

Marine Science Information: an International Commodity
(eds) Grundy, Ford & Beardsley
IAMS LIC. 1986.

CURRENT MARINE INFORMATION PROGRAMMES IN SRI LANKA

Lalitha D. Bandaranayake
National Aquatic Resources Agency (NARA)
Colombo 15, Sri Lanka

ABSTRACT

This paper presents an overview of the marine information programmes in Sri Lanka looking at both the physical characteristics and the techniques for exploiting it.

INTRODUCTION

In Sri Lanka, interest in the oceans has widened within the past ten years. Many look to the sea as the source of food for future generations. Others visualize a vast storehouse of mineral wealth in and under the oceans' waters. For a growing number, judging by the number of hotels that have mushroomed along the coast, the sea's coastal regions have offered a very lucrative business in the form of tourism.

As our demands for resources increase, reality intercepts imagination and we are awakened to the discovery that one use of the sea can compete with and sometimes prohibit many other uses. For example, coastal fisheries often depend upon the waters of brackish bays and estuaries as spawning grounds, but industrial development of coastal areas and waste disposal from urban regions can change the coastal oceanic environment enough to destroy this fragile reproductive fabric of fisheries populations. Mining of the coral along the coast for lime as a building material in Sri Lanka has been going on for years, but only now we are becoming aware of the damage caused by this in the form of sea-erosion of vast stretches of the beaches along the South West coastline.

If the sea is to play any part in supplying the needs of man we need information not only in marine biology, naval architecture and marine engineering; but also on the study of oceans encompassing all conceivable disciplines of science - physics, chemistry, biochemistry, geology, geophysics, microbiology, ecology, physiology, archaeology, paleontology, electronics, etc.; in short, information on "Marine Affairs".

The conservation and exploitation of a natural resource like the aquatic medium requires a diverse allotment of information needs and users. For example, the administrators and planners need information on the overall management of the country's resources, fishermen need information on fishing grounds, fishing tackle, post harvest technology; and in a developing country like ours, fishermen need information even on simple financial transactions such as banking, loan facilities, etc. In all these situations there are essentially two types of information that may be transferred.

1. Data on the physical characteristics of the resources themselves.
2. Data on techniques for exploiting it.

Information programmes are usually designed to transfer the second type of information, but based on the first type of information. The areas traditionally concerned with such systems are: libraries, bibliographies, documentation, record management, archives and publishing in all its ramifications and forms. However, such a system cannot function without drawing on a data base which contains the first type of information. Thus a Data Base and a Documentation Unit are two integral parts of any information programme. The most well known and well established marine information programme, the Aquatic Sciences & Fisheries Information System (ASFIS) that we all are familiar with, amply illustrates this point. But as it has evolved in the developed world, it operates as a single information system covering all aspects of marine sciences, reflecting the minor role of fisheries in the national economics in your part of the world. Our own experience in Sri Lanka is quite different.

Our recent seafaring experience was limited to fishing. This is reflected in the development of marine information programmes in Sri Lanka, in that for a long time no information was available on any other aspect of marine science other than fisheries. Prior to 1982 there were only two marine libraries, the one at the Fisheries Research Station and the one at the Institute of Fish Technology and both of these collections concentrated only on fisheries and the processing of fish.

The need for information for good development and management decisions was recognized, even at that time; however most of the information was in the form of statistics collected by the Divisional Fisheries Inspectors in different parts of the country. They collected information on the number of fishing boats, their sizes, and the types of gear used. They also collected catch and effort data from each boat. With the large number of species, fishing boats, and landing places, the amount of data collected was so great and the analysis so laborious that computerization became essential but we could ill afford it.

To remedy this situation the UNDP/FAO stepped in with, what may be termed the first information programme in Sri Lanka, the "Reg-Tuna Programme".

REG-TUNA PROGRAMME

The Reg-Tuna Programme operates under the Indo-Pacific Tuna Development and Management Programme (IPTP).

The widespread extension of economic zones (EEZs) has increased the interest in tuna resources of the Pacific and Indian Ocean. Distant-water fishing nations are interested in continued access to tuna resources. Coastal nations are interested in receiving a fair return for providing the access and in the opportunities for developing local tuna fisheries.

Tuna are supposed to be a nomadic species. Their wanderings can take individual fish in and out of the EEZs of several countries. Action taken by individual countries to manage or develop their tuna fisheries must take account of actions of other countries exploiting the same resources. In order to make rational decisions concerning participation in the development and management of tuna fisheries, the countries must have ready access to comprehensive information on: resources, fishing techniques, and markets.

The IPTP was established by the FAO in response to recommendations by the Indo-Pacific Fisheries Commission (IPFC) and the Indian Ocean Fisheries Commission (IOFC). Core project support is provided by the UNDP. The primary objective of this programme is to develop an information base in the form of a tuna data base, through collection of historical and current tuna fisheries statistical data. Thus information would be available to support rational decision making for management and development. The other objective is to assist in making arrangements for the establishment and effective use of the project's tuna fishery information system on a self-sustaining, long term basis after the completion of the UNDP/FAO project.

The programmes statisticians have devised standards for data on tuna fisheries catch and effort contributed by countries fishing in the region. At present there are 36 countries reporting to IPTP. They report on 28 species, grouped into the following three categories:

1. Tunas and bonitos,
2. Seerfishes, and
3. Billfishes.

These data are collected at landing sights and reported by Fishery Inspectors to a Liaison Officer in each country who will report the tuna data to IPTP on the prescribed reporting forms. These data are received at the IPTP office housed at the National Aquatic Resources Agency in Colombo, and are stored and analysed on a 1000 computer, with appropriate visual display, printing and plotting peripherals.

It was designed at first to establish a historical data collection from 1970 forward. Each country was requested to report the existing historical data. It is normal procedure for each government to process the raw data and summarize them into the reporting forms. However, if for some particular reason a country should require assistance, the IPTP will assist with the processing of the raw data collected. In that event the country concerned must forward all details to the IPTP.

Biological and economic analysis have been done on this data, and I believe this phase of the programme is now nearing completion. Analysis of the data has revealed some very interesting facts which will illustrate the scope of the programme.

It has revealed that Indonesia records the largest catch of all tuna and tunalike fishes, and Japan is the leading fishing nation not only for commercial tunas, but also for tuna and tunalike fishes.

Turning to Sri Lanka, the records show that along the south coast, the most important tuna fishing area, the landings of skipjack tuna at Galle peak sharply in July and at Matara show a substantial increase in the July-September period. Increased catch levels occur during the South West monsoon, which is from May-October. For the north and east coasts consisting of five parts, there seems to be little seasonality in the relatively small catches; apparently this area is more important for small pelagic and demersal stocks than for tunas. For the central west coast, a seasonal effect is seen only in Puttalam where the landings are particularly low in May-June and then rise to the highest levels in July-December.

The information collected after analysis is published in data summaries, in the form of catch tables. A manual for the collection of historical statistical data on tuna and tuna-like species in the Indo-Pacific region has also been published. Summaries of copies of raw data files are produced at regular intervals and forwarded to the countries involved. Extensive software has already been developed for validation, compilation, and analysis of catch and effort data. The software has been designed to facilitate graphical displays as well. This database will provide uniform coverage of catch and effort as required for future resource conservation and economic management of the fisheries. It is geared to supply information for queries such as: stock structures, seasonal fishing patterns and development of appropriate fish harvesting methods and also to provide information comparing the fishing efforts of two or more countries in the region in tabular or graphical form. This information programme when fully operational will be an effective information system for tunas covering all the elements of data collection, data processing and analysis for resource assessment and economic studies.

A similar information programme has been initiated by the Bay of Bengal Programme of FAO termed BOBFIN. It uses an Apple IIE computer again housed at the National Aquatic Resources Agency in Colombo.

BOBFIN

BOBFIN is more broad based than the earlier system, in that it covers both catch and effort and cost and earning parameters. Participating countries collect their own statistics and data which are recorded according to a given format. Unlike IPTP, where the data is submitted and analysed in Colombo, analyses of the BOBFIN data are done by the participating countries. For this purpose BOBFIN has developed the software which is given to the participating countries free of charge.

Maldives has already commenced using this software but in Sri Lanka we have not yet started. BOBFIN also offers training in the use of their software. The BOBFIN is different, in that it covers all fish species but only pertaining to the Bay of Bengal region. Therefore, the number of countries participating are also few, namely: **Bangladesh, India, Maldives, Sri Lanka, and Thailand.**

From the beginning the information systems in the developed and the developing worlds reflected the role each discipline in marine science played in the national economy of that part of the world. For example, we see that ASFIS embraced all branches of marine sciences as a whole; whereas AQUIS and SEAFIS systems in our part of the world concentrated mainly on aquaculture and fisheries. This is evident even in our own experience in Sri Lanka where the birth of information activity started with the collection of statistics. This collection was very necessary for the extension workers and the statisticians in the development of fisheries. Generally the system which evolved was dependent upon the end user and the channels of communications; more sophisticated in the developed world in direct contrast to the situation in the developing world where the illiterate fisherfolk are the end users with an extension worker as the channel of communication. So we have two programmes, both statistical in nature (rather than bibliographical) and both covering only fisheries.

There is another aspect of development of information programmes in Sri Lanka which is quite incongruous with our national economy. The fisheries industry, which has supported the national economy for generations, has not been supported in information programmes. Strangely enough our information systems and special libraries are catering to industries such as rubber and plastics, textiles, food processing and others which are relatively new industries. Examples are the well established information system at the Ceylon Institute of Scientific and Industrial Research and the Library and Documentation Division of the Industrial Development Board.

But this state of affairs was changed in the early eighties. After nine years of deliberation, the Law of the Sea set forth jurisdictional lines for ocean resources for all countries. Sri Lanka became acutely aware of its ocean resources and suddenly we saw a tremendous surge of activity in marine affairs and marine information, all because of the prestigious convention in December 1982. As an island state, Sri Lanka's jurisdiction displayed a relatively high water-to-land ratio, which could not be ignored.

The affirmation of sovereign rights in respect to the vast offshore area, presented a challenge. Existing institutions and national capabilities were either inadequate or non-existent in the context of the nations assuming responsibility for, and control of, these offshore areas. The government of Sri Lanka decided that a single institutional agency, which would incorporate the existing fishery expertise, should be established. Considering the economic importance of the inland waters and the interrelationship between inland and coastal resources, it was decided

that a single agency should have jurisdiction over both resources and it was to include both living and non-living resources or "aquatic resources". This new agency, known as the National Aquatic Resources Agency (NARA), was thus established; its mandate was to engage in the research, development and management of all aquatic resources.

The also brought home the fact that there is more to the oceans than fisheries. Oceanography, a totally new field to Sri Lanka, was introduced. The need for dissemination of information was urgently felt. The library of the National Institute of Oceanography of Goa (India), our immediate neighbour to the north, collects many relevant documents on oceanography; however, in order to equip ourselves for our new responsibilities, Sri Lanka needs very broad based coverage. It was thought that any information programme initiated by NARA should cover the broad spectra of "Marine Affairs", not just oceanography and fisheries. Plans are now being finalized to set up such an information facility. The present library will be its nucleus. Subject coverage will be of four categories:

1. Fisheries and Aquaculture
2. Marine Science (marine geology, physical and biological oceanography, marine pollution)
3. Marine Technology (fishing gear and boat building, mariculture, exploitation of marine mineral resources, energy from the oceans, marine structures, remote sensing, disposal of waste, underwater photography, and diving gear)
4. Marine Services (hydrography, ports, shipping safety and regulations, maritime surveillance, and navigation).

At the same time it was recognized that there are links between affairs, including marine sciences and other disciplines such as tourism and whale watching, ornamental fisheries, maritime history or marine archaeology, should be maintained. Thus the scope of marine affairs should have not only vertical or in-depth aspects but horizontal or linkage aspects as well.

LIBRARY OF THE NATIONAL AQUATIC RESOURCES AGENCY (NARA)

This is the only library in Sri Lanka covering all fields of Fisheries and Marine Sciences. The FAO/BOBP Library's collection on fisheries in the Bay of Bengal, the Colombo University Library's collection on fisheries, and Ruhuna University Library collection on fisheries represents the only other information sources; and all of these are special collections and do not offer the broad base needed by the NARA. The NARA Library includes information on marine mammals, ornamental fisheries and marine archaeology which constitutes part of the programme of work at NARA; therefore, it covers all aspects of "marine affairs" as outlined earlier.

NARA Library was set up in 1981 with the establishment of the National Aquatic Resources Agency. Situated in a picturesque setting on

Crow Island, which is a reclaimed salt marsh, the library presents an ideal situation of solitude and quiet research. Researchers from all over the world, who are attracted to Sri Lanka to study the unexploited living and non-living marine resources, can study here. The proposed Aquatic Sciences and Marine Affairs Information Systems should have its collection divided into six "subject bays", namely; marine fisheries, inland fisheries and aquaculture, post-harvest technology, hydrography and oceanography, marine technology and special projects such as ornamental fisheries and marine mammals. It is hoped that this kind of arrangement would encourage and facilitate meetings and discussions among researchers and experts in different fields in an atmosphere conducive for study and research.

The present library was created by merging two collections, the former Fisheries Research Station and the Institute of Fish-Technology. Both were under the Ministry of Fisheries. Therefore, the library subject matter on fisheries and fish processing is historical and does not reflect present technology. We are currently acquiring coverage for this and the other fields mentioned. Organization of the new NARA Library was not begun until May 1983. It has now been sorted, accessioned, catalogued and indexed. Open access of the material to the users was introduced and normal library services such as loans, circulation of periodicals, reprographic services, interlibrary loans were established.

COLLECTION

The library collection has about 2000 monographs catalogued by AACR 2 and indexed using U.D.C. This collection includes some very valuable books such as the one mentioned by Jean Bellows, of the National Agricultural Library (this volume page 71) which contains hand painted plates of algae, and a set a books on pearl oyster fisheries and the *Marine Biology of Sri Lanka which is part of the earliest published material on marine science in Sri Lanka*. These and the earliest bulletins put out by the earlier Fisheries Research Station are now almost falling apart and we hope to microfilm them shortly. The entire collection of periodicals is comprised of about 442 periodical titles including serials such as collected reprints and technical reports going as far as back as the 1950s. Bound volumes were accessioned separately and the count now stands at 1398 volumes. Over 200 journal titles and regular technical reports are held, 185 of which were received on an exchange basis. The *Bulletin of the Fisheries Research Station, Sri Lanka* was sent in exchange. Now that it has ceased publication we still receive about 102 titles complimentary.

The library collects all relevant FAO reports and the collection now stand at over 1000 reports. They have been recorded and indexed. The collection of FAO reports are unique in Sri Lanka in that some of these are not even available in the FAO Depository Library at the Central Agricultural Library at Gannoruwa.

In August 1985 the NARA Library was designated as the depository for IOC publications. Multiple copies of IOC publications are received and are being distributed to the other 2 libraries in Sri Lanka, the University of Colombo and the Ruhuna University Campus where graduate and post graduate courses are offered in fisheries. There is a large collection of reprints received before 1983, maps, some transparencies and a growing collection of photographs and microfiches; all are used extensively by the staff of NARA. Newspaper clippings on all NARA activities and on marine affairs in general are collected and arranged by subject, chronologically in files. There is a separate index for newspaper clippings which has proven to be very useful to the NARA staff for retrieving not yet published information relevant to their work. "Ship breaking" and "Law of the Sea" are two examples of the topics for which useful information has been gleaned from this collection of newspaper clippings.

A colour coded card catalogue, termed "AQUAINDEX" offers author, title and subject access for books, subject access only to periodical articles, FAO reports, reprints and pamphlets, all interfiled in one alphabetical sequence. These are assigned a subject heading, sometimes indexed under a number of headings from the *FAO Aquatic Science and Fisheries Information Service Thesaurus*.

Library services include circulation and loans, reference and information, and current-literature alert service and literature searches to NARA staff. Reference and information facilities are available to university students, researchers, various national and regional organizations actively engaged in fisheries and marine affairs. Photocopies are supplied at a nominal charge. Inter-library loan facilities operate with other libraries by post. We also take part in a unique system of exchange of contents pages termed AGRINET/SDCP Service. There is a network of agricultural libraries in Sri Lanka which exchange contents pages of periodicals on SDI basis. Researchers identify their interests and libraries in the network facilitate exchange of the contents pages.

PUBLICATIONS

All editorial work connected with the publications, from the library as well as the Agency are handled by the library staff. We have at present:

a) **Serial list** which records the holdings of NARA Library and the **Accession List** which is a bibliostyled quarterly list of newly acquired books, serials, technical reports, reprints and pamphlets. These are circulated only to the NARA staff.

b) A **current awareness bulletin** entitled *From the Aquaindex of the NARA Library*. It contains bibliographical information on all articles of interest from materials received in the library except from books that

were indexed for AQUAINDEX for that quarter. It is now circulated among 30 technical libraries in Sri Lanka and judging by the numerous requests for photocopies of articles listed, it is very well received. This is the only service of this kind available in Sri Lanka with this subject coverage.

Five more publications, namely the *Journal of the National Aquatic Resources Agency*, the *Occasional Papers*, Technical Reports, Special Publications and a news letter collected *Aqualanka* have just commenced publication. Of this the first issue of the Journal is in-press. This account is of the only library in Sri Lanka covering all aspects of marine affairs.

There is a proposal to set up a National Aquatic Resources & Marine Affairs Information Programme with NARA Library as the nucleus. This would have essentially three components. The library, a documentation and publication unit which would be responsible for acquisition and reference. The Documentation Centre would process and package the material received in the library and disseminate to the prospective users who will be the researchers, the university students, government bodies such as the Department of Coast Conservation, Environmental Authority, Water Resources Board, the extension workers and industrialists such as the shell fish exporters, ornamental fish exporters, boat builders, the growing number of aquaculturists and soon we hope the pearl culturists.

The outputs from the Documentation units, the NARA Journal and the other publications which disseminate the research done at NARA will be handed over for editing, layout, and printing to the Publications Unit.

The above is one part of our information programme planned for NARA. It will cover the bibliographical information. But in marine affairs, data and statistics play an equal role and therefore we will set up a data base as well. This data base would be the responsibility of the already existing "Statistics and Data Processing Division" DATA BASE. It will be different from the ones described as "REG-TUNA" and "BOB-FIN", in that this data base will not only cover fisheries statistics but would include hydrographic, oceanographic and even meteorological data. We have just acquired a research vessel equipped for oceanographic surveys. We need to be prepared for the data which will be collected by our oceanographers on their maiden survey at the end of November, this year. They will be exploring the sea mount located at the southern end of the island.

This comprehensive data base will be set up at NARA as soon as a computer has been acquired, which I believe is scheduled after the first of the year. Due to the fact that fisheries are now well covered by existing information systems we plan to emphasize coastal ecosystems, hydrography and oceanography. A lot of data on coastal ecosystems was collected by researchers over the past fifty years at the now

defunct Fisheries Research Station. Unfortunately this data was not documented. There are only references to the data in articles appearing in the former *Bulletin of the Fisheries Research Station*. The result is that a very valuable baseline study has been lost and we must resurvey our coastal resources. The numerous requests from entrepreneurs for resource maps for particular species of sharks and other information has initiated an urgent need of a data base.

Statistics on location, extent and species in any ecosystem such as corals or mangroves will all be included in the data base. We hope to include data on biological and chemical oceanography; primary production, plankton, salinity and related physico-chemical parameters. Also included should be the physical oceanography data and statistics such as temperature, depth measurement, currents, tides, etc.

A very sad state of affairs prevailing in Sri Lanka is that we have no knowledge of the near shore areas. The only thing we have are Admiralty charts which were produced 100 years ago. What is even sadder is that whenever we need these they have to be purchased from the United Kingdom.

Hydrographic surveys have been done in the past hundred years but again the documentation was neglected and we are forced to start all over again. I understand that the Port Commission, the earlier Port Authority and the Fisheries Harbor Corporation have done their own hydrographic surveys but these are not available for reference. Surveys have been done by foreign consultants but again the data and charts are not available for reference or the data has been lost. We hope to include in the data base at NARA all these hydrographic data including navigational paths. Even archeological data such as shipwrecks are to be included. After all the data has been entered, we hope to correlate the bathometric parameters with availability of resources. Charts and maps are planned outputs from this data base.

When this data base is fully operational NARA would be able to offer an all around information system covering all aspects of aquatic resource and marine affairs, both statistical and bibliographic, in Sri Lanka. It is hoped that an information programme of this magnitude will initiate more effective research and develop technologies that could unlock Sri Lanka's vast aquatic resources.