In the context of information-driven society, the author also discusses the opportunities and challenges brought about in the wake of the digital age in the management of environmental information. The key issues discussed in this paper deal with accessibility, communication and dissemination of environmental information to decision makers at various levels of society to solving environmental issues in the Ghana Environmental Protection Agency (EPA) Library.

Introduction

The remarkable power of the digital technologies to transform society stems from the ability digital communications, high-powered computers and high-capacity networks render to every sound, symbol, and image in computer-compatible form and transmit it over great distances. The movement of data replaces the movement of people and interactions or transactions that once were locked in physical space and now take place in cyberspace. Acquisition of these newly powerful means of communications becomes the central determinant of participation in the digital information age. Routine use of these technologies makes for more efficient consumers and more effective citizens (Cooper, 2002).

Management of our environment is one of the disciplines that have caught the attention of many in recent times. This phenomenon is realised in the growing need and desire for environmental information among policy makers, planners and researchers. This is further heightened by the fact that environmental management is dependent on the availability of relevant, timely and reliable environmental information. This information in particular must be accessible and available in a format, which must be easily interpreted and usable by the users, for example, decision makers. This need is driven by the strategic role that environmental information plays in the success of all development planning processes. However, due to the multi-disciplinary nature of the environment and environmental information, its gathering, storage retrieval and dissemination, poses problems.

This paper looks at the management of environmental information in the Ghana Environmental Protection Agency (EPA). It highlights in particular the peculiar nature of environmental information and the problems associated with its management. The digital age in spite of its challenges has brought in its wake, opportunities that are harnessed to enhance the management of environmental

information. In the context of the information-driven society, the author describes the challenges and opportunities available even as Information and Communication Technologies (ICT) are applied in the management of environmental information. These issues are discussed in the areas of accessibility, communication and dissemination of the information to decision makers at various levels of society for solving environmental issues.

Definition of “Environment”

According to the McGraw-Hill Encyclopaedia of Science and Technology (1977) “Ecologically the environment is the sum of all external conditions and influence affecting the life and development of organisms”. This definition emphasises the all-embracing quality of environmental matters and their profound effect on human activities. It is said that man is the greatest enemy of the environment, which also includes man’s activities and other living things. The environment provides the natural resource base on which sustained economic development depends and it has been recognized that the environment and economic development cannot be treated in isolation from each other. They are mutually interdependent. According to the Bruntland Report (1987), without adequate environmental protection, development will be undermined and without development, environmental protection too will fail. The two-way relationship indicates that economic activity can have impact on the quality of the environment and environmental damage can undermine future productivity.

Factors affecting the environment

The environment from the definitions above is multidisciplinary and cross-sectoral involving several areas including; climate change (global warming, stratospheric ozone depletion), degradation of fresh water resources, deforestation, loss of biological diversity, disposal of hazardous waste, human settlements, noise pollution and more. The conditions and influence that affect the environment are also many and varied. These conditions can be localized, regional and global in scope. In some cases, effects are caused by the activities of living things while natural phenomena are responsible in other cases. The sorts of effects that can contribute to environmental impacts include radiation; chemical materials; soil; climate; and man. The effects of radiation can be the cause of health problems. An example was the case of the Chernobyl disaster in 1996. The damage spread from the vicinity to other areas of Europe due to its dispersal in the atmosphere. Chemical materials especially those found in pesticides, such as lead, cadmium, and mercury also causes environmental damage. Changes in soil and climate can also be brought about by man-made projects such as irrigation dam construction and industrial activities. Climate changes can also be caused by use of chemicals such as, chlorofluorocarbon, which is destroying the ozone layer, or using too much fuel and its contribution to the greenhouse effect (Sweeney, 1995).

Environmental Information

Environmental information, with emphasis on the word *environmental* implies that the information gathering requires a specialized technique and training. It is split among several disciplines with no overwhelmingly important source dedicated to it. Hence, to retrieve information several sources need to be searched. Furthermore, the information required by a particular user may depend more on the user’s understanding of and attitude to environmental issue than on any objective criteria. Above all, information gathering can be costly hence data are sometimes not available. This can have very serious effects when data is required for instance on air and water pollution at different localities (Sweeney, 1995).

The various establishments involved in environmental protection generate much information. The largest portion of the information produced in the environment area is grey literature that is difficult to trace and access. This is literature outside the easily recordable categories and not available in standard information sources like books. It can only be available in subject and special journals and magazines. Typically, grey literature is recorded as conference proceedings, research reports, theses

and often contains relevant and current information. In providing environmental information, care must be taken not to provide misleading information for this might lead a planner to take a decision that might bring about some negative effects on society. It is also essential that an information provider checks or validates information by giving the source of that information, and must provide the user with as much information as possible, to enable the user to decide on the credibility of the information. Users often want information to be interpreted therefore information providers would have to be careful not to do this unless they have particular knowledge of the environmental issues concerned.

Information Management Initiatives

The world's environment problems were steadily getting worse and efforts to address the issue had to start at the global level. It was because of this that the Stockholm Declaration of 1972 by the United Nations was made. Following the recommendations of the Stockholm Declaration organizations and global systems dedicated to the provision of environmental information were established. Consequently, the United Nations Environment Programme (UNEP) in Nairobi in Kenya (Sweeney, 1995) set up the Global Environmental Information Exchange Network System (INFOTERRA). The earliest formalised environmental information exchange mechanism was the Infoterra network established in 1974. The main purpose of the network was to disseminate information and catalyse the exchange of environmental data and information. The Infoterra network structure was designed around a system of national focal points (NFPs) usually located in the principal environmental authority in each country. The UNEP/INFOTERRA system is currently made of 177 countries. In Ghana, the Environmental Protection Agency (EPA) is the INFOTERRA NFP. The EPA compiled a metadatabase on the sources of environmental information in Ghana as input into the INFOTERRA international database (www.unep.org). Even at the early stage, it was recognised that a single institutional provider, irrespective of how comprehensive and authoritative the data and information resources of that provider may be, could not provide a broad-based information service.

The United Nations Conference on Environment and Development (UNCED), 1992, followed the Stockholm Declaration. The concern raised at the UNCED also referred to as the Rio Summit included the proper development of resources with emphasises on sustainable development. The Rio Summit came out with the Agenda 21 document that sets out the tasks and priorities for a whole century in a total of 40 chapters (United Nations, 1992).

The importance that the Rio Summit placed on Environmental Information is taken from Chapter 40 of the Agenda 21. It indicated that there is a very large information gap between developed countries and less developed countries and that it was necessary to make available by publishing already existing data. It also encouraged the creation of inventories of environmental and development information; and electronic networks should be established and/or strengthened; relevant international organisations should oversee the coordination of data collection and assessment and information technology should be made more available for decision making and planning (United Nations, 1992).

Current efforts in Environmental Information Management can be seen in the implementation of the African Environment Information Network (AEIN) project. The AEIN responds to political aspirations, technical needs, strengthening institutional capacities in the collaboration and harmonization of environmental data, as well as filling information gaps, and providing linkages and strategic alignments to relevant regional and global initiatives. The Environmental Protection Agency is one of the AEIN National Nodes. As a participating institution the EPA has compiled and created bibliographic information databases using standard procedures and standard environmental terminologies and published the electronic bibliographic databases and sources of information

through EPA website: www.epa.gov.gh/aein.htm. Information gathered by all the AEIN National Nodes will be published in the African Environment Outlook and also the Global Environment Outlook documents (Africa Environment Information Network, 2003).

Environmental Information for Decision-Making

As environmental degradation continues to threaten the quality of life of people throughout the world, policy makers are turning to long-term strategic plans to integrate social, economic and environmental perspectives in ways that reflect the complexities of environmental management. This is being done through the implementation of strategic plans such as the development and implementation of National Environmental Action Plans, National Conservation Strategies and National Environmental Management Plans. The Ghana Environmental Action Plan provides the broad framework for the implementation of the action plans for the sound management of resources and the environment (Ghana Environmental Action Plan, 1991).

The role of environmental information is crucial to the success of all strategic planning processes. All have largely agreed on the need to make available, relevant information for environmental policy analysis and formulation. It is now also widely accepted that weak information management has often constrained effective natural resource planning. Specifically, absence of or inaccessibility to information has meant that decision-making too often takes place in a vacuum (Environmental Protection Council, 1991).

Environmental issues in Ghana

In Ghana, industrial development, including mining and other socio-economic activities have generally been at the expense of the environment. There is increasing evidence that in some parts of the country excessive demands are being made on limited resources and the carrying capacity of the fragile ecosystem. These developments have led to soil and land degradation, air and water pollution and increase in public health problems. Coastal zone degradation, loss of marine resources and endangering biological diversity are also some of the environmental issues of the country. The main underlying cause of these problems include population pressure, poverty, uneven income distribution and gender issues, land tenure system and land management policies. Other causes are the misuses of coastal resources, fishing, urban, and industrial location and waste disposal. Underground mining problems result in change in water quality. Health and safety hazards include accidents such as gas poisoning, high temperature and various occupational diseases. Misuse of chemicals especially pesticides, rapid population growth and lack of proper human settlement plans, have led to urban sprawls with numerous problems (EPA Annual Report, 1996).

The Environmental Protection Agency (EPA)

The Government of Ghana has a goal to ensure improved quality of life for its citizens. It is for this reason that the Environmental Protection Agency was established by Act 490, (1994). It took over the erstwhile Environmental Protection Council, which was established in 1974 after the Stockholm Conference on the Human Environment held in 1972. The EPA has the powers to regulate and enforce environmental laws and regulations. It also gathers as much local data as possible for the monitoring of the environment in a holistic way. This is important, for example, when conducting an environmental impact assessment where some preliminary report may avert a major problem later on.

To this end, the Agency relies highly on the availability of comprehensive, relevant and reliable data concerning all aspects of the environment, especially reliable data on trends and emerging threats to the environment. It is therefore involved in the collection and processing of data on the environment for integration and dissemination to policy and decision makers who need such information to develop accurate and proper planning strategies. The task of promoting sound environmental management is best accomplished if the citizenry understand the problems and the

role of the individual in its protection. Such skills could be acquired from Environmental Education, which helps the individual to acquire knowledge, and skills and possibly develop positive attitudes towards the environment.

Functions and Activities of the Agency

The EPA has worked with the people of Ghana to develop and implement a broad range of programmes to protect the Ghanaian environment. So far, much has been achieved in raising people's awareness of environmental issues and to secure the commitment of individuals and communities in respect of taking action to protect and enhance their environment. This is in recognition of the inter-sectoral, inter-disciplinary and multi-dimensional nature of environmental issues. The primary focus of networking is the establishment of linkages among various institutions involved in environmental and resource management and the creation of public awareness. Following this, the EPA over the years has continued to organise workshops from the urban level to the district level. The workshops are organized with the view to gather information, acquire knowledge about the environment and environmental issues, and on how to disseminate that information so that it is easily understood and put into practice (EPA, 1996).

Companies and individuals need to be more conscious of how their actions affect the environment. Education and advice helps raise awareness of the issues through the provision of clear information. Information on regulatory requirements is provided so that companies and individuals become aware of their responsibilities and the consequences of failing to meet them. In many cases the Agency works with other organisations to develop and promote information and educational materials.

The Agency also monitors many activities that potentially affect the environment, so that we can assess the risk of adverse effects. We are mainly concerned with emissions to air and water, water resources, waste management and the environmental quality of air and water. We then use this information to decide if further action is required to protect and improve the environment. Enforcement regulation includes penalties or incentives that act as effective deterrents to non-compliance. But where companies and individuals do not comply with legislation enforcement powers are applied, firmly and fairly to prevent pollution or environmental damage or require remedial action to protect the environment.

Environmental Protection Agency Library

In the present Information Age, gaps in access continue to pose a critical challenge, but libraries in some institutions are performing this vital function by providing universal access. The EPA creates awareness to mainstream environment into the development process at all levels of the society. In line with that the EPA Library has a primary responsibility to organise, develop and maintain systematic collection of books, periodicals and other recorded (published and unpublished) materials and make them available to the staff of the Agency and all stakeholders on the environment. This is done in order to facilitate the sound management of the country's natural and environmental resources. It is important to gather as much local data as possible to ensure that monitoring of the county's environmental problems become very effective.

The EPA library maintains a special collection of resources on the environment. The library collection includes information resources on all aspects of the environment and in various formats. The resources include 3,000 books, 800 reports, 100 journals, pamphlets and periodicals and 100 videocassettes. The videocassettes cover public hearing sessions and other activities and programmes organised by the Agency. The collection covers subject areas like mining, environmental law, environmental education, solid waste management, air, water and soil pollution, sanitation, coastal management, environmental impact assessment and auditing, desertification and forestry.

Information and Communication Technologies (ICT)

What is the role of Information and Communication Technologies (ICT) in information management within the EPA? The benefits of the effective use of ICT have huge potentials for the present and the future. Information and Communication tools enhance the creation of functional linkages among sectors to encourage dialogue and consensus building for the purpose of data gathering, sharing and management of natural resources. Information communication technology also enhances environmental education, management of water and air quality through monitoring and modelling.

The Agency realising the value of the Internet has invested significantly in the provision and use of the Internet. The World Wide Web and several online facilities are used to access large volumes of relevant environmental information. This information is used to support activities of the staff of the Agency. Similarly, information is also accessed to meet the information needs of the public users of the library. As mentioned earlier, environmental information is difficult and scarce to access and the cost of obtaining such information from books and journals is very high. It is noteworthy that we are able to download grey literature from remote sources on the Internet. This information has been used to solving environmental problems in Ghana. With other online facilities like emails, discussion group and list serves, staff are kept abreast with current developments especially emerging issues in the environment sector. The use of other ICT facilities such as telephone, fax, and mobile phones has greatly enhanced networking, collaboration and referral activities between the Agency and her networking partners.

Communication tools in both the print and electronic media are used to provide information about environmental performance to a wider audience. Information on the programmes and activities of the Agency for example on legislation and regulatory impact assessment is made available on our website at www.epa.gov.gh. Recent developments in the management of environmental information indicate that Environmental Information Systems (EIS) are widely used by subject specialists to collate, package and disseminate environmental information. Geographic Information System (GIS) for instance enhances the harmonization of datasets and helps analysts identify information needs.

In the Agency, raw data is converted into a form that is meaningful to the decision maker. For example, data is converted into maps. Information generated from forest and rangeland is presented as a series of maps. Data on bushfires, which pose serious constraint to sustainable natural resource management, is also presented in maps that clearly document the extent and frequency of forest and range burning. This information is more likely to ginger the policy maker who, armed with the information provided, has enough evidence to tackle the problem on hand. The Agency is one of the lead Agencies in the application of GIS in the management of the natural resources in the country.

Information Services

The EPA offers information services in various ways to its numerous customers and the library serves as the first point of call for information seekers. The services offered to the users in the library include the following.

- Reference and Referral Services
- Compilation and creation of bibliographic databases/Indexes
- Photocopier services
- Selective Dissemination of Information (SDI) and Current Awareness Services
- Literature Searches on the Internet

Users

The EPA Library provides environmental information to the staff in order to support the programmes and activities of the Agency. It is a Reference library and opens to the public. The users of the Library include researchers from both the universities and research institutes, and students from

other tertiary institutions. This is so because Environmental Science is being offered in the country's universities and tertiary institutions. The library offers a unique opportunity to students and lecturers to access information on the environment. This Library is the only one of its kind in the country. In addition to accessing the information to support academic purposes, the students also use the Library for research purposes. It provides grey literature, which is most relevant for research work. Officers from Government Ministries and Non-Governmental Organizations also benefit from using the Centre. The Library is equipped with two personal computers with Internet connectivity.

External and Internal Networking and Collaboration

Networking and cooperation with other institutions both at the national and international level is one of the strategies adopted by the Agency in meeting most of her information needs. While some countries have been able to come out with solutions to some environmental problems, others are now beginning to find solutions to similar problems. Experience has shown that networking and collaboration enables sharing of ideas and exchange of information. To this end, the EPA maintains a strong network of stakeholders at both the local and international level for information sharing and exchange programmes. Partnerships are fundamental to all aspects of the Agency's programmes. Through partnerships with diverse range of stakeholders, the EPA has developed an informed awareness of environmental issues and responsibilities across all members of the Ghanaian community and facilitated action to protect and enhance the quality of the environment.

Challenges and Opportunities

Experiences with environmental information showed that some of the greatest challenges related to organizational issues, rather than the technical or technological aspects of producing the information. The underlying difficulty arises from the fact that "source information" needed for the production of information to support environmental management practices is multi-disciplinary in nature, comes in different formats, and needs to be adjusted to fit each other to generate new information. This is true even when confined to a single sector such as forestry or agriculture, because additional information may be required on a diverse and variable set of topics. It is inevitable, therefore that the underlying datasets will be scattered amongst many organizations and sources, making the task of integration especially time-consuming. Furthermore, if some organizations are unable or unwilling to provide access to their data, there may be no option but to reproduce secondary copies at great expense. Even worse decisions may be made in the absence of important data because the latter have not been accessible (Africa Environment Information Network, 2003).

The most fundamental of these is the challenge of affordable access. If the Internet is available to only a few, its democratizing potential will never be achieved. Its economic impact will be limited as well. Policymakers, both at the national and international levels, together with service providers and other entities operating the Internet as well as non-governmental organizations representing the public interest have a shared obligation to seek ways to achieve the widespread use of the Internet. The Internet is far from achieving its potential reach and impact, and there are concerns that the "digital divide" is growing as the pace of change accelerates. Access to the Internet, for all its unique qualities, has been for most of its short history largely dependent upon more traditional communications services, specifically traditional telephone service. Consequently, for most people in most countries, access to the Internet can be no better than access to basic telecommunications services. Moreover, the overwhelming majority of people in the world lack access to basic telephone service. Thus, the gap between the haves and the have-nots overshadows our consideration of Internet policy as it does so many other issues (UNDP 1999 <http://www.undp.org/hdro/report.html>).

Opportunities

In Ghana environmental managers, planners and decision makers face the task of providing answers to a host of problems related to improving the well-being of the human race through the proper

management of the environment. Thus, the need to promote and enhance the dissemination of environmental information in order to create a more environmentally conscious public that will be sensitive to the causes that lead to environmental degradation in any form is high. The ability to communicate relevant information across to partners has provided instant solutions to the reoccurrence of many environmental problems. Internet facilities such as the E-mail and the World Wide Web where they are available have served as very useful channels for communication and access to sources of relevant environmental information respectively. Other Internet facilities such as listserves, discussion groups, and the presence of websites have fostered collaboration and facilitated resource sharing, expertise and knowledge among partners. Online digital libraries, online education, telemedicine, e-government, and many other applications are used to solve vital problems in the country.

However, many organizations in a developing country like Ghana are still far away from benefiting from the advantages that are available in the Information Age, traditional sources of widespread public information such as television broadcasting, telephone services, educational institutions and public libraries are used to make information available. Information and Communication tools have enhanced the formation of partnerships with other professionals and collaboration with regional, national, and international associations. This situation has helped reduce some of the challenges that we as providers of environmental information face.

Conclusion

Environmental information is multi-disciplinary and cross-sectoral and several organizations and people are involved in the production of this type of information. The gathering of environmental data and information needs specialized techniques. This information is also produced and packaged in different and unconventional formats, scattered and difficult to access. It is also classified as grey literature. The sensitive nature of the information requires validation. A single institutional provider cannot provide the broad-based nature of environmental information service. Therefore, networking and collaboration between environmental information providers must be established in addition to personal contacts at all levels. While we are being challenged with problems classified as “third world information technology” problems, the inability to adopt and apply these tools in development planning and environmental management means that the vicious cycle of under development, poverty, and environmental degradation will remain with developing countries (Gyamfi-Aidoo 1997). The rapid development of information and communication technologies should be seen as the most powerful weapon of our time for managing environmental information for sustainable development.

REFERENCES

Brundtland Report (1989). Our Common Future: A Reader's Guide. IIED: UK.

Cooper, N. Mark (2002). Does the Digital Divide Still Exist? Bush Administration Shrugs, But Evidence Says "Yes". Director of Research Consumer Federation of America.

Environmental Protection Agency (1996). Report on Trainers' Workshop for Districts Environmental Management Committees of District Assemblies of Ghana. EPA: Accra

Environmental Protection Agency (1998). Annual Report. EPA: Accra

Environmental Protection Agency (2001). Strategic Plan 1999-2003. EPA: Accra.

Environmental Protection Council (1991). Ghana Environmental Action Plan. EPC: Accra

Gyamfi-Aidoo, J (1997). Executive Summary. In- Yves Prevost and Peter Guiruth. Environmental Information Systems in Sub-Saharan Africa: Building Blocks Towards Environmental Sustainable Development in Sub-Saharan Africa Paper No. 12. Africa Region: World Bank.

McGraw Hill (1977). Encyclopaedia of Science and Technology (4th edition) McGraw Hill

Sweeney, M. John (1995). Environmental Information Issues and Sources of Information. German Foundation for International Development: Germany

United Nations (1992). AGENDA 21: Programme of Action for Sustainable Development. United Nations: New York

United Nations Environment Programme (2003). Africa Environment Information Network: Framework for Capacity Building in Integrated Environmental Assessments and Reporting in Africa. UNEP: Nairobi.

World Resources Institute (1992). Global Biodiversity Strategy: Guidelines for Action to Save, and Use Earth's Biotic Wealth Sustainably and Equitably. World Resources Institute: New York.

ACCESS TO ELECTRONIC LITERATURE. AN ANSWER TO DOCUMENT RESOURCES CONSTRAINTS IN AFRICA

Arame G. Ndiaye Keita
Direction des Pêches Maritimes
B.P. 289, Dakar Senegal
Dakar – Senegal
a.keita@odinafrica.net

Problématique

Le coût d'accès à l'information de qualité et particulièrement d'abonnement aux revues scientifiques et techniques est si élevé que même les bibliothèques de pays développés sont incapables de se permettre de se procurer tout ce dont ils ont besoin ou d'acquérir tout ce qui est disponible dans leur domaine d'intérêt.

Alors que cette situation prévaut dans les pays développés, les contraintes budgétaires sont encore plus drastiques dans la plupart des bibliothèques en Afrique. Malgré le fait qu'elles constituent les sources d'information les plus formelles, la majeure partie des bibliothèques, sont parfois dans des situations où elles ne peuvent même pas, souscrire aux ressources minimales essentielles.

En sus, généralement, les chercheurs africains éprouvent des difficultés pour publier leurs résultats de recherches dans les revues internationales de haut niveau. Ceci est dû à plusieurs facteurs mais le plus récurrent reste le défaut de budget de publications au niveau des institutions de recherche. Par conséquent, la plupart des publications est souvent de la littérature souterraine (grise) et est en général disponible sous une forme imprimé de rapports, compte rendu de conférence. Ce qui rend l'accès aux informations encore plus difficile alors qu'elles constituent souvent d'importants gisements de connaissances dans un domaine déterminé.

Si elles sont publiées selon le circuit éditorial traditionnel, ces publications deviennent encore moins accessibles du fait du coût d'acquisitions souvent hors de portée des bibliothèques. Face à cet état de fait, quelle solution adopter? Avec l'ère numérique et l'avènement des consortiums, réseaux et associations de bibliothèques, d'importantes initiatives sont entrain d'être développées dans le monde mais également en Afrique afin de permettre un meilleur accès à l'information.

Une des approches est la mise en commun des ressources d'abord et ensuite le partage de ces ressources entre bibliothèques/centre d'informations à travers des mécanismes d'échange (transmission/réception) électronique de documents ainsi que le développement de bases de données numérisées à texte intégrale et à accès gratuit via le web.

Quelques Opportunités dans les sciences marines

C'est dans cette mouvance que des programmes ont été développés pour les bibliothèques de science aquatiques et marines par des associations professionnelles comme *l'IAMSLIC avec son catalogue Z3950*: <http://library.csumb.edu/cyamus/ill/>

IAMSLIC Z39.50 Distributed Library facilite le partage des ressources entre les bibliothèques et centre d'information marines dans le monde. Il comprend le catalogue des fonds documentaires

ainsi que le catalogue collectif des périodiques (sous format papier ou électronique) des bibliothèques aquatiques et marines participant au système.

D'importantes informations sont disponibles sur le site de IAMSLIC sur les méthodes de recherche du catalogue ainsi que les possibilités d'acquisition des documents à travers le système prêt inter bibliothèque ou de livraison de document.

Un autre outil de facilitation d'accès et d'échange de l'information sur les sciences marines notamment en Afrique est développé par le projet ODINAFRICA (www.odinafrica.org):

AFRILIB.

AFRILIB est un catalogue collectif électronique des fonds documentaires des bibliothèques des 25 institutions participant à ODINAFRICA.

AFRILIB vise à rendre visible et accessibles toutes les publications détenues dans ces bibliothèques afin que toutes les communautés d'utilisateurs puissent en tirer profit pour une meilleure gestion des océans et des zones côtières. Des recherches peuvent être effectuées sur le catalogue via le WEB et l'acquisition d'une copie des documents désirée est possible après formulation d'une requête à l'adresse suivante et l'inclusion de la référence documentaire. Le procédé de transmission électronique des documents de AFRILIB après requête n'est pas encore complètement opérationnel mais le sera dans un futur proche.

Toutes ces initiatives sont basées sur le principe du prêt d'inter bibliothèque et du système électronique de transmission de l'information.

Mécanisme de la transmission électronique d'information

La bibliothèque détentrice des ressources informationnelles soutient la bibliothèque qui n'en dispose pas en envoyant les des copies de document.

Le processus est appelé « document delivery » en Anglais (provision de document) et est en pratique depuis longtemps même en Afrique, bien que souvent utilisé dans le cadre de collaboration informelle entre quelques bibliothèques ou dans le cadre de projets régionaux comme RECOSIX-WIO, SAIAB ...

Dans ce processus, le « centre pourvoyeur » fait une copie du document demandé et l'envoie par courrier (postal) à la bibliothèque demandeur.

Généralement, ce processus prend beaucoup de temps avant que le document n'atteigne l'utilisateur ou parfois le document se perd dans le circuit postal (en Afrique).

Cependant, de nos jours, le processus de photocopie a été remplacé par le système de transmission électronique de l'information avec l'utilisation du Scanner.

Le document (généralement un article de journal) est scanné et est envoyé sous forme de fichier attaché via le courrier électronique à la bibliothèque demandeur qui reçoit le document dans un délai très court.

Le format du fichier le plus utilisé pour cette technique est le « PDF » (format de document portatif) disponible avec le logiciel Acrobat d'Adobe (writer and reader)

Parallèlement, il existe d'autres logiciels spécialisés dans la transmission électronique des documents comme **Ariel and Propero**. Ces deux logiciels sont d'ailleurs les plus utilisés pour le système inter - bibliothèque et de document delivery de IAMSLIC Z39-50.

Par ailleurs, le partage des ressources via les systèmes décrits ci-dessous, présentent des avantages non-négligeables pour la bibliothèque fournisseur d'informations.

En effet, en scannant le document avant l'envoi au centre demandeur, la bibliothèque crée une copie électronique du document.

La sauvegarde de ces copies permet à la bibliothèque de construire en même temps sa propre collection de documents numérisés et ainsi préserver sa collection sous format digital.

Par conséquent, ce système présente un double avantage: contribuer non seulement à la satisfaction des besoins d'information d'un utilisateur ou d'une communauté d'utilisateur mais également disposer d'une collection digitale au fur à mesure du développement de l'activité.

Le partage des ressources, une alternative aux contraintes liées à l'accès aux ressources

Un autre moyen de faire face aux contraintes de déficit de ressource informationnelles consiste au développement de dépôt numériques institutionnels (E-repository) et aux programmes des Journaux électroniques à accès libre (e-journals) pour la littérature locale.

Le dépôt numérique ou E-Repository traite de la production scientifique d'une d'institution ou d'un groupe d'institutions. C'est également une plate-forme de publication pour une communauté donnée, par laquelle la production scientifique générée peut être gérée et rendue électroniquement et gratuitement accessible via le WEB.

Un programme de cette nature est développé dans le cadre du projet ODINAFRICA pour les bibliothèques des sciences marines en Afrique: OdinPubAfrica: <http://www.odinpubafrica.luc.be>

OdinPubAfrica est un système de dépôt et de diffusion électronique de publications sur les sciences marines en l'Afrique. Il contient des preprints, des articles publiés, des rapports techniques, des thèses et autres documents scientifiques sur le domaine marin et autres disciplines connexes en texte intégral et sous format digital, publiées par des chercheurs africains et/ou affiliés aux institutions participant au projet ODINAFRICA.

Un des objectifs principaux d'Odinpubafrica est de rendre plus visible et accessible la littérature scientifique marine africaine. Ainsi, Odinpubafrica donne accès gratuitement, en format électronique, aux publications précitées qui sont enregistrées et maintenues par les principales institutions participants à la phase pilote via le site du projet. Son objectif à long terme est servir de plateforme au développement de journaux électroniques sur les sciences marines africaines. Mais elle peut également servir d'alternative à la transmission électronique des documents volumineux comme les thèses.

Cette base de donnée est démarrée officiellement en août 2005 et contient actuellement plus 500 de metadonnées et de données.

2- e-journals

A l'heure actuelle, Il existe plusieurs possibilités pour les pays en développement d'avoir accès non seulement aux journaux électroniques via leur table de matière et Abstract mais également au texte intégral de journaux électroniques.

En effet, dans le cadre certains programmes régionaux d'échanges d'information comme ODINAFRICA, des accords ont été trouvés avec certains des éditeurs principaux sur des sciences maritimes pour l'accès gratuit ou à moindre coût au texte intégral de leurs journaux électroniques. Parmi ceux-ci on peut citer:

[A-to-Z list de Odinafrica](#) avec 17 titres de journal sur océanographie. Plusieurs revues sont libres d'accès avec texte intégral dans AGORA, DOAJ (<http://atoz.ebsco.com/home>)

Il existe d'autres programmes avec une couverture plus large que les sciences marines

- [Agora](#): avec 747 titres de journal des principaux éditeurs d'activité de la FAO (Agriculture, sciences environnementales) et des sciences sociales); [http:// www.agrinternetnetwork.org](http://www.agrinternetnetwork.org))
- [DOAJ](#) : le répertoire des journaux électronique ([http:// www.doaj.org](http://www.doaj.org));
- [INASP-Peri](#): Accès à différentes collections et bases de données de 24 pays ([http:// www.inasp.info](http://www.inasp.info))
- [Hinari](#): collection et base de données sur la bio médecine et les sciences sociales.

Contraintes

En dépit des différentes opportunités, le partage des ressources connaît des limites dont entre autres:

- Le coût de certain logiciel de transmission électronique de l'information pré requis à l'échange électronique d'information.
- Le défaut d'une bonne connexion à Internet d'autant plus que dans certains cas, un connexion à haut débit est une conditionnalité pour l'échange électronique des documents mais également l'utilisation des dépôts numériques comme ODINPUBAFRICA.
- La Prolongation du temps de travail avec la conversion des documents du format papier en format électronique;
- La préservation des documents numérisés nécessite une grande capacité stockage des ordinateurs;
- Le problème du droit d'auteur reste un des talons d'Achille des bibliothèques et des éditeurs concernant les publications électroniques (IFLA Position on Copyright in the Digital Environment: <http://www.ifla.org/V/press/copydig.htm>)

Conclusion

L'accès à la littérature électronique à Travers le partage des ressources est une solution ou peut contribuer efficacement à réduire ces difficultés.

L'utilisation combinée des ressources et systèmes décrits tantôt peut être une alternative pour faire face aux contraintes liées l'accès à l'information aquatique et marine en Afrique

En sus, des initiatives conjointes entre les différentes associations et /ou réseau en sciences marines et aquatiques en Afrique devraient être développées et /ou renforcées. Ainsi la participation de toute les bibliothèques et centres d'information en sciences marines et marines en Afrique au programme ODINAFRICA et au dela

Le développement d'une base de données commune des différents périodiques disponibles au niveau des bibliothèques africaines sur les sciences marines et aquatiques et son intégration dans le catalogue Z39-50 de l'IAMSLIC devrait être le premier pas.

ELECTRONIC INFORMATION IN AQUACULTURE AND FISHERIES SCIENCE: OPPORTUNITIES AND CHALLENGES IN MALAWI

Geoffrey F. Salanje
College Librarian
Bunda College of Agriculture
University of Malawi, P.O. Box 219, Lilongwe
Malawi. Tel +2651 277348 fax +2651 277251
gsalnje@bunda.sdn.org.mw

Introduction

Libraries and information Centres in Malawi are accessing electronic information which are available through locally created and managed databases, CD-ROMs and the Internet. The extent to which libraries and information centres access the electronic information differs from one library/information centre to another. This paper outlines the ways in which libraries and information centres involved in aquaculture and fisheries sciences information, access the information in electronic form. It also poses the challenges these libraries and information centres face and suggests possible solutions.

Current Situation of Electronic Information in Malawi:

The use of modern information and communication technologies (ICTs) has made aquatic and fisheries sciences information resources accessible online in various forms illustrated below.

CD-ROM databases

Compact disk read only memory (CD-ROM) technology has been around for close to 20 years now. A CD-ROM contains over 600Mb of data. Databases on CD-ROM are in various subjects and formats.

Most Libraries in Malawi have CD-ROM databases on almost all subjects. Bunda College of Agriculture Library through a project by Southern African Institute Aquatic Biodiversity and FAO (SAIAB/FAO) receives Aquatic biology, Aquaculture and Fisheries database by NISC of USA on CD-ROM. It also subscribes to a Silver Platter' Aquatic Sciences Fisheries Abstracts, CAB Abstracts, Agricola, Tropag and Rural databases. However, due to inadequate funds, the library no longer subscribes to other CD-ROM databases by NISC, such as:

- Essential Fisheries Abstracts
- Fish and Fisheries Worldwide
- Marine, Oceanographic & Freshwater Resources
- Water Resources Worldwide
- Water Resources Abstracts

Most of the CD-ROM databases contain bibliographical information and abstracts of articles published in various refereed journals. Printed full text articles are sometimes available locally. For those that are not available, efforts are made to have reprints from elsewhere through document delivery services provided by organizations like SAIAB/FAO, CABI, CTA and the British Library.

Another popular database is The Essential Electronic Agricultural Library (TEEAL) database, which contain full text journal articles published in 140 journal titles since 1993. Bunda College of

Agriculture and Chitedze Agricultural Research Station libraries have subscribed to TEEAL's base set (1993-1996) and updates up to December 2004. Unfortunately TEEAL does not cover much on aquatic and fisheries sciences information.

Local Created Databases

Libraries and information centers in Malawi have created a number of computer databases on various subjects to assist in quick information searching and retrieval. These databases are sources of relevant information on those subjects. The CDS/ISIS computer software is used in the creation and management of these databases.

Bunda College of Agriculture Library has created databases in subjects like maize, forestry, aquaculture and fisheries, soil fertility, CTA's QAS Requests and Answers, and Women in Development. Whilst NAC-LIC has AIFA (Aquaculture Information Services for Africa).

Aquaculture and fisheries database contain bibliographical information on journal articles' reprints and grey literature on Malawi and by Malawians most of which are available in the respective libraries or the records indicate the location of the full text.

In cases where Internet is slow or there are not adequate computer terminals to access the Internet or CD-ROM databases, libraries and information centers download and make print outs of the full articles on information frequently needed by users. Bibliographic records of those articles/reprints are entered in locally created databases.

Accessing Electronic Information through the Internet

There are a number of opportunities, which are available to the libraries and information centres in Malawi for accessing electronic information. These are :

- 1. Initiatives by organizations like eiFL** (Electronic Information for Libraries) and PERI (Programme for the Enhancement of Research Information) who have negotiated highly concessional rates from journal publishers who are being pushed to provide electronic access. In Malawi there have been training workshops on the use eiFL and PERI resources and in the use of ICT in general.
- 2. Publishers such as Academic Press and Blackwells** – the authoritative publishers of peer reviewed journal articles. Then there are organizations such as ProQuest and Ebsco-Host, Emerald who provide access to hundreds or thousands of journals from a variety of publishers, some of which will be popular and some peer-reviewed. Full texts are available on certain articles and whilst others have only the abstract, with an extra fee for a full text. In Malawi we are fortunate to have access to more than US\$3 million of e-journals, more than most prestigious North American Universities.

In 2003 a Malawi Library and Information Consortium (MALICO) was formed in order for libraries and information centres to easily access the electronic resources. MALICO assists in negotiating better prices with the providers and in the joint subscription for the electronic resources.

- 3. HINARI and AGORA** - HINARI (Health InterNetwork Access to Research Initiative), launched in 2002, and led by the World Health Organization (WHO), is an online library of the latest and best information in public health, biomedicine and related social sciences: over 2,500 scientific publications by over 50 publishers (including most of the major scientific presses) in one of the world's largest collections of biomedical literature.

Like TEEAL, HINARI does not contain more information in aquaculture and fisheries sciences.

Whilst Access to Global Online Research in Agriculture (AGORA) is an initiative led by Food and Agriculture Organization (FAO) to provide free or low-cost access to more than 170 major scientific journals in agriculture and related biological, environmental and social sciences to public and qualifying not-for-profit organizations in developing countries. Launched in October 2003, AGORA is a unique collaboration of public and private partners including the World Health Organization (WHO), major scientific publishers, Cornell University's Mann Library, the Rockefeller Foundation, the UK's Department of International Development (DFID), CABI publishing and others. Through its Internet gateway www.aginternet.org, AGORA provides access to over 700 journals from the world's leading academic publishers.

In Malawi over, 10 institutions have so far registered and are using AGORA, and an equal number of institutions in the health sector are registered HINARI users.

Access to Electronic Aquaculture and Fisheries Sciences Information:

There are a few libraries in Malawi who provide access to electronic information in aquaculture and fisheries sciences through local databases, CD-ROMs and Internet resources. Notable among the libraries in Malawi are Bunda College, Chancellor College, National Aquatic Centre – Library and Information Centre, Chitedze Agricultural Research Station, Malawi Fisheries College, Mzuzu University, and Monkey Bay Fisheries Research Centre. Of these libraries, it is only Bunda College, Chancellor College and Mzuzu University who are members of MALICO as such they are able to access a wide-range of electronic resources.

Challenges

Poor or no internet connection

Libraries and information centers in Malawi are failing to take advantage of the availability of up-to-date aquaculture and fisheries sciences information on the Internet because of inaccessibility of the Internet or poor Internet connectivity for those that access it. Of the libraries mentioned above who are accessing aquaculture and fisheries sciences information, it is only Bunda College, Chancellor College and Mzuzu University who are on a V-SAT (very small aperture terminal) Internet connection with bandwidth ranging from 128kbs-256kbs uplink and 256kbs-516kbs downlink. The rest of the libraries have dial-up Internet connections. Since the Internet connection goes with cost, most of the institutions do struggle to pay for the Internet connection.

Little or no Content

Some of the electronic resources available to libraries and information centres in Malawi have little or no content in terms of aquaculture and fisheries sciences information, let alone aquaculture and fisheries sciences information on Malawi.

Inadequate funding

Some libraries and information centres cannot afford to subscribe to electronic information due to inadequate funding. Some are even neither able to become members of MALICO nor buy adequate computers for users. Others may have annual budgets, but it is only money on paper.

Users not trained in the use of electronic resources

Libraries and information centres may have the electronic resources, but sometimes users may not have the required skills in accessing these resources. It is pleasing to note that INASP/PERI and eiFL have been conducting training workshops targeting librarians, researchers and academics from

time to time. Likewise, AGORA and HIHARI have also conducted training of trainers' workshops. The recent training in Malawi on the resources was held from 26th-28th July 2005.

Untrained staff running libraries

Some libraries such as Monkey Bay Fisheries Research Centre and Malawi Fisheries College have untrained staff. Whilst some do not have enough staff to run the libraries.

Recommendations

Despite the constraints hindering libraries and information centres in Malawi accessing electronic information, there is light at the end of the tunnel. What is important is that there are various opportunities for them to access electronic information.

First, electronic information in aquaculture and fisheries sciences is available, though not much is on Malawi. There are efforts to embark on digitization of the Malawi documents, but there is a long way to go.

Secondly, in the past five years or so, the number of ICT infrastructure in Malawi has improved, although concentration has been in the urban areas as opposed to the rural areas where the majority (about 80%) the country's population is.¹ The country has experienced an increase in the number of line phones, mobile phones and operators, phone bureaus, Internet cafes, and broadband Internet connection using V-SAT. This development gives an opportunity to libraries and information centres involved in aquaculture and fisheries sciences information to have an increased accessibility of electronic information.

The formation of MALICO has given an opportunity to libraries and information centres in Malawi to easily access the electronic information. MALICO has within the past two years of its existence:

- Brought into the country four V-SATs with funding from Open Society Initiative for Southern Africa (OSISA) among other donors,
- Subscribes to electronic journals through PERI and eiFL programmes
- Conducted training on how to access electronic information.

Like in countries such as Cameroon² where VSAT technology is in use, libraries and information centres in Malawi have the opportunity to have an increased broadband, thereby accessing more electronic information. It is the intention of MALICO that all its members benefit from the V-SATs located in four sites namely: Bunda College, Mzuzu University, Chancellor College and College of Medicine.

People working in libraries and information centers now have the opportunity to get trained locally. Mzuzu University has introduced training programmes in library studies and ICT at diploma and bachelor degree levels. In the past personnel in libraries and information centers were trained outside the country until three years ago when Mzuzu University introduced a diploma in library studies; this year (2005) it has started bachelor's programmes in library and information studies (BLIS) and in ICT (B.Sc. in ICT). However, not all potential candidates have funding to enroll for the programmes.

Finally, Bunda College Library is designated as a National Coordinating Centre for the CTA's (The Technical Centre for Agricultural and Rural Cooperation) Question and Answer Service (QAS). All

¹ Kanjo, Chipso (2005). Challenges of ICT in Malawi. *IN* The Nation newspaper of Thursday, 25th August, 2005.

² Wirsiy, Kiven Charles and Shafack, Rosemary M. (2005) Greater access to Research in Cameroon's Universities. *IN* INASP Newsletter, No. 29 Summer. p. 6

institutions dealing in agriculture and related subjects including those involved in aquaculture and sciences information send requests for information to Bunda College Library through email, by post, or by phone. The BCA is building up a database on information, which is frequently requested by QAS users. Information is sent using the same media. If the information requested is not found locally, the BCA Library contacts other national centres in the region to assist. Just as Information users have the opportunity to have access to electronic information where possible, so also do the libraries and information centres have access to the database, which BCA has created.

Conclusion

Libraries and information centres in Malawi, especially those involved in aquaculture and fisheries information have a number of opportunities to access electronic resources. However, they must be pro-active and take advantage of these opportunities so as to serve their users better

Reference

Communication for Development Roundtable Report: Focus on Sustainable Report. 9th United Nations Roundtable on Communication for Development, Rome Italy 6-9 September 2004.

Joos, Nicole (2005). TEEAL Update. IN INASP Newsletter, No. 29 Summer. p. 5.

Kanjo, Chipso (2005). Challenges of ICT in Malawi. IN Nation newspaper of Thursday, 25th August 2005. Supplement p. 1.

Levey, Lisbeth A. (1998). Wired for information: putting the Internet to good use in Africa. Nairobi: PIAC

Salanje, Geoffrey F. (2003). Accessing aquatic and fisheries sciences information for change: a case for Malawi. A paper presented at the 1st AFRIAMSLIC conference, Accra, Ghana.

Wirsiy, Kiven Charles and Shafack, Rosemary M. (2005) Greater access to Research in Cameroon's Universities. IN INASP Newsletter, No. 29 Summer. p. 6

D
Se

Fishing Port Mahe

Bac ground

The Seychelles Fishing Authority (SFA) was created in 1984 by the Seychelles Fishing Authority (Establishment) Act. The SFA is the executive arm of the Government of Seychelles in the field of fisheries and marine resources. The functions of the SFA as defined in the above Act are to:

- promote, organise and develop fishing, fishing industries and fishery resources in Seychelles;
- assist in the formulation of the national policy with respect to fishing, fishing industries and fishery resources and in the implementation of that policy; and
- identify the manpower training requirements of Seychelles with regard to fishing and fishing industries.

The broad mandate of SFA, which includes the national responsibility for the management and development of the fisheries sector, and the high level of regional and international co-operation required, have implications for the resources needed and the information and documentation services provided by the Documentation Centre.

The Documentation Centre and its objectives

The SFA Documentation Centre was established in 1989. The Center has as staff one Senior Documentation Officer, one Assistant Documentation Officer and one Library Clerk. Its main objectives are to:

- Create a holding of materials related to fisheries and marine resources in the Seychelles, the Indian Ocean region and internationally;
- Support the scientific, technical and management activities of SFA;
- Managing, preserving and retrieving all such information as and when required so as to assist in the progress of research development;
- Encouraging the inter-regional exchange of all fisheries and marine related literature and information between experts, SFA staff and any other overseas fisheries institutions or bodies;
- Preserving books, materials and information for future generations; and
- Managing and distributing all SFA's publications.

Subject coverage

The documentation centre has a collection of books, serials, journals, maps, charts, posters, photos, videos, cd roms and grey literature. The collection covers a wide range of subjects including aquaculture, marine research, fisheries statistics, marine resources, fisheries technology, scientific expedition, legislation, oceanography, processing of marine products, fisheries management etc.

The collection also includes publication of other international organisations concerned with fisheries and marine environment such as FAO (Food and Agriculture Organisation), UNEP (United Nations Environment Programme), ICCAT (International Commission for the Conservation of Atlantic Tunas), IOC (Intergovernmental Oceanographic Commission) SPC (Secretariat of the Pacific Community) etc.

The unique part however is the collection on the Seychelles Fisheries and to a lesser extent other countries of the region.

Facilities

The facilities and equipment available in the Documentation Centre are: photocopying machine, computers and laserjet printer, duplex scanner, laminating machine, TV and Video and access to the Internet and e-mail.

Users

The main objective of our information services is to support the scientific, technical and management activities of the organization. The primary users are:

- A total of 106 staff is employed at the Seychelles Fishing Authority according to the 2003 Annual Report.
- Of the total staff, eight are scientific personnel including three scientists working for IRD

In addition there is a large community of external users from:

- The organisations and fisheries bodies with whom the SFA collaborates;
- Government departments and other organisations in the Seychelles working with fisheries or related subjects;
- External professionals or visiting experts and consultants to SFA or government;
- School children;
- Polytechnic students and Teachers.
- The Fishing community in general

Above all the centre is open to all those interested in fisheries and related subjects.

Information services and resources

Services provided by the Documentation Centre include:

- access to the subject collection and retrieval of documents
-
- circulation of journals
-
- photocopy services and binding
- production and circulation of a quarterly list of new acquisitions
-
- processing of articles and inter-library loan requests
- lamination services
- literature searches of bibliographic databases such as ASFA on line and IAMSLIC Z39 and other online databases
- ordering of publication
- Internet searching
- Bibliographical compilation

An additional computer is designated for other internal users and visitors

Publications

SFA produces the following publications: Annual Report, Technical Reports, Tuna Bulletin, Fisheries Bibliography and Fisheries Posters. The Centre distributes more than 500 copies of the SFA publications to both national and international bodies annually.

Co-operation

The Seychelles Fishing Authority regional and international activities include partnership with:

- Ocean Data and Information Network in Africa (ODINAFRICA)
- L'Institut de Recherche pour le Développement (I'IRD)
- Inter-governmental Oceanographic Commission (IOC)
- Food Agricultural Organisation (FAO)
- Marine Research Assessment Group (MRAG) based in London
- Japan International Cooperation Agency (JICA)
- Commission de l'Océan Indien (COI)
- European Union (EU)
- The International Association of Marine and Aquatic Science Libraries and Information Centres (IAMSLIC)
- South African Institute for Aquatic Biodiversity (SAIAB)

Recent Developments

The following are recent developments and projects taking place at the Centre:

- InMagic library software was upgraded to version 8.0.
- OdinPubAfrica debuted beginning of the year 2005.
- A new Duplex scanner was purchased.
- Renewal for another two years to the IAMSLIC membership (sponsored by UNESCO).
- Production and distribution of electronic reports.
- Digitisation of older SFA reports.
- Access to ASFA on-line was made possible (sponsored by UNESCO).

OdinPubAfrica (<http://doclib.uhasselt.be/odin>)

What is OdinPubAfrica?

OdinPubAfrica is the name of the OdinAfrica e-print service: A repository for oceanographic and marine science in Africa. A service, which will provide a growing database of research literature from marine science and oceanographic research, centers in Africa.

Goals of OdinPubAfrica

- Creation of a repository for marine science and oceanography in Africa – uploaded and maintained by participating institutes.
- Collecting publications in electronic format from different partners in Africa (starting with Odinafrica partners)
- Making scientific literature accessible
- Enhancing the visibility of the authors
- Enhancing the visibility of the institutes
- Base for further developments:
 - o Quality control on collected literature
 - o Creation of electronic versions of existing journals
 - o Added value for the African Oceans Portal <http://portal.unesco.org/africanoceans/>

Reasons to start a Repository

- Making the scientific production of an organization accessible for the researchers and the scientific community = Expands access to research.
- Making visible the scientific results of the organization = Expands impact of research.
- Archiving the documents (articles, reports, etc.).
- Creating a management tool for the documents created by the members of the organization.

Repository and Catalogue

A repository deals with the scientific production of an institution or a group of institutions only. It is a publication platform for a community, through which their own scientific output can be managed and made electronically available.

The catalogue describes the collection of holdings in an organization. Then the metadata of repository documents can be integrated in the catalogue.

The integration of available electronic documents on the Internet and local holdings in catalogues is at the moment very difficult to realize.

The repository will cover contents from different partners in Africa starting with Oдинаfrica partners.

Documents to be included are:

- Institute journals
- Reports
- Theses
- Conference papers
- Grey literature
- Journal Articles: Limited by copyright agreement but the post refereed pre-published version of a journal article can be deposited (most of the publishers – 70% of the journals accept this policy) <http://www.sherpa.ac.uk/romeo.php>

Benefits of an Institutional Repository

As a collection of the research output of an institution it:

- Provides institutional information asset management tool,
- Defines institutional sources of research,
- Identifies institutions value to funding sources,
- Raises the profile of the Institution.

Why researchers should deposit content

- To make their research more visible and available in electronic form,
- To promote their work and that of other academics within the researcher's community,
- To use it as a secure store for the researcher's publications which can help to respond to many request for full text and publication data.
- To contribute to national and global initiatives which will ensure an international audience for the researcher's latest research (other universities are developing their own archives which, together, will be searchable by global search tools).
- Make their research more visible.
- Extra services can be delivered: hit counts on papers, personalised publications lists – citation analyses.

Role of the information manager

- Inform the scientists of the institute about the possibilities of a repository.
- Inform the scientists about their copyright.
- Collect the documents, which can be uploaded.
- Updating of collections and documents.
- Transforming the documents in pdf-format.
- Submitting the documents to the repository.

THE IMPACT AND BENEFITS OF THE DIGITAL AGE ON THE SAIAB LIBRARY AND THE CHALLENGES FOR THE LIBRARIAN, LIBRARY USERS AND RESOURCE SHARING IN THE REGION

Margaret Shaw

Librarian

South African Institute for Aquatic Biodiversity (SAIAB)

P Bag 1015, Grahamstown, 6140

South Africa

m.shaw@ru.ac.za

Abstract

The SAIAB Library is still perceived by many as a traditional library, housing books, journals and reprints and the role of the librarian as primary custodian of the library materials is also a dominant perception. However, aided by consortia agreements between Universities and Database Providers at a National level, the SAIAB library – a branch library of Rhodes University – has, within a relatively short period of time, entered an arena where the increased access to research material has been exponential.

This paper will provide an overview of the SAIAB Library – its holdings, users and equipment. I will then outline the sources of research material available as a result of the consortium agreements and via the Internet, and will look at the impact this has on the role of the librarian. The changes and challenges to the traditional library will be discussed in the context of an academic and research institution within a developing country and connected with a regional network of fisheries institutions in Africa.

South African Institute of Aquatic Biodiversity

SAIAB's Vision Statement commits it to 'Serving Africa's needs in understanding fisheries and aquatic environments'. According to its Mission Statement, the Institute strives to be 'an interactive hub ... generating, disseminating and applying knowledge to understanding and solving problems on the conservation and wise use of African fishes and aquatic biodiversity.'

SAIAB is one of the leading aquatic research institutes in southern Africa, with a high profile across a number of fields. As the research report in SAIAB's Highlights of the Year 2003/04 states: 'the fields of aquatic research covered are very broad and include studies on taxonomy, systematics, genetics, biology and ecology. Although fish taxonomic and systematic studies are still a cornerstone of research at the Institute, the majority of projects are directed primarily towards answering conservation and management orientated problems. Out of a total of 40 projects and programmes, 27 are linked primarily to the marine and estuarine environments, with 13 being centred on freshwater habitats.'

SAIAB's research and partnership activities are serviced by the Margaret Smith Library, with its extensive holdings on fisheries and aquaculture, and by the National Fish collection, the largest in Africa. The Institute's Communications and Education Unit aims to disseminate research findings and, through its outreach programmes, promote public awareness of aquatic sciences and environmental issues.

Margaret Smith Library at SAIAB: Functions and Activities

From its inception in the late 1960s, the Margaret Smith Library has been a facility shared between SAIAB and Rhodes University. It currently houses approximately

- 5 000 books
- 2 500 journal titles 42 current subscriptions
 174 titles received on exchange agreements
 60 titles from NISC
- 30 000 items in a reprint collection dating back to 1842
- 47 CD Roms

The Rhodes Library uses the Millennium system (Innovative Interfaces) and, as a branch library, the SAIAB library is part of this system. The acquisition, cataloguing, and processing of all new books and journals is centralized at the Rhodes Library. This results in a major saving of staff time for the SAIAB Library. Millennium provides online public access in the Library or from user computers situated in staff offices, student computer laboratories on campus, and via the Rhodes University web page.

The SAIAB Library is staffed as follows:

1. A Collections Manager/Senior Librarian who has oversight for both the Institute's Fish Collection (approximately 500 000 specimens) and the Library.
2. A Librarian (part-time) who is responsible for user assistance, general library management, policy, planning and special projects.
3. A Library Assistant who is responsible for user assistance, issue desk routines, shelving, and maintenance of the periodical collection.
4. A Library Assistant (10 hours per week) to work on specific projects and tasks (for example, cataloguing of SAIAB journal titles on to the Rhodes University Millennium system).

Rhodes University Library Web Page and OPAC

Community Academic Admin Research Applying StudentZone Alumni Library Intranet

LIBRARY CATALOGUE/OPAC
ELECTRONIC INFORMATION RESOURCES
ABOUT RU LIBRARY
WHAT'S NEW INFORMATION LITERACY TUTORIAL
CORY LIBRARY DEPARTMENTAL LIBRARIES
OTHER ACADEMIC INSTITUTIONS
SOUTH AFRICA GOVERNMENT ONLINE

SPOTLIGHT:
Rhodes Library acquires access to World's Top Multidisciplinary Science Journal - NATURE
The Rhodes Library is delighted to announce the procurement of an online subscription to *Nature*. Full text access is available from January 1997 to the present. The Library also holds the full run of all print issues, commencing with volume 1, number 1 of 1869.
Nature's impact factor for 2004 is 32.182, making it the world's top multidisciplinary science journal, and the world's top journal publishing basic scientific research.
An online subscription to *Nature* provides users with:
1. IP-authenticated access to full text HTML or PDF articles, 24 hours a day;
2. Reference linking to the full abstracting services of ISI and PubMed;
3. Tools for downloading citations and references into one's personal bibliographic databases;
4. An option to receive Table of Contents (TOCs) and other e-alerts.
Nature can be accessed via **What's New** on the Library Website at <http://www.ru.ac.za/library/new/>.
It can also be accessed via the **OPAC** at <http://echea.ru.ac.za/search~52>.
Please forward any queries or comments you may have to the Electronic Resources Librarian (Miss Anne Moon) at A.Moon@ru.ac.za or on extension 8281.
MAIN LIBRARY HOURS:
See: <http://www.ru.ac.za/library/about/hours.html>

MARGARET KENYON:
UNIVERSITY LIBRARIAN
9 August 1945 - 21 August 2005
Link to an **edited version** of the **TRIBUTE** read at her Memorial Service on 25 August 2005.

RU Library Web Team

The SAIAB Library has the following technical equipment:

- Staff computers: 1 Pentium 4 (2.8 GHz), 1 Celeron (2.4 GHz)
- User computers: 2 Celeron (2.4 GHz), 1 Celeron TM (333 MHz)
- 1 Scanner (HP ScanJet 5590)
- 1 Photocopier (Minolta DiALTA 152)
- 3M Library security system (tattle tape and gate)

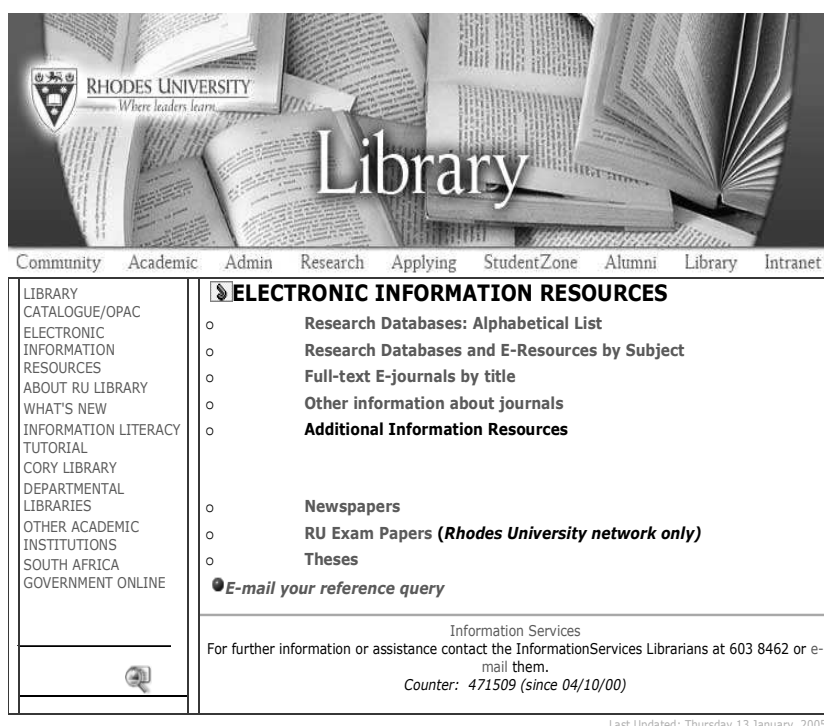
In broad outline, budget allocations in 2005 for library operation and materials are as follows:

- SAIAB allocates R60 000 (9 230 USD) to binding of journals, periodical subscriptions, book purchases, printing, stationery, telephone and postage.
- Rhodes University allocates R164 000 (25 230 USD) to the Department of Ichthyology and Fisheries Science (of this R126 000 is for periodical subscriptions and R38 000 for books and new periodicals)
- Rhodes University spends approximately R1 500 000 (230 770 USD) for access to electronic information resources.
-

The main categories of users of the SAIAB library are as follows:

1. SAIAB scientists and research staff.
2. SAIAB Communication, Education and Outreach departments.
3. Rhodes University Department of Ichthyology and Fisheries Science (DIFS): 8 academic staff, 11 Honours, 14 Masters, 11 Doctoral, and 50 Undergraduate students (2005 figures).
4. Rhodes University Department of Zoology.
5. University of Fort Hare, Department of Ichthyology – a less well-resourced campus 80 kilometres from Grahamstown.
6. Public users, including individuals and consultants.
7. Marine aquatic institutes in South Africa: Marine and Coastal Management (Cape Town), Oceanographic Research Institute (Durban) and Bayworld (Port Elizabeth Museum).
8. South African Bibliographic Network which includes all South African Universities, public libraries and some government institutes.
9. African Fisheries Institutes outside South Africa.
10. International Association of Marine Science Libraries and Information Centres (IAMSLIC).

Rhodes University Library Electronic Resources Web Page



The screenshot shows the Rhodes University Library website. At the top, there is a banner with the Rhodes University logo and the text 'RHODES UNIVERSITY Where leaders learn' and 'Library'. Below the banner is a navigation menu with links: Community, Academic, Admin, Research, Applying, StudentZone, Alumni, Library, and Intranet. The main content area is titled 'ELECTRONIC INFORMATION RESOURCES' and lists several categories: Research Databases: Alphabetical List, Research Databases and E-Resources by Subject, Full-text E-journals by title, Other information about journals, and Additional Information Resources. There are also links for Newspapers, RU Exam Papers (Rhodes University network only), and Theses. A button for 'E-mail your reference query' is visible. At the bottom, there is contact information for Information Services, including a phone number (603 8462) and an email address, and a counter number (471509) with a date (04/10/00). The page footer indicates it was last updated on Thursday 13 January, 2005.

SAIAB's Access to Electronic Information Resources

As a shared facility with the Rhodes Library, the SAIAB Library has access to online electronic information resources. The three resources most extensively used by the SAIAB Library are the following:

1. Academic Search Premier (via EBSCOhost) – provides full text access to more than 4 500 publications.
2. ScienceDirect – provides full text access to more than 1 800 titles of the Elsevier Science journal collection.
3. SpringerLink – provides access to more than 4 500 full text journals.

In addition, the following list contains 39 online electronic information resources available via Rhodes University which the SAIAB Librarian has selected for their particular relevance:

- African Journals OnLine
- Africabib.org
- AGRIS
- Biological Abstracts
- Cambridge Journals Online
- Current and Completed Research
- DOAJ
- EBSCO A-Z List
- EBSCOhost
- Eric
- Faculty of 1000
- Fish and Fisheries Worldwide
- FishBase
- HighWire Press
- Index to South African Periodicals
- InfoTrac OneFile
- Ingenta
- International Bibliography of the Social Sciences
- ISI Highly Sited.com
- ISI Web of Science
- JSTOR
- MEDLINE
- NEXUS
- OAIster
- Oxford Reference Online: Premium Collection
- Oxford Scholarship Online
- POPLINE
- PubMed
- SA Cat
- SA Media
- SA Statutes
- SABINET Online
- SciFinderScholar
- Scirus
- Scopus
- SocIndex
- SwetsWise
- UCTD: Union Catalogue of Theses and Dissertations
- Water Resources Worldwide

Details on each of these are available in Appendix A.

The FAO Library maintains a list of full text non-commercial journals of international organisations, associations and NGOs. Approximately 150 fisheries-related titles are available free of charge at http://www.fao.org/fi/library/jou_free.htm.

One of the main advantages of these online resources is that they enhance cross-disciplinary research outside the core lists of fisheries titles (some of the print versions of which have traditionally been housed in fisheries institutes such as SAIAB). Fisheries research covers areas ranging from nutrition to economics to agriculture to politics and to other branches of science. Relevant publications across these boundaries are more likely to be located in the wider access provided by online resources.

Fish and Fisheries Worldwide

One of the heavily used resources at SAIAB is Fish and Fisheries Worldwide.³ Prior to online access, users would have to come to the library to request the CD Rom for usage on the library computer. Approximately 1 to 5 people used the CD Rom per day. Online access to this NISC database via Biblioline has been available since March 2005. The agreement with NISC allows 10 concurrent users. The summary of searches/hits between January and June 2005 provides an indication of increased usage and usefulness of this resource, now that it is online. Comparative figures for 2004 are available in Appendix B.

Table 1: NISC / FFW Usage Statistics as at June 2005

Database Report 1: Total Searches and Sessions by Month and Database 2005

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Calendar YTD
Fish & Fisheries Worldwide	Searches Run Graph	147	718	687	483	782	284							3101
Fish & Fisheries Worldwide Subscription Details	Sessions	52	203	146	150	169	63							783

Database Report 2 : Turnaways by Month and Database 2005

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Calendar YTD
Fish & Fisheries Worldwide Subscription Details	Database Records Turnaways	36	122	0	0	0	0							158

An additional advantage is that WebBridge software enables a direct link between a reference located on FFW and the full text article in databases subscribed to by Rhodes University. This is a further example of desktop access to resources traditionally located only in a library.

The role of the SAIAB Librarians

The Library aims to maintain an accessible facility so material is easily available and obtainable. It offers user assistance, books and journals loans, literature searches and an inter-library loan facility. For the period January to June 2005, a total of 1 166 items were issued to SAIAB Library users. Library instruction to Rhodes and Fort Hare students takes place at various levels. At Level 1, students are introduced to the library, the OPAC, and facilities on offer. At Level 2, postgraduate students are given a more detailed introduction to electronic resources available. Group instruction takes place in the Rhodes University Library computer laboratory, with the assistance of Rhodes library staff.

The most significant developments have occurred in the sphere of enhancing information literacy. This is a dual challenge. The first is continually to develop the librarian's knowledge of electronic resources and competence in using them. The second is to share this knowledge and competence interactively with students and researchers.

Information literacy is not only a pre-requisite for effective and informed research; it is a vital pre-requisite for citizens to create new knowledge and participate in today's information-intensive societies. People who are information literate are 'able to recognise their need for information, and then able to identify, locate, access and synthesise, evaluate and apply the needed information.'⁴ Information literacy is vital for lifelong learning.

There is an increasing demand for librarians to be adept in using and evaluating Internet and electronic resources. 'Understanding the overlaps and disparities between bibliographic databases is an essential tool in any librarian's repertoire.'⁵ Awareness of search engines, their capabilities and shortcomings, remains a constant challenge.⁶ A particularly useful role that librarians need to play is in providing overviews of, and entry points into, the complex and expanding world of electronic information. A recent example is Peter Fritzler's overview of marine science resources.⁷

There are particular challenges facing the librarian in the South African context. Due to the First/Third World divide and the legacy of apartheid, there are widely varying levels of information competence in the student population. The librarian has to discern individual competence and develop appropriate educational strategies, ranging from basic to more complex instruction.

Regional Co-operation – opportunities and potential for expansion and improvement

Regional co-operation for research purposes occurs at a number of levels:

- directly between fisheries institutions within South Africa
- national inter-library loans
- networking with fisheries institutions in Africa
- the IAMS LIC Z9.50 Distributed Library project
- Publication Exchange Agreements.

Table 2. Documents supplied by SAIAB to Institutions in Africa, January to June 2005

Country	Institution	InstitutionTotal	CountryTotal
Kenya			19
	NEMA	19	
Malawi			5
	Bunda	5	
Mauritius			6
	MOI	6	
Nigeria			6
	NIFFR	1	
	Univ of Calabar	5	
South Africa			92
	Bayworld	11	
	CSIR	2	
	Dept of Agric	4	
	MCM	8	
	NMMU	4	
	ORI	10	
	Plant Protection Unit	1	
	Rand Water Library	1	
	Rhodes	1	
	UCT	19	
	UKZN	8	
	UNISA	7	
	UOFH	1	
	Univ of Limpopo	3	
	Univ of Stellenbosch	6	
	Univ of Wits	1	
	OUFS	2	
	West Coast Abalone	3	
Zimbabwe			1
	Univ of Zimbabwe	1	
	Total	129	129

SAIAB receives requests at regular intervals from Marine and Coastal Management (Cape Town), Oceanographic Research Institute (Durban) and Bayworld (Port Elizabeth Museum). SAIAB has greater access to electronic databases and more printed resources than these other South African institutes. Where possible, articles are scanned or saved in pdf format and sent as e-mail attachments.

Requests are received from a range of South African universities and research bodies. National access to the SAIAB library holdings is via SABINET (South African Bibliographic Network). Due to the wider availability of electronic resources, there is a trend towards a decrease in the number of inter-library loans.

Since 2002, the FAO Fisheries Department and SAIAB have collaborated in a project to create a South African hub for a network a core group of fisheries libraries, aimed to improve access to fisheries publications.⁸ As part of the National Research Foundation, SAIAB is one of the partners in the Africa Interaction Programme, which aims to expand scientific cooperation between scientists in South Africa and their counterparts elsewhere in Africa. The overall objectives of the project

have been to enhance the information capabilities of fisheries institutions and to strengthen the links between fisheries libraries through South-South and North-South cooperation. During 2004-5 there was a decline in requests for resources received by SAIAB from partner institutions, partly due to access to AGORA and to constraints, such as disrupted e-mail and internet facilities in some African countries.⁹

ODINAFRICA (Ocean Data and Information Network for Africa) has AFRILIB (Africa's Library Holdings), which is a collective catalogue of documents held by the ODINAFRICA Information Service Centres in Mombassa and Abidjan. During 2002 and 2003 the database was expanded to contain the catalogues of all ODINAFRICA information centres in Africa. AFRILIB can be accessed at <http://www.ioc3.unesco.org/odinafrica/contents.php?id=268>.¹⁰

The IAMS LIC Z39.50 Distributed Library is a project aimed at facilitating international resource sharing among marine and aquatic science libraries. SAIAB has submitted 126 serial titles to the Distributed Library, and the Kenya Marine and Fisheries Research Institute (KMFRI) 32 titles. There are 36 members in the African regional group. According to IAMS LIC statistics for the period June 2003 to June 2004, just two African countries made requests to the Distributed Library: 10 from South Africa and 6 from Seychelles. SAIAB received 15 requests, and KMFRI 1 request for journal articles from other IAMS LIC member libraries.¹¹ The SAIAB Library has not yet submitted all its holdings to the Z39.50 Distributed Library. The Z39.50 Distributed Library has been useful to the SAIAB Library in obtaining older articles. From an African vantage point, this is an under-utilised free networking resource.

SAIAB produces two in-house publications, *Smithiana Bulletin* and *Smithiana Special Publication*. The SAIAB Library supplies these publications to 376 individuals and institutions. Of these, 75 are distributed to African destinations: 47 within South Africa and 28 outside the country. Over the past two years, SAIAB has received exchange publications from the following African institutions:

- National Museum of Kenya
- Bunda College, Malawi
- IMROP, Mauritania
- Mauritius Oceanography Institute
- NIFFR, Nigeria
- Seychelles Fisheries Authority.

These publications received are indexed by NISC and stored in the SAIAB Library, thus ensuring a wider exposure.

SAIAB recognises the need to expand and develop its links with African counterparts. It is interesting to note that while 36 documents were supplied by SAIAB to African countries other than South Africa during the period January to June 2005, another 24 documents were supplied to countries beyond the African continent. Challenges facing improved interaction with African organisations outside South Africa include better communication and relations between institutions, institutional and staffing capacity, infrastructural constraints (postage, publishing, internet connectivity), and inadequate library collections.

Conclusion

Resource sharing is becoming increasingly international due to the significant expansion of electronic information resources.¹² This paper has illustrated how the SAIAB Library is able, especially through its links to the Rhodes University Library, to gain access to a widening pool of electronic information

resources. This has complemented SAIAB's existing stature as the largest South African fisheries library.

The challenges for librarians and users are to continually improve their information literacy in this information-intensive arena. The role of the librarian has expanded far beyond being a custodian of physical resources to being a dynamic and analytical mediator between electronic resources and research. The paper has outlined initiatives taken at the SAIAB library to engage with these challenges.

There are clearly opportunities to improve regional co-operation in the sharing of resources. Available statistics indicate low levels of usage and interaction between particular fisheries institutions. The many reasons for this are not the subject of this paper, but present a topic worthy of further analysis and discussion.¹³

Acknowledgement:

Thanks to Marian Jiage as Chair, Africa Regional Group of IAMSLIC, and to the Centre for Agricultural and Rural Cooperation (CTA), Netherlands, for their roles in organising and funding this conference

Endnotes

¹⁴ For further information on FFW, see Lawrie, S., Crampton, M. & Hulley, F. 2004. NISC aquatic science databases: an overview and a brief comparison of bibliographic coverage of African fisheries and aquaculture periodicals. In *Report of and papers presented at the Regional Workshop on Networking for Improved Access to Fisheries and Aquaculture Information in Africa. Grahamstown, South Africa, 3-7 November 2003*, PP.119-126. FAO Fisheries Report. No.740. Rome. 232 pp. (available at: <ftp://ftp.fao.org/docrep/fao/007/y5519b/y5519b00.pdf>)

¹⁵ Bundy, A. 2004. *Beyond information: the academic library as educational change agent*. Paper given at the 7th International Bielefeld Conference, Germany, 3-5 February 2004 (available at www.library.unisa.edu.au/about/papers/default.asp#ab)

¹⁶ Parker, J. *Evaluating Bibliographic Database Overlap for Marine Science Literature Using an Ecological Concept*. Issues in Science and Technology Librarianship. Spring 2005. (accessed at <http://www.istl.org/05/spring/refereed-2.html> on 20 May 2005)

¹⁷ Valiela, I. & Martinetto, P. 2005. *The relative ineffectiveness of bibliographic search engines*. BioScience. Vol. 55. No. 8. 688-692.

¹⁸ Fritzler, P. 2005. *Marine science resources: starting points for researchers and students*. College and Research Libraries News. Vol. 66. No. 7.

¹⁹ For more information on this network, see *Report of and papers presented at the Regional Workshop on Networking for Improved Access to Fisheries and Aquaculture Information in Africa. Grahamstown, South Africa, 3-7 November 2003*, PP.119-126. FAO Fisheries Report. No.740. Rome. 232 pp. (available at: <ftp://ftp.fao.org/docrep/fao/007/y5519b/y5519b00.pdf>)

²⁰ Webster, J. and Collins, J. 2005. *Fisheries Information in Developing Countries: Support to the Implementation of the 1995 FAO Code of Conduct for Responsible Fisheries*. FAO Fisheries Circular No. 1006. Rome. 127 pp.

²¹ For more information, see Macharia, J. 2004. The Kenya Marine and Fisheries Research Institute Experience with RECOSCIX and ODINAFRICA for Information Exchange. In *Report of and papers presented at the Regional Workshop on Networking for Improved Access to Fisheries and Aquaculture Information in Africa. Grahamstown, South Africa, 3-7 November 2003*, PP.109-113. FAO Fisheries Report. No.740. Rome. 232 pp. (available at: <ftp://ftp.fao.org/docrep/fao/007/y5519b/y5519b00.pdf>)

²² Library Statistics for the IAMSLIC Z39.50 Project can be found at <http://library.csumb.edu/iamslic/ill/oldstats/ByCountry0304.htm>. (Accessed 29 June 2005)

²³ Jordan, J. 2005. *Global Networking of Information – OCLC's Strategy for the Future*. Paper given at the 7th International Bielefeld Conference, Germany, 3-5 February 2004.

²⁴ See Webster, J. and Collins, J. 2005. *Fisheries Information in Developing Countries: Support to the Implementation of the 1995 FAO Code of Conduct for Responsible Fisheries*. FAO Fisheries Circular No. 1006. Rome. 127 pp.

Appendix A

Selected Electronic Resources available via Rhodes University Library

Academic Search Premier (via EBSCOhost)



The world's largest academic multi-disciplinary database, *Academic Search Premier* provides full text for more than 4,500 publications, including full text for more than 3,600 peer-reviewed journals. PDF backfiles to 1975 or further are available for well over one hundred journals, and searchable cited references are provided for more than 1,000 titles. This database is updated on a daily basis via EBSCOhost

[African Journals OnLine \(AJOL\)](#)

African Journals OnLine (AJOL) began in May 1998 as a pilot project managed by [INASP](#). It promotes awareness and use of over 200 African-published journals, by providing access to **tables of contents (TOCs)** and **abstracts** on the Internet. The full-text articles can, in many cases, be obtained locally, especially as many of them appear in journals which are available in the Rhodes Library (in hard copy format) or on our online databases. Alternatively, they are also obtainable via the [Rhodes Library's Inter-Library Loans service](#). As this is a local service, **it is far more affordable** than the document delivery service offered by this database!

ricabib

Africabib.org consists of two continually updated bibliographic databases covering Africana periodical literature and African women's literature, as well as a comprehensive bibliography on women travelers and explorers to Africa

AGRIS is the international information system for the agricultural sciences and technology. It was created by the Food and Agriculture Organization of the United Nations (FAO) in 1974, to facilitate information exchange and to bring together world literature dealing with all aspects of agriculture.

[Biological Abstracts \(2000-2003\)](#)

Biological Abstracts is the most complete collection of bibliographic references to life science journal literature published internationally. This database is available in CD-ROM format from 1993-1999 and online from 2000-2003. The 1926-1992 issues are available in print format and are housed in the Rhodes Library Store. Please ask for the CD-ROMs at the Information Services Desk in the Main Library where they may be viewed.

Cambridge

Cambridge Journals Online (CJO) provides full text access to approximately 200 journals in the sciences, social sciences and humanities, as well as drama, music and law.

Current and Completed Research

[On-campus access](#)

[Off-campus access](#)

Current and Completed Research Projects contains South African research projects and covers the social sciences, humanities, economic and management sciences. It includes masters and doctoral theses of South African universities, and technikons as well as information on research projects from non-governmental organisations, private sector and government departments. All non-English titles of projects are translated into English. Abstracts for completed projects will be included for projects from 1988 onwards. The Nexus Database System Division of the National Research Foundation maintains this database. Coverage from 1950. Updated monthly

This service covers free, full text, quality controlled scientific and scholarly journals.

EBSCOhost [On](#)

EBSCOhost is an online service providing access to citations, abstracts, and, in many cases, full text of articles from journals and newspapers. The comprehensive databases range from general reference to specially designed, subject-specific collections. These databases can be searched separately, or in any combination.

ERIC (via EBSCOhost) [On-campus access](#) [Off-campus access](#)

ERIC, the **Educational Resource Information Center**, provides access to education literature and resources. The database provides access to information from journals included in the *Current Index of Journals in Education* and *Resources in Education Index*. *ERIC* provides full text of more than 2,200 digests along with references for additional information and citations and abstracts from over 1,000 educational and education-related journals.

Faculty of 1000

Faculty of 1000 is a new online research tool that highlights and evaluates the most interesting papers published in the biological sciences, based on the recommendations of a Faculty of over 1400 of the World's leading researchers.

Fish & Fisheries Worldwide (FFW) [On-campus access](#) [Off-campus access](#)

This exclusive collection of databases is of great value for researchers of fish and fish culture. Distinguished files from around the world provide more than 185,000 citations and some abstracts on all aspects of ichthyology, fisheries, and related aspects of aquaculture. Major topics include culture and propagation, limnology and oceanography, genetics and behavior, natural history, parasites, diseases, habitat management, fish processing/marketing, general research, and fisheries management.

Fish & Fisheries Worldwide (FFW) provides thorough coverage of thousands of journal articles, books, monographs, pamphlets, conference proceedings, symposia, government reports, theses, dissertations, and scientific periodicals, as well as other sources often missed by other commercial databases. The coverage extends from 1966 to the present.

FishBase

FishBase: A Global Information System on Fishes is a relational database with information to cater to different professionals such as research scientists, fisheries managers, zoologists and many more. *FishBase* on the web contains practically all fish species known to science.

HighWire Press

HighWire Press is the online journal-production division of the Stanford University Libraries. It provides free full-text access to over 800,000 articles in journals in the life sciences, medicine, physical sciences and the social sciences

Index to South African Periodicals [On-campus access](#) [Off-campus access](#)

Index to South African Periodicals (ISAP) covers indexed articles from more than 900 South African periodicals. Specialist periodicals are indexed fully, whereas general and popular periodicals are indexed selectively. This database is compiled under the ownership of the National Library of South Africa. Coverage from 1987. Updated weekly

InfoTrac OneFile [On-campus access](#) [Off-campus access](#)

Gale's *InfoTrac® OneFile* is a comprehensive periodical resource containing over 26 million database records. More than 8,000 titles (over half are fulltext) and backfile coverage from 1980 from mainstream to specialized sources make this an excellent source for virtually every popular, business and professional topic. Includes general interest magazines; peer reviewed academic journals; business publications; technology periodicals; plus specialty titles in law, health care and computers.

[Ingenta](#)

Provides a free online search service of published content from reliable research sources and is one of the UK's top 20 Web services. The world's largest website for the search and delivery of research articles, [ingenta.com](#) offers you access to article summaries from nearly 28,000 publications. There are links to the full text of certain journals to which Rhodes subscribes

International Bibliography of the Social Sciences

(IBSS) [On-campus access](#) (

) [Off-campus access\(WebSPIRS platform\)](#)

The [International Bibliography of the Social Sciences \(IBSS\)](#) is the essential online resource for social science and interdisciplinary research in the fields of economics, political science, sociology and anthropology. *IBSS* includes over 2 million bibliographic references to journal articles and to books, reviews and selected chapters dating back to the beginning of the 20th century. It covers a wide range of international data and incorporates over 100 languages and countries. It is updated quarterly and some 20% of the references are new each year. Full text articles are provided for up to half of all current journal articles and full text availability is increasing steadily

[ISI Highly Cited.com](#)

ISI Highly Cited.com is a freely accessible Web site, providing information on the most highly cited science, social science, engineering, and medical research professionals within 21 categories. Information includes education, faculty and professional posts, memberships, current research interests, personal websites, and listing of publications. The directory is organized by name, category, country and institutional affiliation.

ISI Web of Science [On-campus access](#) [Off-campus access](#)

ISI Web of Science offers access, **from January 2003 onwards**, to:

- **Science Citation Index Expanded**

This is a multidisciplinary index to the journal literature of the sciences. It fully indexes 5,900 major journals across 150 scientific disciplines.

- **Social Sciences Citation Index**

This is a multidisciplinary index to the journal literature of the social sciences. It fully indexes more than 1,725 journals across 50 social sciences disciplines, and it indexes individually selected, relevant items from over 3,300 of the world's leading scientific and technical journals.

- **Arts & Humanities Citation Index** This is a multidisciplinary index covering the journal literature of the arts and humanities. It fully covers 1,144 of the world's leading arts and humanities journals, and it indexes individually selected, relevant items from over 6,800 major science and social science journals.

JSTOR [On-campus access](#) [Off-campus access](#)

This unique full-text journal archive contains complete back files of over 488 core scholarly journals in 38 disciplines, some dating from the 1880s. Rhodes users may access the Arts & Sciences Collections I, II, III and IV, (which also provide access to about forty Law journals), as well as the Arts & Sciences Complement Collection, the Biological Sciences; Business, Ecology & Botany, General Science, Language & Literature, Mathematics & Statistics, and Music Collections. Journals are archived from their first volume until 2-5 years prior to the current issue.

MEDLINE (via EBSCOhost) [On-campus access](#) [Off-campus access](#)

MEDLINE provides authoritative medical information on medicine, nursing, dentistry, veterinary medicine, the health care system, pre-clinical sciences, and much more. Created by the National Library of Medicine, *MEDLINE* allows users to search abstracts from over 4,600 current biomedical journals. Includes data through 9/12/03.

The Nexus Database System is maintained by the National Research Foundation. Nexus offers access to the following databases:

- **Research Projects: current and completed RU**

Contains approximately 81 000 South African research projects from 1950 onwards.

- **Researchers Networking:**

Consists of biographical profiles of individual researchers in South Africa, including their fields of interest and areas of specialization

- **Research Organisations**

Contains information on the humanities and social sciences research organisations in South Africa

- **Professional Associations**

Contains information on the humanities and social sciences Professional Associations in South Africa

- **Periodical submission requirements**

Supports research capacity development through the provision of information on the editorial policies and guidelines on the submission of manuscripts of the major South African and international journals in the humanities and social sciences.

- **Forthcoming conferences**

- **NRF funded research projects**

- **Women-in-Research Database**

Women scholars in social sciences and humanities research in South Africa

[OAIster](#)

The goal of *OAIster* is to create a collection of freely available, difficult-to-access, academically-oriented digital resources that are easily searchable by anyone. These includes items such as electronic books, online journals, theses, audio files, images, movies and reference texts

Oxford Reference Online: Premium Collection [On-campus access](#) [Off-campus access](#)

Oxford Reference Online: Premium Collection enhances the 100+ books already available in the Core Collection with an expanding range of key titles in the acclaimed Oxford Companions series plus the Oxford Dictionary of Quotations. This already means an additional 70,000 entries! This vast online library offers integrated and consistent information across the full subject spectrum - from general reference, language and quotations to science and medicine, from humanities and social sciences to business and professional. It also includes English/French, English/German, English/Spanish, English/Italian bilingual dictionaries.

Oxford Scholarship Online (OSO) [On-campus access](#) [Off-campus access](#)

Oxford Scholarship Online is an invaluable teaching and research resource. The complete text of over 700 classic scholarly books is fully cross-searchable. Digital Object Identifiers (DOIs) at books and chapter level make *Oxford Scholarship Online* ideal for online course packs and reading lists

[POPLINE](#)

POPLINE® (*POPulation information onLINE*), the world's largest database on reproductive health, provides more than 300,000 citations with abstracts to scientific articles, reports, books, and unpublished reports in the field of population, family planning, and related health issues.

POPLINE has numerous special features including links to free, fulltext documents; the ability to limit your search to peer-reviewed journal articles

[PubMed](#)

PubMed, a service of the National Library of Medicine, provides access to over 12 million *MEDLINE* citations back to the mid-1960's and additional life science journals. *PubMed* includes links to many sites providing full text articles and other related resources

PubMed Central

The U.S. National Library of Medicine's digital archive of life sciences journal literature. Access to PMC is free and unrestricted.

On-campus access Off-campus access

This SABINET Online database is a union catalogue of all the major academic, corporate, and public libraries in Southern Africa. It contains multi-disciplinary records and holdings information for books, periodicals, audiovisual material and other information formats held in Southern African libraries, and is the main tool used by interlibrary loan facilities to locate items needed by library users. Its coverage extends from 1800+ and is updated on a weekly basis.

SA Media On-campus access Off-campus access

SA Media covers more than 120 South African newspapers and periodicals. More than 500 articles are selected daily, categorized according to 22 categories and indexed in Afrikaans and English. Copies of original articles are available from microfiche archives for the period 1978 to 1996. Digital images of articles are available online since January 1997. Coverage: bibliographic from 1978-1996, full text from 1997.

SA Statutes On-campus access Off-campus access

The *SA Statutes* database provide access to the full text South African Statutes. The acts are categorised into the following subjects: Agriculture, Fisheries, Forests and Water; Commercial Law; Communications; Constitutional Law; Criminal and Procedural Law; Education; Electricity, Energy and Mining; Estates and Succession; Health; Labour; Pensions and Welfare; Persons and the Family; Professions; Property; Revenue; Security; Trade and Industry; Transport

SABINET Online On

The first stop for South African information

ScienceDirect On-campus access Off-campus access

ScienceDirect offers access to the Elsevier Science journal collection (more than 1,800 full-text titles), along with abstracts of journal articles from a host of prestigious societies and STM publishers.

SciFinder Scholar

Please contact libinfo@ru.ac.za if you would like to use this database. *SciFinder Scholar* is today's leader in providing the most accurate and comprehensive chemical and related scientific information. See <http://www.cas.org/SCIFINDER/SCHOLAR/chemplus.html> for more information on the contents of this database.

Scirus

Scirus is the most comprehensive science-specific search engines available on the Internet. Driven by the latest search engine technology, it enables scientists, students and anyone searching for scientific information to chart and pinpoint data, locate university sites and find reports and articles quickly and easily. *Scirus* returns results from the whole Worldwide Web, including access-controlled sites. It currently covers 90 million science- related Web pages.

Scopus On-campus access Off-campus access

A new abstracting and indexing database produced by Elsevier Science. It covers 14,000 international journals from over 4,000 Scientific, Technical and Medical (STM) publishers and has coverage going back even before 1960 in some cases. In order to take advantage of alerting services available via Scopus, please register on Scopus by clicking on the "Register" link at the top of the homepage

SocIndex On-campus access Off-campus access

SocINDEX with Full Text is the world's most comprehensive and highest quality sociology research database. The index features more than 1,300,000 records with subject headings from a 15,600 term sociology-specific thesaurus designed by expert lexicographers. *SocINDEX with Full Text* contains full text for 242 "core" coverage journals dating back to 1895, and 72 "priority" coverage journals. This database also includes full text for 547 books and monographs, and full text for 6,711 conference papers.

SpringerLink

As a result of the merger between Kluwer Academic Publishing and Springer-Verlag, wherein all content has moved to Springer's newly branded *SpringerLink*, Springer is now the world's second-largest supplier of scientific, technical and medical (STM) literature. *SpringerLink* provides access to more than 10,000 journals, Springer has expanded its product range by seven new disciplines: biology, chemistry, earth and planetary science, engineering, medicine, physics, astronomy, linguistics, philosophy, psychology and social sciences. All journals published subscription of 10 or more issues per year are available in a "Pay-Per-View" format. To assist you, all titles your subscribing institution has access to are highlighted with "a pair of glasses" next to each. In the case of all Brill and Woodhead titles no indicator will be shown.

SwetsWise [On-campus access](#) [Off-campus access](#)

SwetsWise offers searching over 15,000 journals including full-text access to nearly 300 journals to which Rhodes subscribes.

UCTD: Union Catalogue of Theses and Dissertations [On-campus access](#) [Off-campus access](#)

The *Union Catalogue for Thesis and Dissertations (UCTD)* contains bibliographic records of theses and dissertations at master and doctorate level submitted to universities in South Africa. Honorary doctorates are also included. Coverage from 1918. Updated annually.

[Water Resources Worldwide](#) [On-campus access](#) [Off-campus access](#)

Water Resources Worldwide provides the exceptional value and convenience of four of the world's major water-resource databases plus powerful searching using the WATERLIT thesaurus. South Africa's WATERLIT, Canada's SQUAREF, CAB Abstract's Aquatic Subset and the Netherlands' DELFT HYDRO provide more than 531,300 citations and abstracts — oceans of vital water-research information. Automated thesaurus based searching helps you find any topic with ease.

Appendix B

NISC / FFW Usage Statistics for 2004

Database Report 1: Total Searches and Sessions by Month and Database 2004

	Database												Report 2	Report 3
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Calendar YTD	
Fish & Fisheries Worldwide Searches Run Graph				63	100	169	58	74	137	134	148	42	925	
Fish & Fisheries Worldwide Subscription Details				39	45	64	35	42	61	56	50	21	413	

Database Report 2 : Turnaways by Month and Database 2004

	Database												Report 1	Report 3
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Calendar YTD	
Fish & Fisheries Worldwide Subscription Details				31	21	82	18	32	59	35	23	8	309	

IAMSLIC (AFRIAMSLIC) MEMBERSHIP BENEFITS AND CHALLENGES

**Marian A. Jiagge, &
Mac-Anthony Cobblah**
CSIR
P.O. Box M32
Accra
Ghana
mjiagge@yahoo.com
mactony66@hotmail.com

The International Association of Aquatic and Marine Science Libraries and Information Centers (IAMSLIC) is an association of individuals and organizations interested in aquatic and marine science information.

Objectives

- To provide an association of individuals and organizations having an interest in library and information science especially as these are applied to the recording, retrieval and dissemination of knowledge and information in all aspects of aquatic and marine science and their allied disciplines.
- To provide ample opportunities for international co-operation.

Membership

Membership of IAMSLIC is open to all persons having an interest in library and information science and related disciplines.

Personal membership for individuals and institutions in the “developed” world costs US \$35.00 per year and includes voting privileges, membership directory and a subscription to the quarterly newsletter. Membership for individuals and institutions in the “developing world” costs US \$20.00 per year with same benefits.

Institutional Membership

One (1) designated representative of each Institutional member shall have the right to vote and hold any elective or appointive office in the Association.

Sponsored Membership

In order to increase membership, IAMSLIC provides IAMSLIC sponsored memberships for a period of 3 years.

Sponsored members are encouraged to input some of their journal holdings into the iamslic union list of serials for active participation in resource sharing.

Regional Treasury

A Regional group shall maintain its own treasury and undertake projects and activities consistent with the goals of IAMSLIC.

Dues

The Executive Board shall establish dues and shall be payable to the Association on or before the Annual Business Meeting.

Regional Groups

Regional Groups of IAMSLIC provide networking opportunities among colleagues, facilitated by regional meetings and undertake projects of regional interests. The regional groups are:

- Africa group (AFRIAMSLIC),
- West Coast of North America and Hawaii (CYAMUS),
- European Association of Aquatic Science Libraries and information Centres (EURASLIC),
- Latin American Group,
- Pacific Islands Regional Group, and
- Eastern and Southern U.S and Caribbean (SAIL)

Formation and Recognition of Regional Groups

A majority of the IAMSLIC members within a proposed region may propose to the IAMSLIC Executive Board that a Regional Group be formed. Recognition of Regional Status will be by majority vote of the Executive Board.

Membership in Regional Groups

Requirements for regional membership and any regional membership fees will be at the discretion of the Regional Group. All members of a Regional group will be actively encouraged to become full members of IAMSLIC and therefore be able to vote and run for office in IAMSLIC.

Dissolution of Regional Groups

Dissolution of Regional groups will be on majority vote of the Executive Board.

Fiscal Period

The fiscal period of the Association shall be from *1st October* through *30th September* of the following year.

AFRIAMSLIC

The Africa Regional Group has been in existence since the 1980s although only in recent years has communication by electronic mail enabled more active participation.

The IAMSLIC Membership Directory lists thirty-nine (39) members of the Africa Regional group.

Benefits of IAMSLIC/AFRIAMSLIC Membership

- Eligibility for IAMSLIC research and travel grants
- Contacts – Personal Contacts made during regional and annual conferences
- IAMSLIC Newsletter (published quarterly)
- Access to IAMSLIC Membership Database (updated daily)
- Printable PDF Membership Directory (updated quarterly)
- Eligibility to serve as IAMSLIC Officers or Committee members
- Voting privileges in IAMSLIC elections
- Partnership with IOC, FAO, SAIAB, ODINAFRICA etc.
- Sponsored Memberships
- IAMSLIC duplicate Exchange Program
- Use of the IAMSLIC discussion list
- IAMSLIC Z39.50 Distributed Library Borrowing privileges

IAMSLIC Z.39.50 Distributed Library for Inter-Library Lending

The IAMSLIC Z.39.50 is a project aimed at facilitating international resource sharing among marine and aquatic science libraries. It was developed as a joint project of the IAMSLIC Resource Sharing Committee, California State University Monterey Bay Library and the National Oceanic and Atmospheric Administration (NOAA), Coastal Center.

What is Z39.50?

The national information standards organization z.39.50 information retrieval protocol is a computer protocol that can be implemented on any platform. It dates back to the 1970s and it:

- defines a standard way for two (2) computers to communicate for the purpose of information retrieval.
- enables one interface to access multiple systems providing the end-users with transparent access to other systems.
- is a protocol which specifies data structures and interchange rules that allow a client machine (called an “origin” in the standard) to search databases on a server machine (called a “target” in the standard) and retrieve records that are identified as a result of such a search.

- server that are identified as a result of such a search.

❖ For more information on Z.39.50 visit <http://library.csUMB.edu/cyamus/unionlist>

Partnership/Linkages with other existing Networks

FAO/SAIAB Regional Network for Improved Access to Fisheries and Aquaculture Information in Africa. SAIAB links with African members of IAMSLIC, strengthened through participation in 1st AFRIAMSLIC Conference in Accra, Ghana, (2003) and Regional Workshop on Networking for Improved Access to Fisheries and Aquaculture Information in Africa held in Grahamstown, South Africa, (2003).

SAIAB maintains a directory of the participating institutions selected by FAO on the basis of their active utilization of the Aquatic Science and Fisheries Abstracts (ASFA) and Aquatic Biology, Aquaculture and Fisheries Resources (ABAFR) CD-Rom databases and of their expressed need for full text documents.

SAIAB has contributed about 160 titles to the IAMSLIC Union List of Marine and Aquatic Serial Database to enhance IAMSLIC Resource Sharing Goals.

IAMSLIC/UNESCO-IOC Memorandum of Understanding

- To promote the participation of marine information managers from developing countries in IAMSLIC Annual Conference as a forum for sharing of knowledge and expertise.
- To promote collaboration within AFRIAMSLIC/Ocean Data Information Networks for Africa (ODINAFRICA) group and the Latin American Regional group (ODINCARSA).
- To promote partnership between IOC and IAMSLIC on projects and initiatives.

UNESCO-IOC- Sponsored Membership

UNESCO-sponsored IAMSLIC membership for ODINAFRICA group.

ODINAFRICA

Ocean Data and Information Network for Africa was launched as a follow-up to the Regional Cooperation in Scientific Information Exchange in the Western Indian Ocean (RECOSEX-WIO) to support member states of Africa.

ODINAFRICA/AFRIAMSLIC COLABORATION

1. ODINAFRICA members are members of AFRIAMSLIC and IAMSLIC.
2. Provision, utilization and dissemination of aquatic and marine information services and products
3. Same objectives – provision utilization and dissemination of aquatic and marine information delivery
4. Need for more collaboration in sharing of resources and human resources development.

Challenges

- a. Lack of Internet Access
- b. Poor financial position of member libraries
- c. Inadequate library collections
- d. Absence of electronic catalogue in some member libraries to enhance resource sharing
- e. Publicity
- f. Lukewarm attitude of members
- g. Payment of membership dues.

The Way Forward

- a. Members must lobby and source for funding
- b. The need to intensify the publicity of IAMSLIC/ AFRIAMSLIC activities
- c. Need to set up automation of our library resources
- d. Active participation in Resource Sharing Initiatives
- e. Payment of membership dues should be encouraged.

THE RELEVANCE OF THE LIBRARIAN IN THE DEVELOPMENT OF DIGITAL LIBRARIES IN AFRICA

M.O. Ibeun

Head

Library, Information and Documentation Division

National Institute for Freshwater Fisheries Research

P.M.B. 6006, New Bussa,

Niger State, Nigeria

Moibeun@yahoo.com

Abstract

The Glasgow Digital library project of 1994, which cost about \$68 million by 1999, marked the beginning of the development of digital library. The multi-disciplinary and multi institutional approach and funding served as the bedrock of its achievement. Four activities have been identified as prerequisite for digital library development, namely, collection development, design and developmental issues, information organization, classification and indexing, and funding. However, the paper saw the creation of Web sites, CyberCafe and many journals online as a threat to the future of librarianship. These fears have been allied by the three traditional roles of librarians, which are still integral part of digital library development. Such roles are information gathering and processing, re-emergence of collection development and the ever-increasing relationship between librarians and publishers. In conclusion the paper identified lack of the ability of government and its agencies to understand the evolving concept of library and funding as the greatest impediment to digital library development in most African countries. The courage to pool resources of commodity based libraries, the preparedness for the retraining of librarians, revision of curricular of African library schools, and readiness of librarians to work with other specialists in the information sector, will make librarians part of the development of digital libraries in the region.

Introduction

The paper presupposes that digital library development is in its lowest ebb in developing countries. Secondly, librarians are skeptical about the role they have to play in the development of digital library in spite of the fact that they are the major players. The paper examines the following:

- Historical perspective of digital library development,
- Preparation for the creation of digital libraries,
- Constraints and relevance of librarians in digital library development.

Historical perspective of digital library development

The literature shows that digital library technologies started as a research project with the Glasgow Digital Library (GDL) in 1993-1994 (Mischo 2005; Dawson (2005). The fact is that it was federally supported by formulating series of community based planning workshops that provided the relevant inputs to the project. It is on record that the first significant federal investment in US digital library research was in 1994 with funding of six projects under the auspices of the Digital Libraries Initiative called DLI-I Programm. The National Science Foundation (NFS), the National Aeronautics and Space Administration (NASA), and the Defense Advanced Research Project Agency (DARPA) (Gariffin 2000) were sponsors of the project.

The second project known as DLI-2 Programme started in 1998, and was again jointly funded by NSF, NASA DARPA the National Library of Medicine (NLM), the Library of Congress (LC), the Federal Bureau of Investigation (FBI) and the National Endowment for the Humanities (NEH). It is interesting to note that the library as an organization was not left out in the second project. Also noted in 1998 was the effort of the corporation for National Research Initiative (CNRI) under DARPA, which supported the funding of the three-year D-Lib Test Suite Program by providing continuous, funding for several of the digital library Testbeds created under DLI-1. Thus, between 1994-1999 a total of US\$68 million in federal research grants was awarded and expended under the DLI-1 and DLI-2 (Fox 1999). Lesk (1999) confirmed that senior scholars from other computing disciplines were brought into the digital library projects.

Preparation for creating digital libraries

There are conditions that must be fulfilled before a digital library is established. Dawson (2003) has dwelt exhaustively on this from developed countries' perspective. In the following sections four essential points are discussed.

The Collection.

For a digital library to be established, there must be sound collection development policy. This is paramount because a library is complete when there is what we call backup delivery system. This cannot take place without sound collection development. A good collection development is based on the broad vision of the library and the organization it serves.

Design and developmental issues

A digital library system has been described as a number of servers spread over the internet that interact with each other to meet users' requests (Chowdhury and Chowdhury 1999). The question is whether there is the technology available in Africa to design and develop a digital library system that suits our circumstances. Even though there may not be many, especially due to resource constraints, the good news is that the technology is already in existence and ready to be adopted.

Information organization, classification and indexing

The standard of measuring any library is the ease with which information is retrieved. This is achieved through classification and indexing using controlled vocabulary. However, Dawson (2003) cautioned about the choice of thesaurus because the current use of Library of Congress subject heading is far from perfect because of its cultural biasness. This may not be the case with specialized controlled vocabulary such as AGROVOC, ASFA, etc, with the advantage of its international acceptability and their periodic review and updates. Again, most African fisheries and aquatic sciences libraries are fully ready for digitalization from the perspective of organization.

Funding and Equipment

Equipment do not digitize themselves yet it is fundamentally important to any digital library to have the required equipment such as scanners, cameras, microphones portable hard disks, computers, service providers etc. However, the availability of equipment depends on funding. The lack of funds to support the procurement of these items of basic equipment is the bane of most African libraries.

While funds and equipment may be inadequate, Librarians in developing countries could concentrate on professional improvement of their libraries using available free software such as AGRIS and ASFA methodologies. It will be easier to join the digital library service through the creation of specialized collections in the respective libraries in the hope of developing these into web sites whenever funds are made available.

Relevance of Librarians to Digital Library development in Africa

The digital library project of 1994, combined the word digital with library and defined three interrelated areas i.e. librarians, computer scientists and publishers. (Paepeke *et al* 2005). Librarians saw this new partnership as an opportunity for gaining instant access to information through online access, which constitutes digital facilities for many libraries. This partnership with computer scientists could therefore complement the expertise that was not available in the library.

The development of Web sites as a form of digital library has however, been a source of worry to some librarians. To them, the library is losing the notion of collection development, which has been a strong and long-standing traditional role of librarianship. Also many journal publishers now digitalized and charged a premium for digital content. Chief Executives are no longer willing to allocate fund for journal subscription, hence many libraries are forced to cancel their subscriptions. Thirdly, the creation of Cybercafés has been a source of concern. These Cafés seems to usurp the role of information provision of the library.

To some librarians these fundamental issues threaten the future of librarianship. This fear made Paepeke *et al* (2005) pose the question, “*has computer science swept across the information landscape like the vandals of old and left librarianship in ashes?*” He allayed this fear with the following traditional functions of librarians, which are still relevant to digital library development.

Information gathering and processing

The core function of librarianship remains information gathering and accessioning, which rest on a highly technical infrastructure. The information must still be organized, collated and well documented even with digitalization, providing keywords, cross-references. These are still the traditional role of librarians, which enhances recall or retrieval with precision particularly with specialized web sites.

The re-emergence of collection Development

One of the shortcomings of Web sites is collection development. Web sites can be regarded as pathfinders. That explains why most web sites direct visitors to other web sites of relevance or specialized in nature such ASFA, CAB etc. All these specialized collection development (databases) are endless openings for librarians. This explains why all African fisheries libraries should be part of ASFA development.

Relationship between librarians and Publishers

There are some direct connections between librarians and scholarly authors. Some publications are online and they directly move to the hands of librarians who with their professional training add value in terms of re-packaging. This has really showed that librarians, computer scientists and authors are close neighbours in the publication chain. Citing the example of Dutch Academics who declared research free-for-all, Paepeke *et al* (2005) indicated that, for librarians to expand their operations by helping scholars who are not computer savvy, they have to produce output that works well in an online world.

The situation in some developing countries

What is currently in practice in most developing countries is the opening up of CyberCafés by people for commercial purposes using VSAT. Through the Internet facilities, web sites are visited for information. Some of these websites provide open access services such as, doaj.org/; fishbase.org; iamslic.org; inasp.info.org; worldfishcenter.org; fao.org/fi/asfa.asp; aginternetwork.org and fao.org/fi/library/jou.free.htm. From such visits, articles, and books could be downloaded. The question is why can the library not operate such CyberCafes? Some reasons could be given.

Lack of understanding of the evolving concept of library in a digital age.

The greatest constraints to library development in the digital age in some developing countries are the lack of commitments of governments and their agencies. Such governments and their agencies still see the libraries as gatekeepers and custodian of archival records. In some cases there seems to be no clear-cut understanding of the different roles of an institutional computer center and the library. Most Institutional computer centers have abandoned the role of data analysis for services of CyberCafé, which ideally should naturally be attached to the library of a well-structured organization. When the author visited the University Library in Grahamstown in 2003, he was amazed at the number of computers (numbering over 50) that were set out in one of the apartments for library users. Clearly, this has put the library in a better position to provide digital services.

Funding

Funding has been a constraint to library development in developing countries. Librarians from developing countries have hardly written any article without mentioning funding as a constraint. Salanje (2003) enumerated constraints to harnessing and accessing fisheries information to be inadequate funding, poor or no internet connectivity, poor telecommunication facilities, and the inadequacy of computers. Solving the problem of funding strongly depends on understanding the evolving concept of the library by governments and heads of institutions. The tendency has been for governments to make bulk allocations of funds to institutions and agencies under which libraries in most cases come. Very unfortunately, the disbursement of these funds depend on the priorities of the heads of these institutions and libraries are some of the least favoured.

Conclusion

The major impediment to the development of digital libraries in Africa is funding. The joint funding, which was exhibited at the advent of digital library development in 1994, is positive and worth emulating for the improvement of libraries in Africa. The achievement in digital library development today has been through cross- disciplinary and multi sectoral collaboration. This brings to the fore, the critical need for intersectoral collaboration between agencies such as those for fisheries and marine resources to pool resources for the promotion of libraries. Furthermore, governments and other relevant agencies need to positively consider the role of libraires in evolving civilizations and accordingly increase their support especially with the emergence of digital librairies, which have taken the libraries a step higher.

On the other hand, librarians must be prepared to learn new technologies and be ready for retraining. Secondly, the curricular of the library schools in Africa should be reviewed to cope with the new technologies. More courses on computer application should be introduced in library school course content, if librarians are to be relevant in future information provision. Librarians in Africa should also learn from the corporate venture on the early history of digital library development. It is now imperative that librarians can no longer be the sole provider of information. Therefore librarianship as a profession should be prepared to work with specialists from other disciplines to achieve their aims.

REFERENCES

- Arms William Y.** (2005), A viewpoint analysis of the digital Library. D-Lib Magazine 11 (7&8): July/August 2005.
- Chowdhury G.G. and Chowdhury, S.** (1999). Digital library research: major issues and trend. J. of Documentation 55(4): <http://www.Aslib.Com.uk/jdoc/1999/Sep/05.html>.
- Dawson, Alan** (2003) Development issues for the Glasgow digital library. In: Computers for Librarians: an introduction to the electronic library edited by Stuart Ferguson and Rodney Hebls.
- Fox, Edward A.** (1999). Digital libraries initiative: update and discussion. Bulletin of the American Society for Information Science 26 (1): 7-11.
- Dawson, Alan** (2004) Building a digital library in 80 days: the Glasgow experience In: Digital Libraries: Policy, Planning and Practice edited by Andrews J. and Law D.
- Griffin, Stephen M.** (2005) Funding for digital libraries Research past and present. D-Lib Magazine 11 (7&8): July/August 2005.
- Lesk, Michael** (1999) Perspective on DLI-2-growing the field. Bulletin of the American Society for Information Science 26(1): 12-13.
- Lynch, Clifford** (2005) Where do we go from here? The next decade for digital libraries. D-Lib Magazine 11 (7&8): July/August.
- Mischo, William H.** (2005) Digital Libraries: challenges and influential work. D-Lib Magazine 11 (7&8) July/August, 2005.
- Paepeke, Andreas; Hector Garcia-Molina and Rebecca Wesley** (2005) Dewey meets Turing: Librarian, computer Scientists, and the digital libraries initiative. D-Lib Magazine 11 (7&8): July/August 2005.

Appendix

Historical perspective of digital library development

- Started in 1993-1994 with the Glasgow Digital Library research Project [(Mischo 2005), (Dawson 2005)]
- It was a joint project. The DLI-1 was funded by
 - National Science Foundation (NFS)
 - The National Aeronautics and Space Administration (NASA)
 - The Defense Advanced Research Project Agency (DARPA)(Gariffin 2000)
- DLI-2 Project
 - The three above
 - The National Library of Medicine (NLM)
 - The Library of Congress (LC)
 - The Bureau of Investigation (FBI)
 - The National Endowment for the Humanities (NEH)

Of note is that the library is not left out in the project at the formation stage.

- Between 1994-1999 a total of US \$68 million in federal research grants were awarded and expended under the DLI-1 and DLI-2 (Fox 1999)
- Other scholars from other computing disciplines were brought into the digital library project (Lesk 1999)

TOGO NATIONAL OCEANOGRAPHIC DATA CENTRE

Dométo Kokoè Kouevi Akue (Mrs)

Marine Information Manager

Centre de Gestion Intégrée du Littoral et de

l'Environnement de l'Université de Lomé (CGILE/UL)

BP : 1515 Fax : (228) 221 85 95

Tél : (228) 221 68 17 / 222 48 65

Email : (1) dometohuguette@yahoo.fr

(2) d.kouevi@odinafrica.net

Lomé –Togo (West Africa)

Background NOCDC-Togo

Togo National Oceanographic Data Centre is established at the Centre de Gestion Intégrée du Littoral et de l'Environnement de l'Université de Lomé. The NOCDC-TOGO co-operates with 13 institutions represented by a focal point. The Centre de Gestion Intégrée du Littoral et de l'Environnement of Lomé University (CGILE/UL in short) is a coastal zone research unit.

Objective

Leads Fundamental Research Activities in Coastal Zone.

Domains

Morphodynamic, Pollution, Socio-economic, Geography, Planning and Management of Soil, and Biological resources.

Divisions

Physical resources, GIS and Remote sensing, Legal aspects, Natural resources, Analysis of the potential human and economic, Management and Planning of Soil, Library.

Activities

Works at national and international level.

1. Jobs description

- Cataloguing ;
- Documents Collection ;
- Cooperating with other Libraries ;
- Organising and attending Meetings ;
- Ordering Documents ;
- Providing User Services ;
- Interlibrary Loan Connection ;
- Draw Users Attention to Online Publications ;
- Information Retrieval ;
- Secretarial Duties.

2. Partnership

Working in partnership with laboratories and other scientific and research structures of the Lomé University and the ministries.

3. Products/services

- a. a. public awareness;
- b. articles collection;
- c. internet access to users;
- d. Togo NODC brochure;
- e. institutions and researchers index;
- f. library free access to the public;
- g. magazine subscription; and
- h. local publications catalogue (going).

4. Users

- a. students from different departments at the University;
- b. any department at the university involved in coastal/marine science research;
- c. governmental institutions;
- d. non governmental organisations (NGO), private services, etc; and
- e. consultants.

DEUXIEME AFRIAMSLIC CONFERENCE A ACCRA (GHANA) SYSTEME DE GESTION DE L'INFORMATION AU CGILE

Introduction

La gestion de l'information au CGILE est un travail de catalogage, de collecte des revues aussi bien sous format papier que numérique et d'abonnement de revues. Ce travail se fait à l'aide du logiciel Inmagic 4.1 qui vient d'être actualisé 8.0. (mai 2005). Il est acquis dans le cadre du projet ODINAFRICA II. A ce jour, il y a 568 ouvrages catalogués.

A- Présentation du logiciel:

Clicker sur "démarrer"

Aller à programme pour choisir Inmagic DB/Text dans Inmagic application
ou simplement double clicker sur le raccourci

Aussitôt, une page avec Information Management Menu vous offre des possibilités de faire tout ce que vous voulez:

- 1) Acquisitions
- 2) Cataloging
- 3) Serials
- 4) Loans
- 5) Interlibrary loan
- 6) Search the catalog

1. 1 – au niveau de "Acquisitions functions", nous avons :

Ordering

General

Title	
Author	
Subject	
Publisher	
Publication date	
Order date	

- Journal articles
- Journal
- Serials

Receiving

General

Title	
Author	
Corporate author	
ISBN	
ISSN	
Publisher	
Supplier	
Order number	
Purchase order	
SAN	

Serials/journals

Reports

New arrivals
History/statistics

Supplier maintenance

Add/change supplier

Supplier	
Company name	
Contact person	
City	
Status	

1. 1- “Cataloging functions”

Journal articles

Title	
Author	
Publisher	
Record type	

Journals
Serials

Other

Descriptor cross references
Review/approve cataloging

3. 1- “Serials Management Functions”

Issue tracking

Check in issues
Route issues
Claim missing issues

Subscription maintenance

Set up arrival patterns
Modify routing lists

1- “Lending Functions”

Transactions

Lend title
Process return, etc.

Reports

Over due loans
Outstanding loans
Etc...

Borrower Maintenance

Add new borrower, etc...
2. 1- "Interlibrary loan"

3. 1- "Search the catalog"

Searching - Multiple Fields

Title

AND /OR/NOT
Auteur
AND /OR/NOT
Publisher
AND /OR/NOT

Any word

AND /OR/NOT
Record type
AND /OR/NOT
Pub date
AND /OR/NOT
Bar code
AND /OR/NOT

A- Application

Le catalogage consiste à insérer au niveau de différents champs des informations nécessaires se trouvant sur les documents à cataloguer.

Certes, il paraît être de l'automatisme mais nécessite une connaissance de règles bien définies pour bien le réussir et heureusement que des travaux périodiques de mise à jour se font au niveau du projet ODINAFRICA pour son harmonisation et de pouvoir le rendre beaucoup plus accessible à tous les pays membres du projet.

Voici un squelette de champs :

Record type	
Title	
Subtitle	
Author	
Corporate author	
Responsibility	
Edition	
Publication date	
Place	
Publisher	
Descriptor	
Serials	
Abstract	
Physical descriptor	
Notes	
Classification	
ISNB	
Label information	
Bar code(s)	
LC card number	
Loan policy	
url	
	Date cataloged
	Date approval

Exemple de catalogage

ID 1

Record type	Report
Title	Comité COI-OMM-PNUE pour le Système Mondial d'Observation de l'Océan (I-GOOS-IV)
Subtitle	4ème Session, 23-25 juin 1999, Paris (France)
Author	
Corporate author	Intergovernmental Oceanographic Commission, Paris (France)
Responsibility	
Edition	
Publication date	2000
Place	Paris (France)
Publisher	Intergovernmental Oceanographic Commission, Paris (France)
Descriptor	GOOS Oceanography GODAE HOTO IGOOS Anchoring PIRATA ARGO

Serials	Rapports des Organes Directeurs et des Principaux Organes Subsidiaires, Rapport GOOS, 72	
Abstract		
Physical descriptor	95 pp.	
Notes		
Classification	2141	
ISBN		
Label information	1-2141-IOC	
Copy information	1	
Bar code(s)		
LC card number		
Loan policy		
url		
Location	TOGO/CGILE	
	Date cataloged	05/02/2002
	Date approval	12/06/2003

Le logiciel presente de differents types de formulaires de catalogage, d'impression, d'affichage et d'ecran de recherche.

A- Résultats:

Le catalogage du Togo compte ce jour, un nombre total de 568 enregistrements regroupant plusieurs types de documents, à savoir des rapports de réunion ou d'activités de la COI (57), des rapports annuels de la COI (60), des rapports techniques de la COI (138), des livres (86), des CD-Rom (16), des périodiques (47), des articles (59), des manuels et guides (8), des revues (64) et des thèses (12) ;

Collection de documents, coopération avec des bibliothèques, abonnement aux revues, fourniture de services aux utilisateurs, prêt inter-bibliothèques, oriente les utilisateurs, accès d'internet aux utilisateurs;

Bien connu sur le plan national et international;

Utilisateurs (étudiants de différents départements à l'Université, tous les départements de l'Université impliquée dans recherche de la science aquatique et marine, des institutions gouvernementales, des ONGs, des services privés.

D- Sources de documentation:

des rapports techniques et annuels de la COI ;
livres "Comaraf"
Thèses
Mémoires de maîtrise, de DEA, de Master
Articles/publications
des journaux/bulletins
revues : Window
des CD-Rom de données océanographiques et de revues
des DVD

E- Difficultés / limites du logiciel :

- logiciel en Anglais (difficile pour les utilisateurs) ,
- ce qui est en Français, est mal traduit et la compréhension est difficile

Conclusion

Il serait souhaitable d'avoir un logiciel facilement téléchargeable et des possibilités de formation en ligne ; disposer d'un site web pour la fourniture des outils nécessaires facilitant la gestion de l'information.

Perspectives :

Un répertoire de publications locales est en cours.

ACCESS TO MARINE INFORMATION SPECIALISTS IN AFRICA (AMISA) PROJECT

KABA Fodé Karim

Spécialiste d'Information

Service d'Information et de Valorisation (SIVA)

Centre National des Sciences Halieutiques de Boussoura (CNSHB)

B.P. : 3738/39 (Conakry) Guinea

E-mail : fkaba@cns hb.org.gn or kabalondon@yahoo.fr

PRESENTATION DU PROJET

Le principal obstacle pour le fonctionnement et le renforcement de AFRIAMSLIC est le manque d'information exhaustive sur les spécialistes d'information marine en Afrique. Ce qui a pour conséquence :

- ✚ Méconnaissance des spécialistes de l'information marine en Afrique ;
- Problèmes d'indentification de membres potentiels
- Manque d'outils de gestion de l'association
- Impossibilité de planification des activités de l'Association ;
- Problèmes de contact entre professionnels

Bref tant qu'il est impossible de connaître :

- Le nombre de professionnels de l'information par pays et en Afrique.
- Parmi c'est professionnel qui fait quoi ?
- Qui peut faire quoi

Qui peut être membre de AFRIAMSLIC dans chaque pays africain

Il sera impossible de mettre en place un plan de renforcement de l'Association faute de connaissance du potentiel de contribution à AFRIAMSLIC voire à IAMSLIC.

C'est pour palier à ce problème de communication que le Projet Accès au Spécialiste de l'Information Marine en Afrique, en abrégé Projet AMISA a été entrepris.

LES OBJECTIFS DU PROJET

Ce projet se propose de réaliser des outils, de collecte de données, de les analyser afin d'améliorer la disponibilité des informations sur les spécialistes d'information marine en Afrique. A ce titre,

Projet AMISA vise à réaliser et mettre à disposition les suivants :

- Une Base de données (sous WINISIS) des spécialistes d'information marine en Afrique ;
- Un catalogue des spécialistes d'information marine en Afrique accessible via le site Web de AFRIAMSLIC ;
- Un Annuaire bilingue des spécialistes d'information marine en Afrique ;

Article sur les activités associatives des spécialistes d'information marine en Afrique ;
Rapport d'étude sur les spécialistes d'information marine en Afrique dans le but de proposer des recommandations ;
Informations structurées disponibles sur les spécialistes d'information marine en Afrique ;
Information sur les activités associatives des spécialistes d'information marine en Afrique.

LES ACTIVITES PREVUES

Le Projet sera exécuté en quatre étapes :

I – La première étape sera consacrée à la réalisation des actions suivantes :

1. Acquisition de matériels informatiques (ordinateur et logiciels)
2. Réalisation des travaux préliminaires tels que :
 - Faire le formulaire d'enquête ;
 - Créer la base de données sous WINISIS ;
 - Faire un OPAC test avec le logiciel GENESIS ;
 - Faire la maquette de l'annuaire des spécialistes d'information marine en AFrique.

II – La deuxième étape sera consacrée à :

1. Collecte des données existantes sur les professionnels d'information marine en Afrique, les saisir dans la base de données et procéder aux tests de réalisation de l'annuaire ;
1. Enquête par courrier ou par e-mail pour actualiser et compléter les données.
2. Comparer et corriger et saisir les données collectées ;
3. Réaliser une première version de :
 - Base de données des spécialistes d'information marine en Afrique ;
 - Catalogue en ligne des spécialiste d'information marine en Afrique
 - Annuaire des spécialiste d'information marine en Afrique ;

III – La troisième étape sera consacrée à l'exploitation des données d'enquête en procédant à :

1. Analyser les données de la base de données pour réaliser un article ou un rapport d'étude sur les spécialistes d'information marine en Afrique et AFRIAMSLIC ;
2. La traduction de l'annuaire et de l'article ou le rapport d'étude en anglais ;
3. Présentation et Transfert d'une première copie de la base de données à Accra (Ghana) pour un test d'évaluation ;

IV – La quatrième étape sera consacrée à :

1. Réalisation de la version définitive des résultats du Projet AMISA et leur transfert à AFRIAMSLIC ;
2. Proposer la présentation d'un article ou un rapport à la Présidente de AFRIAMSLIC et à la conférence IAMSLIC de 2006.
3. Soumettre la version finale de l'annuaire des spécialistes d'information marine en Afrique à AFRIAMSLIC pour impression et diffusion ;
4. Proposer des informations pouvant être publiées sur le Site Web de AFRIAMSLIC.

RESULTATS ATTENDUS

Une Base de données sous WINISIS des spécialistes d'information marine en Afrique ;
Un catalogue des spécialistes d'information marine en Afrique accessible sur le site Web de AFRIAMSLIC ;
Un Annuaire bilingue des spécialistes d'information marine en Afrique ;
Article sur les spécialistes d'information marine en Afrique
Rapport d'étude sur les spécialistes d'information marine en Afrique ;
Informations structurées disponibles sur les spécialistes d'information marine en Afrique ;
Information sur les activités associatives des spécialistes d'information marine en Afrique.

METHODE D'EVALUATION

L'évaluation aura pour but de déterminer le contexte dans lequel le Projet AMISA aurait amélioré la disponibilité d'informations sur les spécialistes d'information marine en Afrique.

Elle visera en particulier à faire le bilan des résultats en mettant l'accent sur le caractère opérationnel des produits (bases de données et annuaires).

REALISATIONS

Les activités ci-après ont été réalisées à ce jour :

Au niveau de la première étape :

1. Les matériels informatiques acquis :ordinateur portable Acer 40 Go et progiciels WinIsis, Genesis, etc.
2. Travaux préliminaires réalisés :
Formulaire d'enquête ;
Base de données sous WINISIS ;
Catalogue test avec le logiciel GENESIS ;
Maquette de l'annuaire des spécialistes d'information marine en AFrique.

Les réalisations citées ci-dessus peuvent faire l'objet de démonstration.

IMPROVING ACCESS TO FISHERIES AND AQUACULTURE GREY LITERATURE IN KENYA

James Macharia
Kenya Marine & Fisheries Research Institute
ASFA Input Centre
P.O. Box 81651
Mombasa - Kenya
Email: jmacharia@kmfri.co.ke

Introduction

The contents of this paper include a short discussion on the nature and production of grey literature - print and the electronic. The Internet is now a major source for dissemination and retrieval of fisheries and aquaculture grey literature and methods of bibliographic control. Efforts of organizations such as Kenya Marine and Fisheries Research Institute (KMFRI) in facilitating access to grey literature are focused.

Background

The current vision for the Kenyan fishery sector is to increase fish production on sustainable yield basis in order to improve incomes of fishers and fish farmers, alleviate poverty, reduce unemployment and enhance food security at both the household and national levels. Fisheries is important in Kenya both from a social viewpoint (where fishing is a way of life for fishing communities) and from an economic viewpoint (where fisheries contribute to the economy through employment creation, generation of income and foreign exchange earning). Fisheries resources also provide for recreation through sport fishing and angling activities, which promote fisheries tourism in Kenya.

Due to the increasing environmental threats to many coastal and inland water bodies caused increasing aquatic pollution, habitat degradation, water use and other man made pressures, there is the need to provide a better understanding of the aquatic systems and prevent the environmental impacts affecting fisheries resources and aquatic biodiversity. At the same time there is the need to expand aquaculture and sustain capture fisheries, in order to meet the high demand for fish. Inadequate and difficulty in accessing quality data and information has been identified as one possible reason for the failures in fisheries management. A reliable information base, systematic observations and increased knowledge are a pre-requisite for sustainable development, and rational use or management of the environment and natural resources.

This paper reviews the Grey literature information resources in Kenya for effective aquaculture and fisheries management in terms of conducting research and transmitting the results of research to all of the stakeholders involved.

Challenges to accessing grey literature

Some of the problems in providing access to grey literature include the following:

- Irregular publication and indexing,
- Patrons not knowing what is available,
- Large contrast with journal articles,
- Material being hard to identify, but could easily be obtained,

- Limited dissemination,
- Small print runs,
- Confidentiality of research findings and poor publicity,
- Lack of skills to retrieve information from the internet, and
- Tropical humidity that affects the quality of printed publications.

Coverage of Grey Literature in Kenya

Since 1995 when KMFRI became an ASFA input centre it has been monitoring published and grey literature in the WIO region for ASFA Database. A look at the publications entered in the ASFA database indicates that over 65% of all publications in fisheries and aquaculture from the region are grey literature. Figure 1 shows the percentage of publications monitored for ASFA on Kenya by types of literature namely: Journals, Conference papers, dissertations and theses, monographs etc.

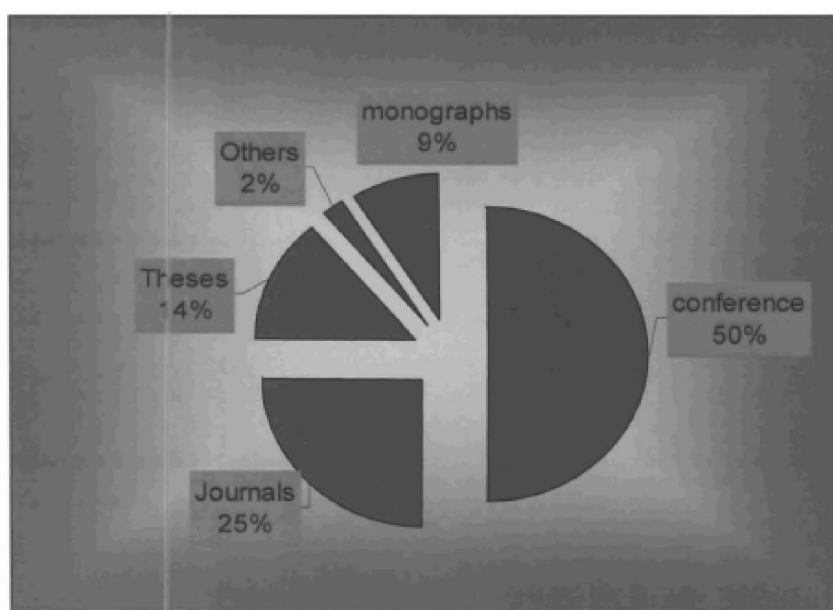


Fig. 1. Percentage of publications by type of literature

What is Grey Literature?

Information, which is produced on all levels of government, academics, business and industry in print and electronic formats, but which is not controlled by commercial publishers. They may include, but are not limited to, the following:

- Reports (technical reports, preliminary progress and advanced reports, statistical reports, memoranda, state-of-the-art reports, market research reports, project reports),
- Theses,
- Preprints,
- Working papers,
- Conference proceedings and conference papers,
- Market surveys,
- Newspaper clipping files, and
- Official documents not published commercially (primarily government reports and documents).

These documents often contain valuable and unique information, which is not found elsewhere. The result is that a large pool of scientific and economic information is seldom accessed by the research community.

Grey literature is valuable to researchers for the following reasons:

- It can provide information that never appears in other sources,
- It is available on a more timely basis than conventional literature,
- Grey literature is available at little or no charge,
- Open access movement addresses financial barriers,
- It usually has concise, focused and detailed content – for example, technical reports and unofficial government documents, whose information content will be diluted to a greater or lesser extent in published form.

One of the earliest uses of the Internet was to enable the efficient circulation of grey literature within the research community. The inaccessibility of grey literature is a particularly serious problem in the Kenya and in the WIO region as a whole where there are relatively few libraries and other organizations responsible for the collection and dissemination of information. Most reports that are produced in the region are never integrated into the standard literature vehicles like journals or conference proceedings. This has two undesirable results. (i). Valuable data is not shared throughout the region. (ii). Important work done in the country is not shared with the rest of the world's scientific community. Thus the work does not get the recognition that it deserves.

Aquaculture, fisheries, and coastal management have become important issues in Kenya. As economic and technological developments propel the country into the modern age, these issues are rapidly gaining in ecological and economic significance. Preservation of and access to information gathered in the past is important to research being done now and planned for the future. Likewise access, preservation, and dissemination of present and future information will continue to be a priority as the country develops.

Digital collections of Grey Literature

Digital collections of Internet resources place important information close at hand. They facilitate the dissemination of new research faster, and create access for wider audiences. Rather than searching the entire Internet, a collection limits resources to those pertinent to a subject. A collection also suggests that material has been identified as useful by a qualified librarian or subject experts. There are several projects, whose main objective is the promotion of access and digitally avail fisheries and aquaculture grey literature in Africa. **OdinPubAfrica** (<http://www.doclib.luc.ac.be/odin/> Development of an African repository for electronic publications in marine science and oceanography). The goal of **OdinPubAfrica** is to develop an electronic platform to collect scientific documents (articles, conference papers, working papers, etc) produced by members of African research institutes in the field of oceanography and marine science. The FAO Corporate Document Repository (<http://www.fao.org/documents/>) houses FAO documents and publications, as well as selected non-FAO publications, in electronic format. It enables users to easily access the accumulated knowledge and information produced by FAO directly on the Internet.

KMFRI

KMFRI (<http://www.kmfri.co.ke/>) has been involved in the pilot digitization project on marine and coastal literature project promoted by ODINAFRICA project and conducted as a background to a new project to archive the African grey literature an initiative of IOCUNESCO.

Future of Grey Literature

Grey literature provides stakeholders with the information they require to make decisions. Grey literature will continue to serve as a source of information that is consulted most often. The Information Communication Technology (ICT) has eliminated many of the barriers to information flow. Grey literature is gaining greater importance as a source of information for much of the world's population. It is an indispensable resource for an informed public and will undoubtedly continue to serve as a necessary supplement to journal literature well into the future.

References

Report of and Papers Presented at the Regional Workshop on Networking for Improved Access to Fisheries and Aquaculture Information in Africa. South Africa, 3-7 November 2003.

FAO Fisheries Report No. 740, 232 pp.

The Abuja declaration on sustainable fisheries and aquaculture in Africa (<http://www.eurekalert.org/pu b releases/2005-081wfca~u082505.ph~>)

GROUP DISCUSSIONS

Group One

Theme : WORKING DOCUMENT / CONSTITUTION FOR AFRIAMSLIC

Group Members: Mr. Geoffrey Salanje (Chair), Ms. Lucy Dzandu, Ms. Marian Jiagge, Ms. Dometo Kouevi Akue, and Mr. Joseph Oppong

Article 1: *Name* - AFRIAMSLIC

The name is Africa Regional Group of IAMSLIC. (AFRIAMSLIC.)

Article 2: *Membership*
Individual Membership
Institutional Membership

Members should be those who are involved in aquatic, marine and related disciplines. An individual or institution desirous of becoming a member must pay the stipulated fees after filling a membership form. People not in marine related disciplines but are interested can still join. There is the need to have more members from North African countries. This should be encouraged.

Article 3: *Objectives*

(a). Main objective - to strengthen the cooperation between individuals, and libraries/ information centers in Africa.

(b). 2nd Objective - to collaborate with other institutions with similar objectives.

Article 4: *Meetings*

(a). Meetings should be after every two years (biennial).

(b). The venue is to be rotated and this should be decided on at the previous meetings.

(b). At the local level, members are free to meet when the need arises.

Article 5: *Benefits*

(a). The right to vote or to hold office

(b). Capacity building

(c). Support to attend meetings and conferences

(d). Access to IAMSLIC membership database

(e). Access to AFRIAMSLIC newsletter

Article 6: *Projects*

(a). AMISA (Access to Marine Information Specialist in Africa) project – A Database of Marine specialists.

(b). Directory of Marine Scientists in Africa

(c). Website of AFRIAMSLIC

(d). Establishing a secretariat for AFRIAMSLIC

(e). Project for capacity building

Article 7: Sources of Funding

- (a). Membership fees should be paid annually by individuals and institutions
- (b). Institutional support
- (c). Proposal writing to donor agencies (e.g. AU, ECOWAS, SADEC, NEPAD, IOC, CTA, FAO).
- (d). Publishers
- (e). Internal dues – AFRIAMSLIC - 10 dollars
- (f). Institutional dues – 10 dollars.=

Article 8: Management Structure

Positions

1. Chairperson
2. Vice Chairperson
3. General Secretary
4. Vice General Secretary
5. Treasurer

Committee Members: One representative each

6. West Africa
 7. South Africa
 8. East Africa
 9. North Africa
 10. Central Africa
- (Ten-member committee)

Article 9: Election Procedure

Nominations

How and when to call for nominations and how many/duration of membership of nominated persons.

How: Both nominee and the nominated should be a paid-up member.

When: Six months preceding the next meeting

How many: Three candidates; we should have and study the profile of the persons. The candidates should have been members of the association for at least three years.

Elections

- ❖ It should be at the general level
- ❖ There should be a presiding officer (independent person)
- ❖ Should be by secret ballot
- ❖ Electronic voting should be allowed for members who cannot be present at the meeting.
- ❖ In an event where the first or second positions come from different block, that ends it. In an event where first and second comes from the same block, the first position would be for the chairperson. Nominations and voting would be done at the meeting for the Vice who automatically is to come from the other block (francophone and Anglophone).
- ❖ With the secretary's position, out of three nominations the first and the second position would go to the secretary and vice.
- ❖ The committee members can be elected at the regional levels and the names of representatives submitted at the meeting for recognition by all members.

Tenure of Office

- (a). Shall be for two (2) years
- (b). Shall be eligible for re-election for another term (ie. Maximum of four years)
- (c). Shall not stand for the same position after two terms, but can be eligible to stand for any other post.

Other Recommendations

- Duties or obligations not covered
- It is suggested that at a meeting members present should decide on duties to the executive committee
- A certain % (10%) of the annual dues (from both institutions and individuals) should be retained at the regional level for running the secretariat
- There should be a spirit of belonging. Members should not be passive (only paying their dues and keeping a loaf) but should be active and ensuring that the association grows. Members should realize the need to be very committed.
- Need to promote personal contacts after the meeting by communicating through their emails etc.
- Document to be reviewed whenever necessary.

Group Two

Theme: Develop Networking Strategies for Afriamslic Members

Group Members: Ms. Margie Shaw (Chair), Ms. Arame Keita, Dr. Moses Ibeun, Ms. Vivian Nuhu, Ms. Denise Mathiot, Mr. Charles Udzu and Mr. Emmanuel Nyamadi

1. Strategies for Networking.

- It was noted that there are 39 IAMSLIC members from Africa, and yet only a small number have been involved in the AFRIAMSLIC meetings.
- There is a need for a membership survey, which would obtain information about the Institution, Library Contact details, Library Capacity and Training Needs.
- To obtain the above information, questionnaires need to be administered.
- Arame Keita (Senegal) suggested that an ODINAFRICA questionnaire could be adapted for use.
- Proposal was made that Margie Shaw (South Africa), Marian Jiagge (Ghana) and Arame Keita (Senegal) be delegated to work on preparation and administering of the questionnaires.
- Questionnaires should be administered early in 2006 and the information should be collated as soon as possible.
- Arame Keita advised that this survey will need support and possible funding.

2. IAMSLIC Union List of Serials

- The Committee agreed that member libraries be encouraged to enter their serial holdings onto the existing Union List.
- It was noted that Steve Watkins of IAMSLIC has already agreed on establishing a subset of the Union List for the Africa Region and that this would facilitate resource sharing in the region.
- It was also decided that members could contact Steve Watkins directly for advice and guidelines on how to enter their holdings to the Union List.
- The committee noted that as at September 2005, only KMFRI (Kenya) and SAIAB (South Africa) were the only two African Libraries to have submitted some of their serial holdings to the Union List.

3. Linkage with other Networks

- Members agreed that this should be the responsibility of the AFRIAMSLIC Chairperson.
- Members could however inform the Chairperson of linkages that need to be followed up.

4. AFRIAMSLIC Website– General Issues

- Discussion focused on who could assist with the design and which languages should be used.
- Proposed that Fode Kaba (Guinea), Arame Keita (Senegal), Mac-Anthony Cobblah (Ghana) and Edna Nyika (Tanzania) be asked to work together on the website.
- Proposed that both English and French languages be used.
- Proposed that the web site be established by 31 January 2006.
- Proposed that the web site be hosted by IAMSLIC.

- Nominated Webmasters be Fode Kaba, Arame Keita, Mac-Anthony Cobblah and Edna Nyika.
- Proposed that the Logo include the Africa map.

5. AFRIAMSLIC Website-Content

After some discussion the following suggestions were made on the content of the web site:

- Objectives of the organization.
- AFRIAMSLIC Office Holders (Names and Contact Details).
- Membership Information (Name of Institution, Mission Statement of Institution, Contact Person, Address, Telephone/Fax, E-Mail) – the questionnaire would assist in obtaining this information.
- Conference Information –Proceedings and notification of future meetings.
- Link to Africa Regional Subset of Serial Holdings from the Union List.
- Links to other IAMSLIC Regional Groups.
- Links to members websites.
- Links to other African related organizations for example African Ocean Portal and Ocean Teacher.
- Training Opportunities.
- Discussion List.

6. Coordinating Centres for Resource Sharing.

- The committee noted that KMFRI (Kenya) is already coordinating the collection and digitizing of African Marine publications.
- The suggestion was that SAIAB (South Africa) become the coordinating centre for freshwater publications from the Region.
- Margie Shaw agreed to discuss the proposal with Jean Collins of FAO and the Director at SAIAB; and to investigate what would be needed for grey literature and other publications to be located and forwarded to SAIAB and subsequently digitized for easy access.
- Margie Shaw agreed to liaise with Bunda College (Malawi) and NIFFR (Nigeria) as well the other Freshwater Institutes present at the meeting.
- It was suggested that 5 Regional Representatives (Central, West, East, North and South) coordinate AFRIAMSLIC information at country level.
- Further Networking to be discussed at the next conference.

7. Training Needs

- Suggestions included: In Magic, AGORA, EBSCO, INASP/PERI, ASFA.
- The need could be more clearly assessed after the survey/ questionnaire have been collated.

8. Sources of Funding

- It was suggested that, the following organizations could be approached: IOC/ ODINAFRICA, FAO, NEPAD, CTA and the AU.

9. Comments on the 2005 AFRIAMSLIC Conference.

- All members of the group felt that the theme had been appropriate.
- Levels of participation by attendees had been good due to the focus on both marine and aquaculture issues.
- Due to this being the second AFRIAMSLIC meeting, people were getting to know each other and thus more in depth discussion had been possible.

- It was noted that the number of people attending was low; however it was also felt that this should not hinder the group from making progress and moving forward in 2006.
- Thanks to Marian Jiagge and Mac-Anthony Cobblah for organizing and hosting the meeting.

APPENDIX I

CONFERENCE PROGRAMME OPENING CEREMONY

2nd INTERNATIONAL ASSOCIATION OF AQUATIC AND MARINE SCIENCE LIBRARIES AND INFORMATION CENTERS (IAMSLIC) AFRICA REGIONAL GROUP CONFERENCE

Theme:

**Coping with the Digital Age in Aquatic and Marine Science Libraries
in Developing Countries.**

13th-15th September 2005

Bay View Hotel - Conference Room

Tuesday, 13th September 2005

- 8.45 a.m - 9.15 a.m : Arrival of Participants/Invited Guests
- 9.15 a.m - 9.20 a.m : Opening Prayer by **Mr. Mac-Anthony Cobblah**
- 9.20 a.m - 9.25 a.m : Introduction of Chairman by **Mrs. Agnes Adjabeng**
- 9.25 a.m - 9.30 a.m : Chairman's Remarks
- 9.30 a.m - 9.40 a.m : Welcome Address by Chairperson, Africa
Regional Group of IAMSLIC **Mrs. Marian A. Jiagge**
- 9.40 a.m - 10.00 a.m: Guest Speaker's Address – **Mr. C. Entsua-Mensah**
Director, CSIR-Institute for Scientific and
Technological Information
- 10.00 a.m- 10.20 a.m: Keynote Address by **Dr. Charles A. Biney**
Director, CSIR-Water Research Institute
- 10.20 a.m- 10.25 a.m: Chairman's Closing Remarks
- 10.25 a.m- 10.30 a.m: Vote of Thanks by **Mrs. Vivian Nuhu**
- 10.30 a.m- 10.35 a.m: Closing Prayer by **Mr. Chris Lettu**
- 10.35 a.m- 11.30 a.m: Group Photographs/Refreshment

M.C. Mr. G.T. Mensah

APPENDIX II

2nd AFRIAMSLIC Conference, 13th–15th September 2005 at the Bay View Hotel, Accra Ghana

PROGRAMME

Date	Time	Venue	Activity	Remark
12/09/05	6.00 a.m- 9.00 p.m	Bay View Hotel	Arrival/Registration	Contact Registration Desk at Bay View Hotel
13/09/05	9.00 a.m-11.30a.m	Conference Room	Opening Ceremony	Chairperson Dr. Emmanuel Adjei University of Ghana
	11.30 a.m-1.45 p.m	Conference Room	Seminar	Chairperson Dr. Richard Kofie
	11.30 a.m-12.15p.m		Presentation by Dr. Mrs. M. Entsua-Mensah Senior Research Scientist, CSIR-WRI Topic: “Artisanal Fisheries in Ghana”	CSIR-INSTI
	12.15 p.m-12.30 p.m		Discussion	
	12.30 p.m-1.15 p.m		Presentation by Dr. E.K. Abban Principal Research Scientist, CSIR-WRI	
	1.15 p.m-1.30 p.m		Topic: “Networking: An Option for the African Librarian to cope with the digital Age”	
	1.30 p.m-2.30 p.m		Discussion	
	2.30 p.m-4.30 p.m		Lunch Break 1 st Plenary Session”	
13/09/05	2.30 p.m-2.50 p.m		Electronic Information In Aquaculture And Fisheries Science: Opportunities And Challenges In Malawi	Chairperson Ms. Margie Shaw
	2.50 p.m-3.00 p.m		By Mr. Geoffrey Salanje (Malawi)	
	3.00 p.m-3.20 p.m		Discussion	

	3.20 p.m-3.30 p.m		<p>”Improving Access to Fisheries and Aquaculture Grey Literature in Kenya”</p> <p>By Mr. James Macharia (Kenya)</p>	Chairperson Mr. Geoffrey Salanje
	3.50 p.m-6.00 p.m		<p>Discussion</p> <p><i>Visit to town</i></p>	
14/09/05	9.30a.m-1.30 p.m	Conference Room	<p>2nd Plenary Session”</p>	
	9.30 a.m-9.50 a.m		<p>How Relevant is the Librarian in the Development of Digital Libraries in Africa”</p> <p>By Dr. Moses Ibeun (Nigeria)</p>	
	9.50a.m-10.00a.m		<p>Discussion”</p>	
	10.00 a.m-10.20a.m		<p>E n v i r o n m e n t a l I n f o r m a t i o n Management Challenges and Opportunities of the Digital Age: Case Study – Ghana Environmental Protection Agency (EPA Library)”</p> <p>By Mrs. Agnes Adjabeng (Ghana)</p>	
	10.20a.m-10.30a.m		<p>Discussion</p>	
14/09/05	10.30a.m-10.50a.m	Conference Room	<p>”The Impact of the Digital Age on the SAIAB Library and the Challenges for the Librarian, Library Users and Resource Sharing in the Region”</p> <p>By Mrs. Margie Shaw (South Africa)</p>	Chairperson Dr. Moses Ibeun
	10.50a.m-11.00a.m		<p>Discussion</p>	
	11.00a.m -11.30a.m		<p>Tea Break</p>	

11.30a.m-11.50a.m		”An Overview of the Seychelles Fishing Authority Documentation Center” By Ms. Denise Mathiot (Seychelles)	
11.50a.m-12.00p.m	Conference Room	Discussion Access to Marine Information Specialists in Africa: AMISA Project” By Mr. Fode Karim Kaba (Guinea)	Chairperson Mr. James Macharia
12.00 p.m-12.20p.m			
12.20p.m-12.30 p.m			
12.30 p.m-12.50 p.m		Discussion 3 rd Plenary Session” Access to Electronic Literature: An Answer to Resource Constraints in Africa” By Mrs. Arame Keita (Senegal)	Chairperson Mrs. Marian Jiagge
12.50 p.m-1.00p.m		Discussion Information Management System at CGILE” By Mrs. Dometo Kokoe Kouevi (Togo)	
1.00 p.m-1.20 p.m			
1.20 p.m-1.30 p.m		Discussion	
1.30 p.m-2.30 p.m		Lunch Break	
2.30 p.m-3.00 p.m		Business Meeting Presentation on - “IAMSLIC and A F R I A M S L I C Membership: Benefits and Challenges” By Mrs. Marian Jiagge and Mr. Mac-Anthony Cobblah (Ghana)	Chairperson Mr. Mac-Anthony Cobblah
3.00 p.m-4.30 p.m		Discussion and Election of Officers	Chairperson
		Close Session	Mrs. Marian Jiagge (Conference Convener)
9.30 a.m-1.30 p.m	Conference Room	Workshop/Group Work	

15/09/05	11.00 a.m-11.30 a.m	Tea Break
	1.30 p.m-2.30 p.m	Lunch Break
	2.30 p.m-4.00 p.m	Presentation of Group Report/ Drafting of Communique
	4.00 p.m-4.30 p.m	Closing Ceremony
	6.00 p.m-9.00 p.m	Dinner Outside
16/09/05	7.00 a.m	Bus Departs to Kakum National Park and Cape Coast Castle (Excursion)
17/09/05	6.00 a.m-10.00p.m	Participants Depart

APPENDIX III

LIST OF PARTICIPANTS

1. Agnes Adjabeng (Mrs)
Environmental Protection Agency
Accra.-Ghana
Email: a_mawuama@hotmail.com
2. Denise Mathiot (Ms)
Seychelles Fishing Authority
P.O. Box 449,
Fishing Port
Mahe - Seychelles
Email: dmathiot@hotmail.com
3. Mr. Patrick Amartey
Ministry of Food & Agriculture
Fisheries Department
Research and Utilization Branch
P.O.Box B62
Tema-Ghana
p.amartey@odinafrica.net
4. Mr. James Macharia,
Kenya Marine Fisheries Institute,
ASFA Input Centre,
P.O.Box 81651
Mombasa - Kenya
Email: jmacharia@kmfri.co.ke
5. Mr. Mac-Anthony Cobblah
CSIR – Institute for Scientific &
Technological Information
P.O. Box M 32
Accra- Ghana
Email: mactony66@hotmail.com
6. Mr. Fode Karim Kaba
Centre National des Science,
Halientique, CCNSHP,
Boussoura Port, 3738/39
Conakry-Guinea
Email: fkaba@cnsnb.org.gn
7. Vivian Nuhu (Mrs)
Wildlife Department
Forestry Commission
Accra-Ghana
Email: vannuhu@yahoo.uk
8. Dr. Moses Ibeun,
National Institute for Freshwater
Fisheries Research
P.M.B. 6006,
New Bussa - Nigeria.
Email: moibeun@yahoo.com
9. Mr. Emmanuel Nyamadi,
Food & Agriculture Organization
Regional Office for Africa
Accra- Ghana
Email: emmanuel.nyamadi@fao.org
10. Mr. Geoffrey Salanje
Bunda College of Agriculture Library
P.O.Box 219
Lilongwe - Malawi
Email: gsalanje@bunda.unima.mw
11. Charles Udzu,
CSIR-Institute for Scientific &
Technological Information
P.O.Box M 32,
Accra.- Ghana
Email: charlesudzu@yahoo.com
12. Dometo Kokoe Akue (Mrs)
Secrétaire de Direction Bilingue,
Marine Information Manager
B.P. 1515 CGILE/UL
Lome - Togo
dometohuguette@yahoo.fr

13. Arame G. Ndaye Keita (Mrs)
Direction de l'Océanographie et
de Pêches,
Maritime (DOPM).
BP 289
Dakar- ***Senegal***.
Email: a.keita@odinafrica.net
14. Margie Shaw (Mrs)
South African Institute for Aquatic
Biodiversity,
Private Mail Bag 1015,
Grahamstown - South Africa
Email: m.shaw@ru.ac.za
15. Emily Otoo-Asare (Mrs)
Volta River Authority
Accra -Ghana
Email: emilyasare@hotmail.com
16. Lucy Dzandu (Mrs)
CSIR-Institute for Scientific &
Technological Information
P.O.Box M 32
Accra.
Email: lucydzandu@yahoo.com
17. Mr. Oppong Joseph
Wildlife Department
Forestry Commission
Accra.
Email: joseoppong@yahoo.com
18. Marian Jiagge (Mrs)
CSIR-Water Research Institute
P.O.Box M 32
Accra.
Email: mjiagge@yahoo.com

Other participants from Ghana

1. Mr. Worlanyo Afenyo
Central University College
Accra - Ghana
2. Mr. Stephen Yiborku
CSIR Head Office
P.O.Box M 32
Accra Ghana
3. Dr Eddie Abban
CSIR- Water Research Institute
P.O. Box M 32
Accra -Ghana
4. Dr Richard Kofie
CSIR- INSTI
P.O.Box M 32
Accra - Ghana
5. Mr. Ebenezer Afari-Kumah,
CSIR- INSTI
P.O.Box M 32
Accra - Ghana
6. Dr (Mrs) Mamaa Entsuaah-Mensah
CSIR- WRI
P.O.Box M 32
Accra - Ghana