

**An Assessment of Information Resources in Marine Sciences in India,\***  
(Information System 19).

V S Bhatt, *Indian National Oceanographic Data Centre, Planning and Data Division, National Institute of Oceanography, Goa-403 004.*

[Reports the findings of a survey of the Marine Institutional Information Resources/Services in India. Questionnaire method has been adopted for the collection of information. Suggests the establishment of a full-fledged National Oceanographic Information Centre having linkage with Inter-governmental Oceanographic Commission and World Data Centres.]

### 1 Introduction

Information system plays a significant role in the advancement of science and technology. The future growth and development of marine science and technology in a country depends upon the effective flow of data/information from the generators and collectors to various types of users (3). Thus, it is necessary that the management of information resources and development of information systems go hand in hand with the development of science and technology.

Recently the Department of Science and Technology, Government of India, has indicated the need for a planned development of the National Information System for Science and Technology (NISSAT) in the Science and Technology Plan (2). The future development of Marine Information System should also form a part of the programme envisaged in the NISSAT.

In India, marine information resources, are spread over many different institutions and organizations. The present paper is an attempt (i) to make an assessment of these institutional resources and their information services and (ii) to locate the gaps and suggest ways and means to fill in these gaps.

A proforma (Appendix 1) developed by the Indian National Scientific Documentation Centre (INSDOC), New Delhi was used for this survey. In all, 68 different agencies including Central and State Government Departments, autonomous bodies and universities having courses in marine sciences were requested to complete and return the proforma. About 40 organizations responded. The information received from these organizations was processed to determine the information resource and services available with them during 1975-76.

### 2 Existing Information Resources and Information Generators

Marine Science in some developed nations is perhaps the third largest science after atomic energy

and space research (4). It will also be true for India if one takes into account the total number of persons engaged in different organizations connected with marine sciences including fisheries. In India there are about 80 establishments belonging to 68 organizations (Appendix 2) dealing with marine sciences in one form or the other and are located mainly along the east and west coasts of India (Fig. 1). From the nature of the work undertaken by different organizations, their activities can broadly be grouped into eleven categories (Table I and Fig. 2). However, such a classification is arbitrary as some of these institutions deal with two or more subjects. The graphical presentation of the staff engaged in marine research (Fig. 3), library facilities (Fig. 4), information services (Fig. 6) and reprographic services (Fig. 7) available in the major institutions from each category are collectively shown in Table II. The age and date of the establishment of these organizations is given in Fig. 5.

#### 2A FISHERY SCIENCE AND FISHERY MANAGEMENT

There are about 14 organizations under this category dealing with fishery science, survey and management (Appendix 2-01). The major Institute in this category is the Central Marine Fisheries Research Institute (CMFRI), Cochin, which, with a network of survey centres (1) spreads all along the Indian coastline including Andamans and Laccadives, collects and maintains data on fish landings. The Institute has 209 scientific staff engaged in research on different aspects of fishery sciences, mariculture and biological oceanography.

There are three other organizations engaged in the survey of fishery resources. These are Exploratory Fisheries Project in Bombay and Integrated Fisheries Project and Pelagic Fisheries Project, both in Cochin. These projects are good sources of information.

All the maritime States such as Gujarat, Maharashtra, Goa, Karnataka, Kerala on the west coast and Tamil Nadu, Andhra Pradesh, Orissa and West Bengal on the east coast have their own Directorates or Departments of Fisheries responsible for fishery

\* Paper presented at the U.S.-India Seminar on Information Resources in Energy, Environment and Natural Resources, Washington, D. C., 13-16 October 1976.

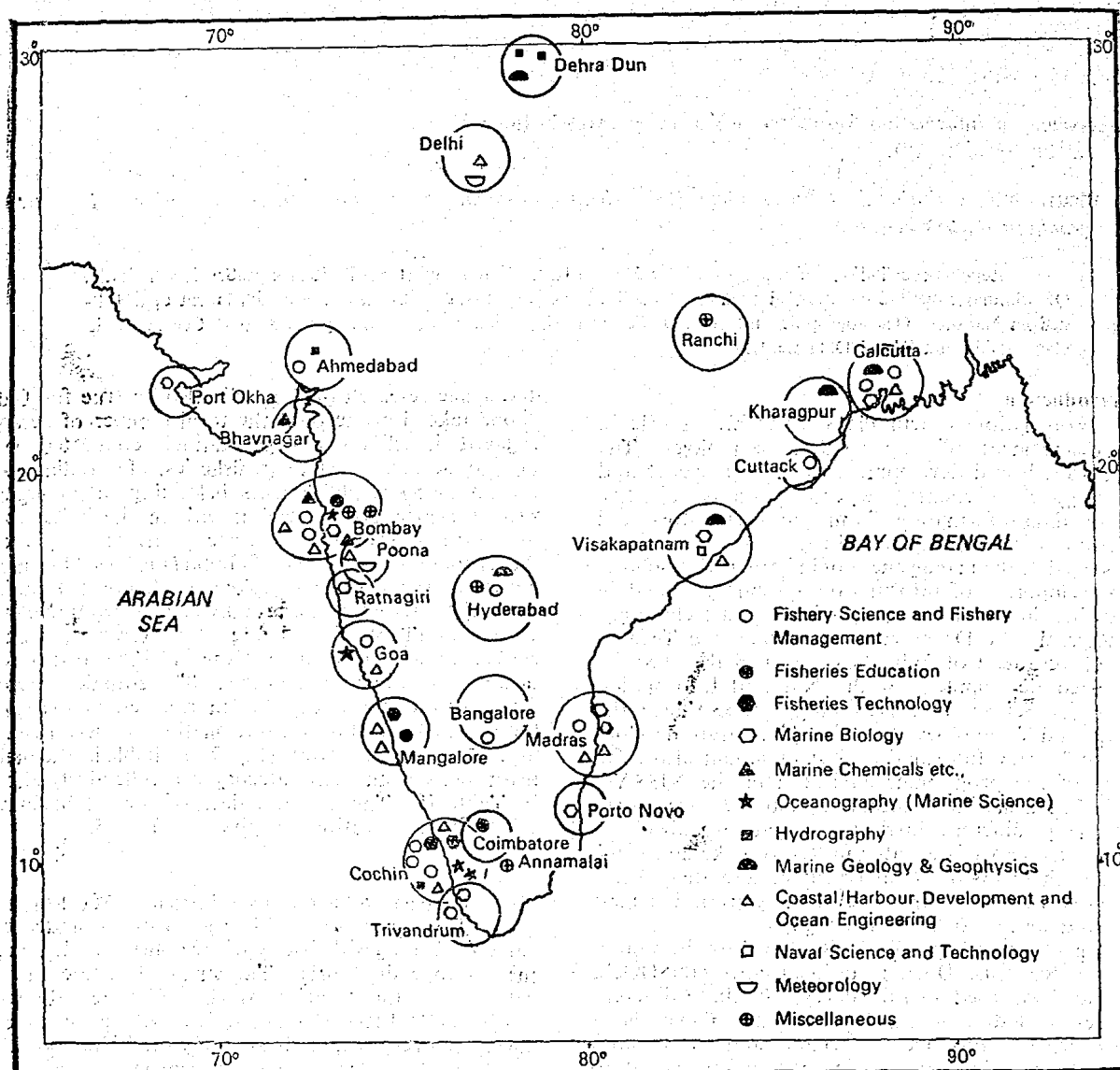


Fig. 1 Location of Institutions/Organisations engaged in different categories of activities in Marine Science and Technology in India

management. Some of these Directorates have fairly well organized laboratories for research and there is a growing trend towards the development of more such laboratories in other States. The Department of Fisheries, Government of Maharashtra, has a good research laboratory with about 30 persons involved in marine biological problems. All such Directorates form a good source of various types of data and information on important findings on landings of fisheries in different States.

## 2B FISHERIES EDUCATION

There are four organizations connected with fisheries education (Appendix 2.02). Of these, the major institutions are : College of Fisheries, Mangalore, which is having 45 staff members devoted to the teaching of fishery science, fish technology, aquaculture, oceanography etc., at the post-graduate level and Central Institute of Fisheries Education (CIFE), Bombay which is a Government Institute responsible for training fisheries officers from the various Indian

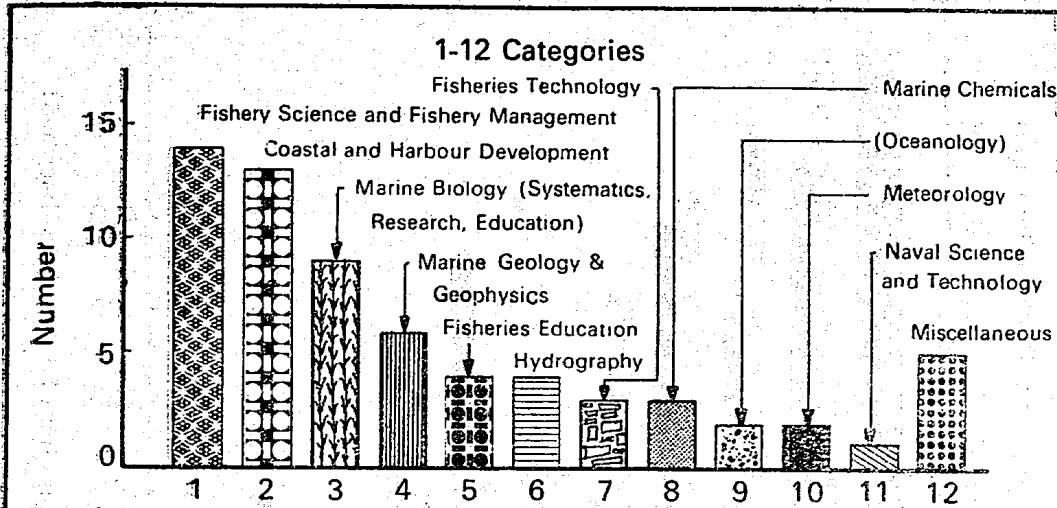


Fig 2 Number of Institutions/Organisations in different categories of activities in Marine Science and Technology in India

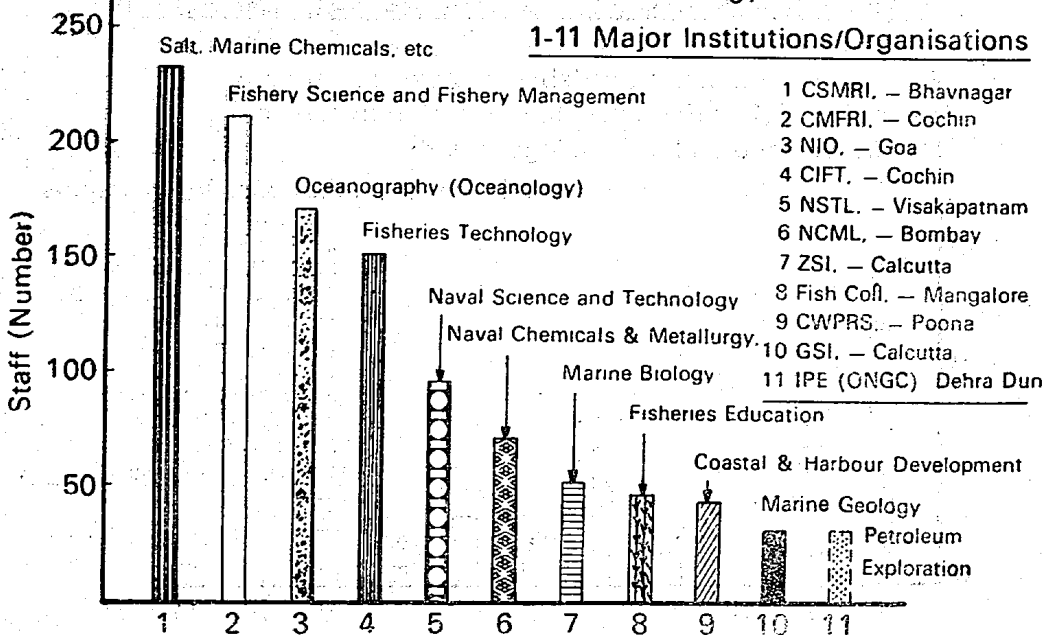


Fig 3 Staff engaged in Marine research in Major Institutions belonging to 11 different categories of activities in Marine Science and Technology in India

States. The Institute has several other smaller training centres and also has a good library with about 10,000 books and 130 subscribed journals. These Institutes are largely devoted to teaching. However, the staff are also undertaking some research work. Thus, these institutions could be classified as users as well as generators of information.

2C FISHERIES TECHNOLOGY

Under this category, there are three institutions (Appendix 2.03). The Central Institute of Fisheries Technology (CIFT), Cochin, is the major institution having about 148 staff engaged in craft and gear and processing technology. The Institute has several extension units spread all over the east

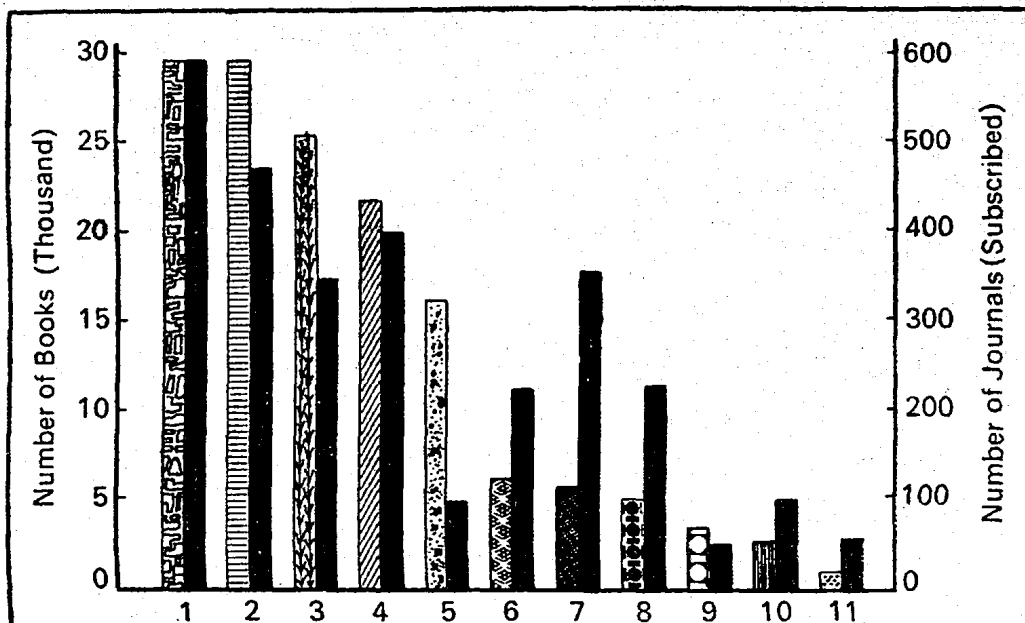


Fig. 4 Books and Periodicals available in Major Institutions belonging to 11 different categories of activities in Marine Science and Technology in India

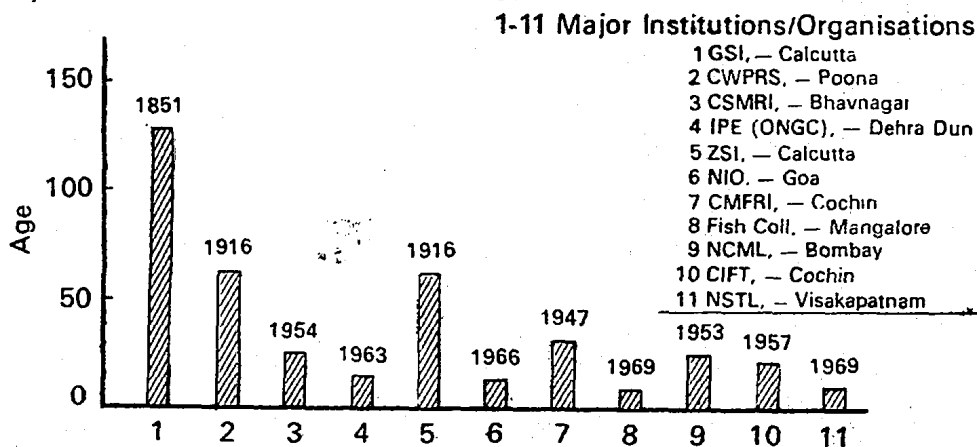


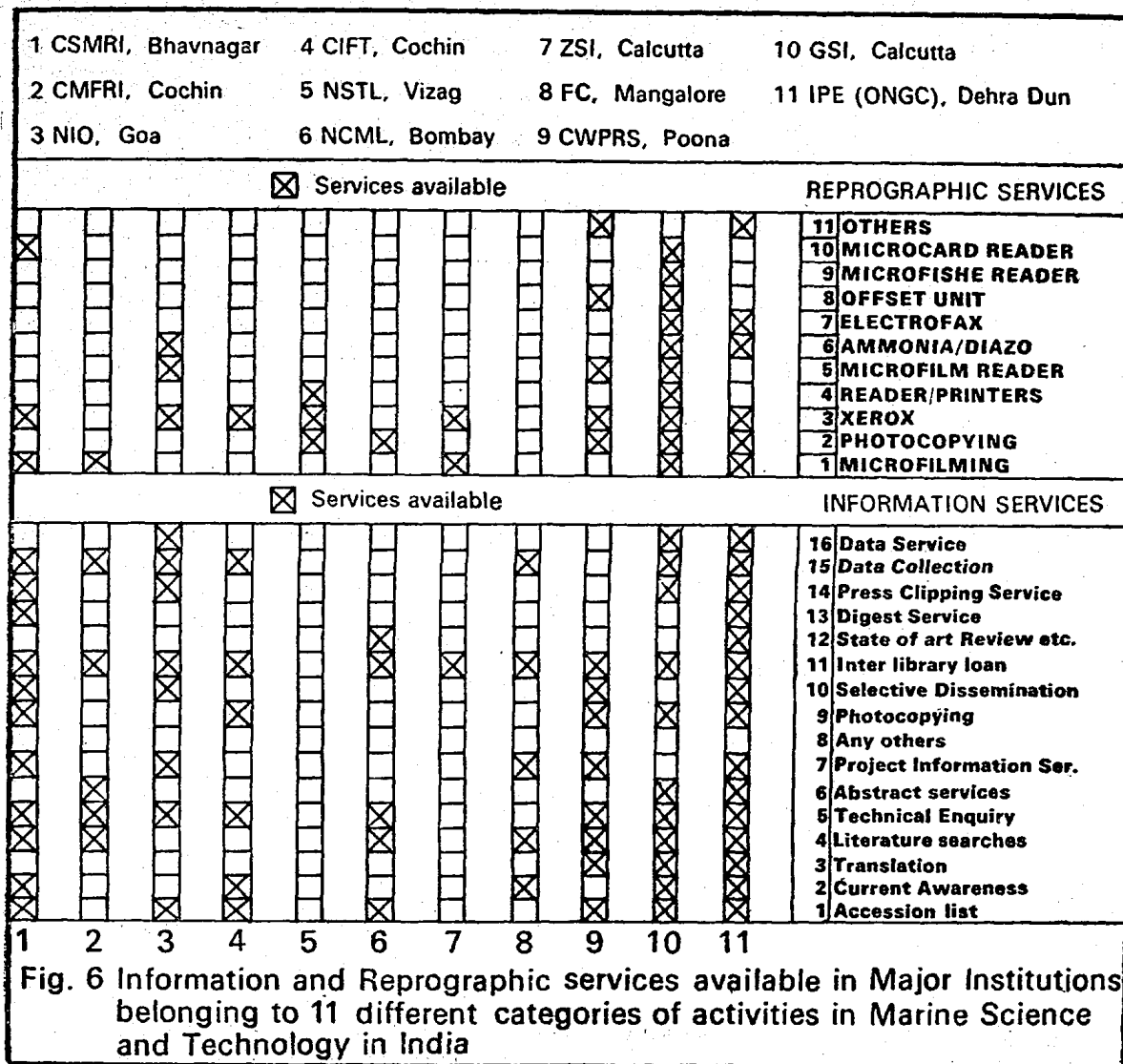
Fig. 5 Age and date of establishment of Major Institutions belonging to 11 different categories of activities in Marine Science and Technology in India

and west coasts of India. Other institutions in this group are Fisheries Technological Research Station, Malpe and Central Institute of Fisheries Operatives, Cochin. The latter is responsible for training the staff deputed by the various states in fishing operation, navigation, etc.

These institutes provide technological information and also produce non-conventional literature in their specialized subjects.

## 2D MARINE BIOLOGY

There are about nine institutions under this category (Appendix 2.04). Seven of these are engaged



in teaching and research while the remaining two are engaged only in research. The Zoological Survey of India, Calcutta, is the major organization of this group and has about 50 staff members working on the systematics of marine flora and fauna. Other important institutes are (1) Centre of Advanced Study in Marine Biology at Porto Novo and, (2) Department of Aquatic Biology and Fisheries Aquarium, Trivandrum. Both are teaching-cum-research institutes and have good libraries. The Institute of Science, Bombay has no organized Department for Marine Biology, although teachers and research scholars from the departments of Zoology and Botany frequently undertake research related to marine biology and have made

a significant contribution in their field of interest from time to time.

#### 2E MARINE CHEMICALS

Three institutions fall in this category (Appendix 2.05). The Central Salt and Marine Chemicals Research Institute (CSMCRI), Bhavnagar, is the major institution having about 230 scientific and technical staff engaged in research on various problems connected with salt and marine chemicals, marine algae, sea water irriculture, desalination, corrosion, etc. By and large, the activities of this Institute are oriented towards the development of processes for marine based industries. The next large laboratory is the Naval

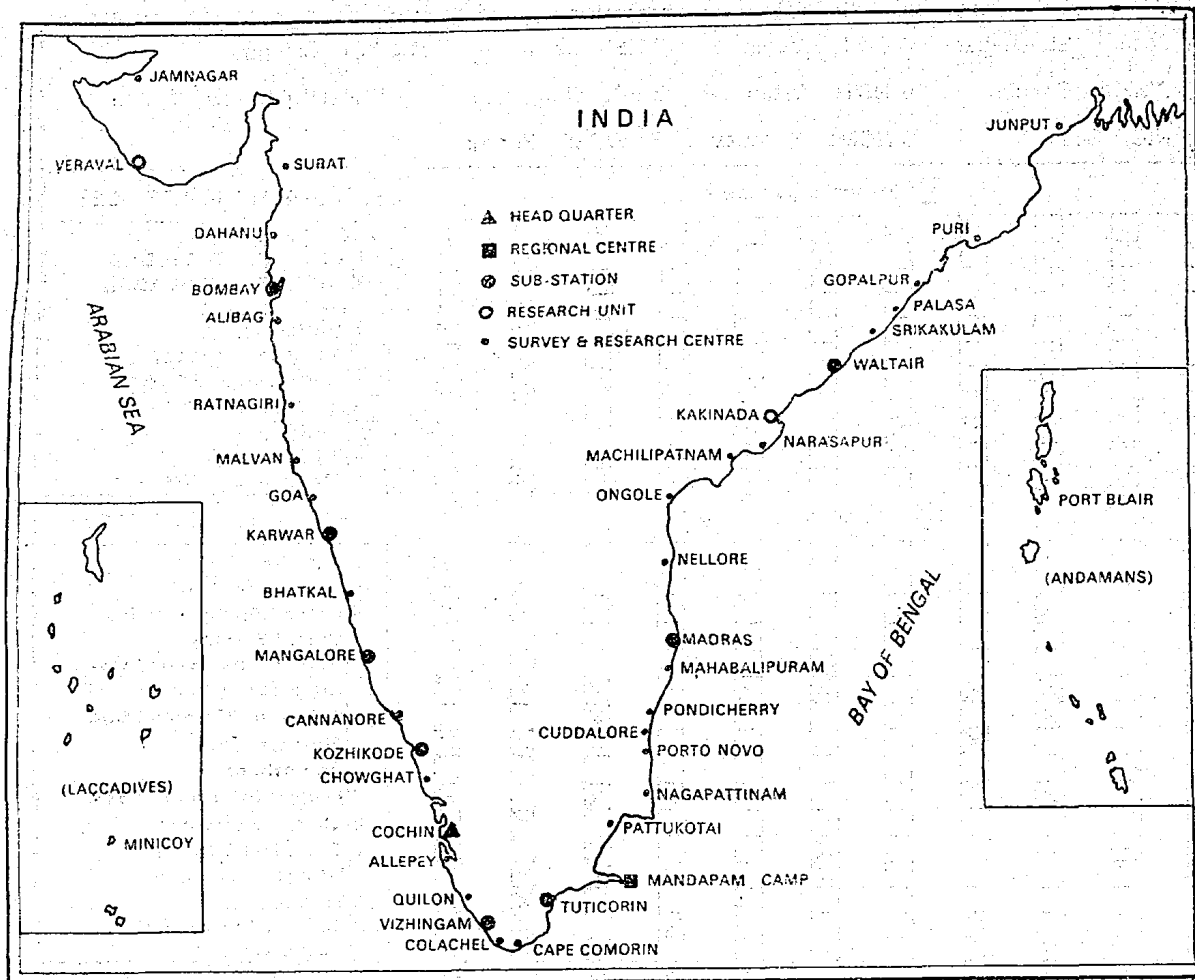


Fig. 7 Location of CMFRI Headquarter and Subordinate Establishments

Chemical and Metallurgical Laboratory (NCML), Bombay, which has about 70 persons working on the problems connected with marine corrosion, marine paints, metallurgy, marine biology and allied subjects. The third organization, the Bhabha Atomic Research Centre (BARC), Bombay, is a very large organization. It has a Chemical Group under the Health Physics Division working on radio-active waste problems in the sea and their effect on marine animals.

## 2F OCEANOGRAPHY

There are only two organizations which can be included under this group (Appendix 2.06). The National Institute of Oceanography (NIO), Goa, is the only Institute which has a multidisciplinary approach to marine sciences. Physical oceanography, chemical oceanography, biological oceanography, geology and geophysics, marine instrumentation, ocean engineer-

ing, etc., are the different fields being studied under separate Divisions. Oceanographic Data and Information have also been organized in a separate Division. The Institute has an oceanographic research vessel *Gaveshani*. It has about 168 scientific staff. The Institute has an Indian National Oceanographic Data Centre which is at present the main source of oceanographic data and information pertaining to the Indian Ocean.

The Institute is currently engaged in an important work under the United Nations Environment Programme (UNEP) on marine pollution monitoring and assessment of living resources. A status report on the institutional capabilities on monitoring pollutants in different South-East Asian countries bordering the Indian Ocean has already been completed.

Another organization developing on similar lines but largely for teaching purpose is the Department of

TABLE 1. NUMBER OF ORGANIZATIONS/INSTITUTIONS IN DIFFERENT CATEGORIES OF ACTIVITIES IN MARINE SCIENCE AND TECHNOLOGY IN INDIA

Broad Categories	Number of Organizations
1. Fishery Science and Fishery Management	14
2. Fisheries Education	04
3. Fisheries Technology	03
4. Marine Biology (Systematics, Research, Education)	09
5. Marine Chemicals	03
6. Oceanography (Marine Sciences)	02
7. Hydrography	04
8. Marine Geology and Geophysics	05
9. Coastal/Harbour Development and Ocean Engineering	16
10. Naval Science and Technology	01
11. Meteorology	02
12. Miscellaneous	05
<b>TOTAL</b>	<b>= 68</b>

Marine Sciences, University of Cochin. This department is at present in a growing phase.

2G HYDROGRAPHY

There are four organizations included in this category (Appendix 2.07). Two of these belong to the Indian Navy and third is the Survey of India. These organizations have their main interest in hydrography and physical aspects of the sea. The first two are good users of oceanographic data. The third one produces the tide tables. The Physical Research Laboratory, Ahmedabad is also interested in some aspect of physical oceanography.

2H MARINE GEOLOGY AND GEOPHYSICS

There are five organizations included in this category (Appendix 2.08). The Geological Survey of India, Calcutta, is the largest organization having over 2,000 scientific and technical officers engaged in the survey of mineral resources on land. Its Off-shore Mineral Exploration and Marine Geology Division has about 30 scientific staff working on marine resources.

The Institute of Petroleum Exploration (IPE), Dehra Dun, of the Oil and Natural Gas Commission is another large organization with about 400 scientific and technical staff engaged on the problems of petroleum exploration. The number of persons working on marine geology and geophysical problems is not known separately.

The National Geophysical Research Institute (NGRI), Hyderabad, has about 6 scientists working on marine geophysical problems. Similarly, the Indian Institute of Technology, Kharagpur, has about 6 scientists and the Department of Geology of the Andhra University has about 10 scientists working on

the marine geological problems. These organizations constitute an important source of geological and geophysical information.

2I COASTAL/HARBOUR DEVELOPMENT AND OCEAN ENGINEERING

There are about 16 organizations including engineering colleges and port trusts for research and development in the field of coastal and ocean engineering problems (Appendix 2.09). Of these, the Central Water and Power Research Station (CWPRS), Khadakwasla, is the largest organization having about 42 staff members working on the problems of coastal and harbour development, maritime structures, tidal hydraulics, etc.

Karnataka Regional Engineering College, Suratkal, is the next important centre for coastal engineering research and development and has about 20 engineering staff working on problems in this subject.

The Engineers India Ltd., New Delhi, undertakes consultancy work.

The Indian Institute of Technology (IIT) in Bombay and Madras also have small groups dealing with coastal engineering problems.

Besides these, there are about 10 major port trusts located along the east and west coasts of India which are the main users of expertise available in coastal engineering and harbour development.

2J NAVAL SCIENCE AND TECHNOLOGY

Naval Science and Technological Laboratory, Visakhapatnam, is the only organization dealing with this subject (Appendix 2.10). It has over 80 scientific and technical staff for R and D work in the subject field. This laboratory is one of the important users of oceanographic information.

2K METEOROLOGY

Indian Meteorological Department, New Delhi, and Indian Institute of Tropical Meteorology, Poona, are the two major organizations dealing with marine meteorology (Appendix 2.11). The former is the most important service organization dealing with meteorological data and weather forecasting. The latter is engaged in researches related to the prediction of monsoon and other weather problems.

2L MISCELLANEOUS

There are several other organizations having interest in marine science and technology (Appendix 2.12). These organizations have one or two staff members trained in marine sciences. In India, there may be many more such organizations, university departments, etc., where one or two marine scientists are working on some problems related to marine sciences. These organizations are the users of oceanographic data and information.

TABLE II. MAJOR\*\* INSTITUTIONS ENGAGED IN DIFFERENT AREAS OF MARINE SCIENCE AND TECHNOLOGY IN INDIA AND THE INFORMATION FACILITIES AVAILABLE WITH THEM

SN	Name of Major Institutes	Major Areas of Interest	Staff engaged in Marine Research	Library Facilities			Information <sup>1</sup> Services Types and (total)	Reprographic <sup>2</sup> Services Types and (total)
				Books Number	Journals Number	Trained Staff		
1.	Central Salt and Marine Chemicals Research Institute, Bhavnagar (Estd. 1954)	Salt and Chemicals	230	26,238	350	2	1, 2, 4, 5, 7, 8, 9, 10, 11, 13, 14, 15 = 12	1, 3, 5, 10 = 4
2.	Central Marine Fisheries Research Institute, Cochin (Estd. 1947)	Marine Fisheries	209	5,600	360	2	4, 5, 6, 11, 15 = 5	1 = 1
3.	National Institute of Oceanography, Goa (Estd. 1966)	Oceanology	168	6,000	250	2	1, 5, 7, 10, 11 = 8	3, 5, 6 = 3
4.	Central Institute of Fisheries Technology, Cochin (Estd. 1957)	Fisheries Technology	148	2,617	101	2	1, 2, 5, 9, 15 = 6	11, 3 = 1
5.	Naval Science and Technological Laboratory, Visakhapatnam (Estd. 1969)	Naval Science and Technology	83	886	63	1	..	2, 3, 6 = 3
6.	Naval Chemical and Metallurgical Laboratory (NCML), Bombay (Estd. 1953)	Chemicals and Metallurgy	70	3,500	50	3	1, 4, 5, 11, 12 = 5	2 = 1
7.	Zoological Survey of India, Calcutta (Estd. 1916)	Marine Biology (Systematics)	50	15,584*	..	..	11 = 1	1, 3 = 2
8.	Fisheries College, Mangalore (Estd. 1969)	Fisheries Education	45	4,923	230	2	2, 5, 7, 11, 15 = 5	..
9.	Central Water and Power Research Station, Poona (Estd. 1916)	Coastal and Harbour Development	42	59,000*	475*	3	1, 3, 4, 5, 7, 9, 10, 11 = 9	2, 3, 5, 8, 11 = 5
10.	Geological Survey of India, Calcutta (Estd. 1851)	Marine Geology	30	3,80,000	1,400*	20	1, 2, 3, 4, 5, 6, 9, 11, 14, 15, 16 = 11	1, 2, 3, 4, 5, 6, 7, 8, 9, 10 = 10
11.	Institute of Petroleum Exploration (ONGC), Dehra Dun	Petroleum Exploration	402*	22,000*	405*	3	1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16 = 15	1, 2, 3, 6, 7, 11 = 6

\*\* Major — based on their strength of the staff engaged in marine research.

\* Total — only a part of which is devoted to Marine Sciences.

<sup>1</sup>Key to Information Services

- (1) Accession List
- (2) Current Awareness
- (3) Translation
- (4) Literature Searches
- (5) Technical Enquiries
- (6) Abstract Services
- (7) Project Information Services
- (8) Any other
- (9) Photocopying
- (10) Selective Dissemination of Information
- (11) Inter-library Loan
- (12) State of Art, Review etc.
- (13) Digest Service
- (14) Press Clipping Service
- (15) Data Collections
- (16) Data Service.

<sup>2</sup>Key to Reprographic Services

- (1) Microfilming
- (2) Photocopying
- (3) Xerox
- (4) Reader Printers
- (5) Microfilm Reader
- (6) Ammonia/Diazo
- (7) Electrofax
- (8) Offset Unit
- (9) Microfiche Reader
- (10) Microcard Reader
- (11) Others



### 3 Library Facilities

Library facilities including books and journals, available in different institutes/organizations, are given in Appendix 2.01-2.12. Information about major institutions representing each category is given in Table II and Fig. 4. Under Fishery Science and Fishery Management, the CMFRI, Cochin, has the largest library with a collection of about 5,600 books and receives 360 journals. The rest of the organizations in this group are having limited library facilities.

In the category Fisheries Education, the CIFE, Bombay, has a collection of 10,000 books and receives 130 journals. College of Fisheries, Mangalore, has a collection of about 5,000 books and receives 230 journals.

In Fisheries Technology, the CIFT, Cochin, has a library of about 2,600 books and receives 101 journals. All other organizations have far less number of books and journals.

In Marine Biology, excepting one or two, the library facilities in most of the organizations are of a limited nature (see Appendix 2.04).

In Marine Chemicals, the library of CSMCRI, Bhavnagar, has a good collection of over 26,000 books and receives 350 journals. Others have limited facilities.

The National Institute of Oceanography has a collection of 6,000 books and receives 250 journals. The Department of Marine Sciences of Cochin University also has a fairly good collection of books and journals.

The organizations grouped under 'Hydrography' have limited library facility more or less specific to their needs.

The libraries of GSI, Calcutta, IPE, Dehra Dun and NGRI, Hyderabad are very large but their relevance to marine geology and geophysics appears to be of a limited nature.

The Central Water and Power Research Station (CWPRS) and Karnataka Regional Engineering College have fairly good libraries. Engineers India Ltd. and Kerala Engineering Research Institute also have useful collection of books and journals. The other organizations under this group, perhaps being mostly the users, do not have sizeable libraries.

### 4 Information Services

Appendices 2.01-2.12 give details of information services available in the different institutions. Further details regarding 11 major institutions under different categories are given in Table II. According to the analysis of about 40 institutions/organizations which provided necessary information on services, the common services the Accession List and Inter-library Loan are offered by about 40-45 per cent of the institutes. The following table gives the number and percentage of institutions offering different types of information services in India.

Information service	Number of Institutions offering the service	Percentage (approx.)
1. Accession List	16	40
2. Current awareness	10	25
3. Translation	6	15
4. Literature searches	11	27
5. Technical enquiries	14	37
6. Abstract service	6	15
7. Project information	5	12
8. Selective dissemination	7	17
9. Inter-library loan	18	45
10. State-of-art, review, etc.	4	10
11. Digest service	4	10
12. Press clipping service	7	17
13. Data collections	11	27
14. Data service	7	17
15. Photocopying	17	42
16. Others	3	7

### 5 Reprographic Services

The availability of reprographic services in the organizations under report is given in Appendices 2.01-2.12. The details about the selected services representing 11 different categories is given in Table II and illustrated in Fig. 7. The following table gives the number and percentage of institutions offering different types of reprographic services.

Reprographic services	Number of institutions offering the service	Percentage (approx.)
1. Microfilming	10	25
2. Photocopying	17	42
3. Xerox	17	42
4. Reader-print	3	7
5. Microfilm reader	17	42
6. Ammonia/Diazo	16	40
7. Electrofax	3	7
8. Offset unit	4	10
9. Microfiche reader	4	10
10. Microcard reader	7	17
11. Others	3	7

All the 11 major institutions of different categories provide limited services. In most of the institutions

trained library staff are few. On an average in all the 11 major institutions/organizations, only 2-3 trained staff are available for information work. The library of the Geological Survey of India, Calcutta, is the only organization which has about 20 trained staff. However, their service on marine resources is limited.

The National Institute of Oceanography, Goa, has 2 trained staff in the library and 11 scientific and technical hands responsible for the work of oceanographic data and information including planning and publications. Much attention has been given during the last two years to organize information and data activity at the Institute.

### 6 National Facility for Oceanographic Data

The Indian National Oceanographic Data Centre, located at the National Institute of Oceanography, Goa, acts as a national facility for acquisition, processing and dissemination of different types of data and information pertaining to the Indian Ocean Region.

The Data Centre works in close co-operation with the World Data Centres A and B (Washington and Moscow) and participates in the activities of the Inter-governmental Oceanographic Commission (IOC) and its Working Committee for International Oceanographic Data Exchange (IODE). The Centre is taking a deep interest in the activities of the FAO/IOC sponsored Aquatic Sciences and Fisheries Information System (ASFIS) which is developing an international information system for Marine Sciences and Technology.

The Centre is also participating in the activities of the IOC in Marine Environmental Data and Information Referral System (MEDI) and Marine Information Management (MIM).

The Centre has started collaboration with the French Oceanographic Data Centre (COB) and German Oceanographic Data Centre (DOD), and hopes to collaborate with other data centres of the world in the near future.

### 7 Need for Development

From a general overview of the findings of the survey of information resources and services available in different institutions/organizations, it would appear that except in a few, library facilities are inadequate. The information and reprographic services need to be augmented in terms of equipment, facilities and operating personnel.

While the Indian National Oceanographic Data Centre has been declared as a national facility for oceanographic data, it is short of an adequate system for the effective acquisition of oceanographic data from all the national sources. Information about the priority needs of the user community at the national level is not available. Specialized information services have to be developed.

### 8 Suggestions

1. *National Oceanographic Information Centre*: Oceanographic Data and Information Services should go hand in hand as they are dependent on each other. Indian National Oceanographic Data Centre should also be declared as a National Oceanographic Information Centre for the Indian Ocean Region as it will help in maximizing the utilization of facilities.

2. *Indian National Committee for Oceanographic Data and Information Service*: A National Committee represented by information scientists from major institutions dealing with marine sciences and technology be constituted to formulate policies and to review the needs from time to time for the management of oceanographic data and information.

3. *Proportional Budget Provision*: A reasonable percentage of the total national budget allocated for the development of marine science and technology be earmarked for the Indian National Oceanographic Data and Information Service on an annual basis.

4. *More Co-operation*: Facilities for acquisition, processing, storage and dissemination of oceanographic data and information should be developed and further co-operation from the national and international agencies generating oceanographic data should be developed.

5. *Linkage with Inter-governmental Oceanographic Commission and World Data Centres*: All oceanographic data should be stored on internationally approved formats as per the recommendations of the IOC Working Committee for International Oceanographic Data Exchange. Co-operation from World Data Centres A and B and leading National Oceanographic Data Centres should be obtained to evolve effective methods for processing, storage and dissemination of oceanographic data.

6. *Coastal Data*: Special arrangements for processing and storage of coastal data, specially on waves, currents and other physical parameters and geological and geophysical parameters should be made because these data are in greater demand by agencies dealing with coastal problems.

7. *Co-operation with ASFIS*: All efforts should be made to co-operate with the FAO/IOC activities on Aquatic Sciences and Fisheries Information System (ASFIS) as the ASFIS is supposed to cater to the information needs of the entire user community representing marine science and technology.

8. *Survey of User Community*: A survey of the user community on its specific needs has to be made at the national level with a view to developing proper facilities as per their requirements.

9. *Selected Information Services*: Selected information services based on the needs of the user community should be developed with the assistance of the experts. Specialized user agencies should be involved in the development of these services.

10. *Non-conventional Literature* : Besides conventional sources of literature, the non-conventional sources of information should be procured from different agencies generating this type of literature. The information should be processed, abstracted and disseminated to the user community.

11. *Indo-US Co-operation* : A collaboration with the US National Oceanographic Data Centre (NODC), Washington, Environmental Science Information Centre (ESIC), Washington, needs to be established for the development of oceanographic data and information services in India.

12. *Overall Development under NISSAT* : The Data and Information Centre should function in conformity with the standards and recommendations being developed in India under the National Information System for Science and Technology (NISSAT) laid down in the Indian Science and Technology Plan.

The present paper is very selective and it is quite likely that some important sources might have been omitted or are not adequately covered. There is need for further effort to make a detailed assessment of the information resources available in India.

**91 Acknowledgements**

I am grateful to Dr. S. Z. Qasim, Director, NIO for encouragement and for his many suggestions in the preparation of this paper. I also wish

to thank Shri S. P. Sharma for his help in the collection of data, to Shri S. R. Bhat for his help in tabulation of information, to Shri Wahidulla for the preparation of drawings and to Shri S. A. Fonseca for secretarial assistance.

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**93 Annexure**

**93 Appendix 1**

**QUESTIONNAIRE**

1. Name of the Institute/Organization :
2. Nature of Management :
  - ( ) Government ( ) Semi-Government ( ) Autonomous
  - ( ) Coop-Res. Association ( ) Industrial
3. Address :
  - Telegraphic Address :
4. Name of Director/Incharge of Marine Science Group :
  - Telephone :
5. Established in :
6. Annual Budget :
7. Strength of staff engaged in Marine Science Research Work :
8. Divisions/Field Stations and their Heads :
9. Brief History of the Institute :
10. Special Facilities available (Training, instrument, consultancy, etc.) :
11. Publications :
  - Periodicals :
  - Reports :
12. List of papers published in the field of Marine Science :
  - (Separate sheet may be attached if space is not sufficient)
13. Strength of Library Collection :
  - (i) No. of books
  - (ii) No. of current periodicals
  - (iii) No. of trained staff
14. Services offered :
  - ( ) Accession List ( ) Photocopying
  - ( ) Current Awareness ( ) Selective dissemination of information
  - ( ) Translation ( ) Inter-library loan
  - ( ) Literature Searches ( ) State of Art, Review, etc.
  - ( ) Technical enquiries ( ) Digest Service
  - ( ) Abstract service ( ) Press Clipping Service
  - ( ) Project information service ( ) Data Collections
  - ( ) Any other (give details) ( ) Data Service

15. Do you provide these services to other organizations? If yes, give the details of charges thereof.
16. What reprographic services are available?
- |   |  |
|---|--|
| <input type="checkbox"/> Microfilming     | <input type="checkbox"/> Ammonia/Diazo     |
| <input type="checkbox"/> Photocopying     | <input type="checkbox"/> Electrofax        |
| <input type="checkbox"/> Xerox            | <input type="checkbox"/> Offset Unit       |
| <input type="checkbox"/> Reader Printer   | <input type="checkbox"/> Microfiche Reader |
| <input type="checkbox"/> Microfilm Reader | <input type="checkbox"/> Microcord Reader  |
|   | <input type="checkbox"/> Name others       |
17. What computer/unit record facilities are available?
18. What is the major foreign language covering your interest?
19. Staff (In marine science):

Please return to:

Scientist (Incharge)  
 Indian National Oceanographic Data Centre (INODC)  
 Planning and Data Division,  
 National Institute of Oceanography  
 P.O. NIO, Dona Paula, Pin 403 004,  
 Goa (INDIA).

N.B. Please enclose a list of research projects, organization chart, major publications and Annual Report.

### Appendix 2

#### INFORMATION RESOURCES OF ORGANIZATIONS DEALING WITH DIFFERENT ASPECTS OF MARINE SCIENCE AND TECHNOLOGY IN INDIA

S.N.	Organizations and their addresses	Staff engaged in Marine Research	Library Facilities			Information* Services	Reprographic* Services
			Books Number	Journals Number	Trained Staff		
<b>2.01 Fishery Science and Fishery Management:</b>							
1.	Central Marine Fisheries Research Institute (I.C.A.R.) Post Bag No. 1912, Cochin 682018	209	5600	360	2	4, 5, 6, 11, 15 = 5	1
2.	Exploratory Fisheries Project (Government of India) Botawala Chambers, Sir P.M. Road Bombay-400 001	21	..	..	--	--	--
3.	Integrated Fisheries Project Post Box No. 1801 Cochin-682016	10	..	..	--	--	--
4.	Pelagic Fishery Project Post Box No. 1791 Cochin-682016	07	..	..	..	--	..
5.	Central Inland Fisheries Research Institute, Barrackpore West Bengal	06	3500	178	2	1, 2, 4, 5, 6, 9, 10, 11 = 8	1, 2, 6 = 3
6.	Department of Fisheries Taraporawala Aquarium Bombay-400002	30	893	3508+		4, 5, 6, 11, 15 = 5	5 = 1
7.	Directorate of Fisheries State Fisheries Department Trivandrum, Kerala	20	170	14	6	10, 13, 15, 16 = 4	..
8.	Directorate of Fisheries Government of Goa, Daman and Diu Dayanand B undodkar Marg Panjim-Goa	3	410	18	..	..	--

\* Explanation to codes is given earlier after Table II.

+ Total No. of Volumes.

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SN	Organizations and their addresses	Staff engaged in Marine Research	Library Facilities			Information* Services	Repro- graphic* Services
			Books Number	Journals Number	Trained Staff		
9.	Directorate of Fisheries (Tamil Nadu) Madras-600006, Tamil Nadu	18	1900	..	..	..	..
10.	Directorate of Fisheries Government of Gujarat Ahmedabad	..	..	..	..	..	..
11.	Directorate of Fisheries Government of Karnataka Bangalore	..	..	..	..	..	..
12.	Directorate of Fisheries Government of Orissa Cuttack	..	..	..	..	..	..
13.	Directorate of Fisheries Government of West Bengal Calcutta (West Bengal)	..	..	..	..	..	..
14.	Directorate of Fisheries Government of Andhra Pradesh Hyderabad (A.P.)	..	..	..	..	..	..
2.02. Fisheries Education							
1.	Central Institute of Fisheries Education Post Box No. 7392, Kakori Camp, J.P. Road, Versova, Bombay-400058	15	19000	130	1	1, 11, 14 = 3	1
2.	College of Fisheries Mathsyanagar, Mangalore-575002 Karnataka State	45	4923	230	2	2, 5, 7, 11, 15 = 5	..
3.	Department of Fisheries Science Tamil Nadu Agricultural University Coimbatore-641003	09	..	..	..	..	..
4.	Department of Fisheries University of Calicut University Post Office 673635 Calicut, Kerala	..	..	..	..	..	..
2.03. Fisheries Technology							
1.	Central Institute of Fisheries Technology P.B. No. 1039, Chittor Road Ernakulam, Cochin-682016	148	2617	101	2	1, 2, 5, 9, 11, 15 = 6	4
2.	Fisheries Technological Research Station Malpe, Udipi Taluk (South Kanara district) Karnataka State	12	115	2	2	..	..
3.	Central Institute of Fisheries Operatives Dewan's Road, P.B. No. 1724 Ernakulam, Cochin-682016	09	850	25	1	..	2, 3, 6 = 3

SN	Organizations and their addresses	Staff engaged in Marine Research	Library Facilities			Information* Services	Repro- graphic* Services
			Books Number	Journals Number	Trained Staff		
<b>2.04. Marine Biology (Systematics, Research, Education)</b>							
1.	Zoological Survey of India 34, Chittaranjan Avenue Calcutta-700012 West Bengal	50	15584**	26000†	...	11 = <u>1</u>	1, 3 = <u>2</u>
2.	Marine Biological Research Station Department of Fisheries Port Okha	12	436	46	..	..	..
3.	Centre of Advanced Study in Marine Biology Porto Novo-608502 S.A. District (Tamil Nadu)	11	4000	40	...	1, 11, 17 = <u>3</u>	5 = <u>1</u>
4.	Marine Biological Research Station Konkan Krishi Vidyapeeth Dapoli, Ratnagiri Maharashtra	09	893	3508†	1	9 = <u>1</u>	2 = <u>1</u>
5.	Department of Zoology Andhra University Waltair Visakhapatnam-530003	06	..	..	..	..	..
6.	Department of Zoology University of Madras Madras-600005	05	..	..	..	..	..
7.	Centre of Advanced Study in Botany University of Madras Madras-600005	05	..	..	..	..	..
8.	Department of Aquatic Biology and Fisheries Aquarium University of Kerala Trivandrum-7	28	2000	25	1	1, 5 = <u>2</u>	..
9.	Institute of Science 15, Madame Cama Road Bombay-400032 Maharashtra	02	18000	150+	1	1, 2, 3, 4, 9, 11 = <u>6</u>	3, 4, 5 = <u>3</u>
<b>2.05. Marine Chemicals</b>							
1.	Central Salt and Marine Chemicals Research Institute Waghwadi Road Bhavnagar-364002	230	26238	350	2	1, 2, 4, 5, 7, 8, 9, 10, 11, 13, 14, 15 = <u>12</u>	1, 3, 5, 10 = <u>4</u>
2.	Naval Chemicals and Metallurgical Laboratory Tiger Gate, Ballard Estate Naval Dockyards Bombay-400001	70	3500	50	3	1, 4, 5, 11, 12 = <u>5</u>	2 = <u>1</u>
3.	Bhabha Atomic Research Centre Health Physics Division Trombay, Bombay-400085	10	..	..	..	1, 2, 3, 4, 5, 6, 7, 9, 10, 11, = <u>10</u>	2, 3, 5, 6 = <u>4</u>

† Total No. of Volumes.

\*\* These include books on other subjects as well.

+ Includes only a small part in marine biology.

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SN	Organizations and their addresses	Staff engaged in Marine Research	Library Facilities			Information* Services	Repro- graphic* Services
			Books Number	Journals Number	Trained Staff		
<b>2.06. Oceanology (Marine Sciences)</b>							
1.	National Institute of Oceanography Dona Paula PIN : 403004—Goa	169	6500	250	2	1, 5, 7, 9, 11, 14, 15, 16 = 8	3, 5, 6 = 3
2.	Department of Marine Sciences Ernakulam Cochin University Cochin-682016	17	5500	93	1	...	5 = 1
<b>2.07. Hydrography</b>							
1.	Naval Hydrographic Office Post Box No. 75 Dehra Dun-248001	10	200	12	..	10, 14 = 2	2, 8 = 2
2.	Naval Physical and -Oceanographic Laboratory Naval Base Cochin-682004	7	1000	12	..	9, 11 = 2	2, 3, 5, 6 = 4
3.	Surveyor General's Office Geodetic and Research Branch Survey of India Dehra Dun (U.P.)	3	150	100	2	5, 8, 11, 14, 15 = 5	1, 2, 5, 6, 11 = 5
4.	Physical Research Laboratory Navrangpur Ahmedabad-9 Gujrat	5	..	..	..	..	..
<b>2.08. Marine Geology and Geophysics</b>							
1.	Geological Survey of India Director General's Office 27, Jawaharlal Nehru Road Calcutta-700013	30	380000	1400	20	1, 2, 3, 4, 5, 6, 9, 11, 14, 15, 16 = 11	1, 2, 3, 4, 5, 6, 7, 8, 9, 10 = 10
2.	Department of Geology Andhra University Waltair Visakhapatnam-530003	10	5000	60	20	..	1, 2, 5, 6, 10 = 5
3.	Indian Institute of Technology Kharagpur-721302 West Bengal	6	100	2	..	1 = 1	3, 5, 6, 10 = 4
4.	Institute of Petroleum Exploration ONGC, Kaulagarh Road Dehra Dun	402	22000	405	3	1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16 = 15	1, 2, 3, 6, 7, 11 = 6
5.	National Geophysical Research Institute C.S.I.R. Uppal Road Hyderabad-500007	6	13335	225	5	1, 2, 3, 9, 11, 14, 15, = 6	1, 2, 3, 5, 6, 9, 10 = 7

SN	Organizations and their addresses	Staff engaged in Marine Research	Library Facilities			Information* Services	Repro- graphic* Services
			Books Numbe	Journals Number	Trained Staff		
<b>2.09. Coastal Harbour Development and Ocean Engineering</b>							
1.	Central Water and Power Research Station P.O. Khadakwasla Poona-411024	42	59000	475	3	1, 3, 4, 5, 8, 9, 10, 12, 16 = 9	2, 3, 5, 8 = 4
2.	Karnataka Regional Engineering College Suratkal P.O. Srinivasnagar-574157	20	25102	332	2	1, 4, 5, 9, 11 = 5	3, 5, 6, 9, 10 = 5
3.	Bombay Port Trust Administrative Office Building Shoorji Vallabhadras Marg, Ballard Estate Bombay-400038	11	..	..	..	..	2, 3, 6 = 3
4.	Kerala Engineering Research Institute Planning Circle Peechi, Trichur District Kerala State	8	5500	40	<u>1</u>	1 = <u>1</u>	5, 10 = 2
5.	Engineers India Limited Ocean Engineering Division Hindustan Times House Kasturba Gandhi Marg New Delhi-110001	6	8150	260	6	1, 4, 6, 9, 11, 14, 15, 16 = 8	2, 3, 6 = 3
6.	Chief Engineer and Administrator New Mangalore Port Panambur, South Karnataka-575010	6	300	15	..	..	6 = <u>1</u>
7.	Kandla Port Trust Gandhidham (Kutch) Gujarat	..	..	..	..	..	..
8.	Mormugao Port Trust Mormugao Goa	..	..	..	..	..	..
9.	Cochin Port Trust Willingdon Island Cochin-682003 Kerala	..	..	..	..	..	..
10.	Chief Engineer and Administrator Port of New Tuticorin Tuticorin Tamil Nadu	..	..	..	..	..	..
11.	Madras Port Trust Madras Tamil Nadu	..	..	..	..	..	..
12.	Visakhapatnam Port Trust Visakhapatnam Andhra Pradesh	..	..	..	..	..	..
13.	Paradip Port Trust Paradip Orissa	..	..	..	..	..	..



SN	Organizations and their addresses	Staff engaged in Marine Research	Library Facilities			Information* Services	Repro- graphic* Services
			Books Number	Journals Number	Trained Staff		
14.	Calcutta Port Trust Hydraulic Study Department 20, Garden Reach Road Calcutta-700043	6	..	..	..	..	..
15.	Indian Institute of Technology Madras-600036 Tamil Nadu	..	..	..	..	..	..
16.	Indian Institute of Technology Powai, Bombay-400076 Maharashtra	..	..	..	..	..	..
2.10.	<i>Naval Science and Technology</i>						
1.	Naval Science and Technological Laboratory Ministry of Defence R & D Organization Visakhapatnam-530003	83	886	63	1	..	2, 3, 6 = <u>3</u>
2.11.	<i>Meteorology</i>						
1.	Indian Meteorological Department Director General of Observatories Lodi Road New Delhi-110003	..	172	14	1	5, 11, 15, 16 = <u>4</u>	1, 2, 3, 5, 8, 9, 10 = <u>7</u>
2.	Indian Institute of Tropical Meteorology Ramdurg House Shivajinagar Poona-411005	..	..	..	..	..	..
2.12.	<i>Miscellaneous</i>						
1.	National Remote Sensing Agency No. 4, Sardar Patel Road Post Box No. 1519 Secunderabad-500003	..	78	33	3	5, 7, 9, 12, 15, 16 = <u>6</u>	6, 7 = <u>2</u>
2.	Institution of Marine Technologists C/o Ericson & Richards 32, Nicol Road Bombay-400038	..	..	..	..	2 = <u>1</u>	..
3.	Department of Zoology Ranchi University Ranchi-834001	3	..	..	..	..	..
4.	Department of Biological Science Madurai University Palkalai Nagar Madurai-625021	1	..	..	..	..	..
5.	Hoechst Pharmaceuticals Limited Lal Bahadur Shastri Marg Mulund Bombay 400080	1	..	..	..	..	..