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MARINE SCIENCE AND TECHNOLOGY: SURVEY AND PROPOSALS

Report of the Secretary-General

Addendum

Replies to the Secretary-General's note verbale and  
questionnaire of 6 July 1967

INDIA, MOROCCO

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INDIA

Which of the following activities  
in marine science and technology  
does your country pursue:

(a) Research, whether basic  
or applied?

Research, both basic and applied in all  
aspects except ocean engineering.

(b) Surveying and provision of  
public services.

Surveying and provision of public  
services:

(i) Nautical charting - hydrographic  
survey ships.

(ii) Monitoring of physical conditions  
of the ocean only - forecasting  
not yet initiated.

(iii-a) Work on domestic and industrial  
pollutants is the responsibility  
of NIO.

(iii-b) Radioactivity monitoring - Bhabha  
Atomic Research Centre (Health  
Physics Division).

(iv) Exploration, monitoring and  
forecasting of fish stocks  
including preparation of fishing  
charts - N.I.O. and Fisheries  
Research Institutes.

(v) Submarine Geological and  
Geophysical Survey, N.I.O. and  
N.G.R.I.

(vi) Maintenance and modification of  
coasts and channels - Ministry of  
Transport, Government of India.  
Scientific data on coastal  
processes by NIO.

(c) Uses of sea and its  
resources.

Uses of sea and its resources:

(i) Harvesting of biological resources  
fishing programmes of both  
central government and state  
governments.

(ii) Extraction of mineral resources -  
 (a) chemical recovery from sea water: salt and by-products: Central Salt and Marine Chemicals Research Institute, Bhavnagar - works in close co-operation with salt industry.

(iii) Waste disposal - atomic energy establishment in respect of radio-active wastes.

2. What is the magnitude of the activities of your country in marine science and technology, as measured by:

(a) Annual total expenditure for research whether basic or applied.

(b) Number of professional scientists and engineers engaged in (I) research and in (II) surveying and provision of public services.

At present there are about 130 scientists engaged in research and surveying - the following disciplines are covered.

Biology = 60

Physical Oceanography = 24

Chemical Oceanography = 9

Geological Oceanography = 10

Maritime Meteorology = 6

Instrumentation = 1

Radioactivity studies )

Radioactivity monitoring) = 20 = 130

(c) Annual extraction of minerals from the sea, sea-bed and below sea-bed.

3. Is the development of the activities of your country in marine science and technology limited by the shortage of trained personnel? What Educational Institutions or other arrangements do you have for instruction in marine science and technology.

Activities in the field of oceanography and other marine sciences have been started comparatively recently in the country. There has been initial shortage of trained manpower, but we are trying to rectify this deficiency by training programmes, provision of facilities in the Universities etc. The undermentioned Institutions offer courses, or training facilities in the different branches of marine sciences:

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4. What mechanisms do you have for co-ordinating your activities in marine science and technology, including their international aspects.

1. National Institute of Oceanography.
2. Universities of Andhra, Aenamalai and Kerala.
3. Fisheries Research Institute (Marine) Mandapam.
4. Central Institute of Fisheries Education, Bombay.
5. Atomic Energy Department - Bhabha Atomic Research Centre (Health Physics Division), Bombay.
6. Indian Naval Physical Laboratory, Cochin.
7. Naval Chemical and Metallurgical Lab. Bombay.
8. Marine Biological Stations of the Government of Maharashtra.

The chief co-ordinating body for oceanographic activities in its various disciplines is the Indian National Committee on Oceanic Research. INCOR functions as an advisory body and has in it representatives from various organizations and government departments. Co-ordination of programmes relating to fishery oceanography is done by the Fisheries Research Committee of the Government of India.

In addition symposia and seminars are being organized in some of which oceanographers and marine scientists from abroad are invited to participate and contribute papers.

India also participated in a number of international symposia and conferences relating to various aspects of marine science.

5. To what extent is your country engaged in marine science and technology as indicated by participation in:

(a) The work of pertinent inter-governmental organizations:

(i) India is a Founder Member of the Intergovernmental Oceanographic Commission of UNESCO and a representative from the country has participated in the meetings of the IOC and its working groups - Dr. N.K. Panikkar, Director, NIO and Member-Secretary INCOR was also Chairman of IOC (1964-1966).

(ii) India is also a member of WHO (which also deal with some aspects of marine meteorology with special reference to Air-Sea-Interaction.

(iii) In the meetings of the International Atomic Energy Agency (IAEA) with particular reference monitoring of radioactivity in the sea and India has been represented.

(b) The work of pertinent non-governmental organizations:

India is represented in the scientific Committee on Oceanic Research (SCOR) of the International Council of Scientific Unions (ICSU) and the International Association of Physical Oceanography of the International Union of Geodesy and Geophysics - The Indian Representative's have attended several meetings of these bodies, symposia and seminars organized by them and participated in the discussions and programmes.

(c) Co-operative marine investigations:

India has actively participated in the SCOR-UNESCO sponsored International Indian Ocean Expedition (1960-1965). Indian Programme was for three years (1962-1965).

(d) Bilateral or multilateral programmes in education and training:

The country is participating in the following Exchange Programmes and arranging facilities for advanced training in Marine Sciences for various Junior and Senior Scientists. Visits to Marine Institutes, attending symposia and conferences:

- (i) Indo-Soviet Cultural Exchange Programme.
- (ii) Indo-United States Cultural Exchange Agreement.
- (iii) CSIR-DAAD (German Academic Exchange Service)-Exchange Agreement.
- (iv) Indo-United Kingdom Exchange Programme through the British Council.
- (v) CSIR-GDR Exchange Agreement.

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1. (a) Basic research.
2. (a) About 500 to 750 dirhams.  
(b) About one research worker in all, made up as follows:  
    Mr. Elkaim - 1/2  
    Miss Gantes - 3/8  
    Mr. Panouse - 1/8
3. Faculty of Science: basic education.
4. Moroccan National Oceanographic Committee (meets very infrequently).
5. None as far as I know.

Explanatory notes

1. (a):
  - (i) Basic research: hydrology in the Atlantic Ocean (Ibero-Moroccan bight) and the Mediterranean (sea of Alboran), marine biology: benthic bionomy of the Atlantic continental shelf.
  - (ii) Applied research: research into swell forecasting for use in connexion with meteorological records.  
Biology of some species of marine animals with a view to rational exploitation (tunas, triglids, etc.).
1. (b) (c) These questions do not come within the competence of IFMM.
2. (a) The IFMM budget, which has not shown any marked variation over the past five years, totals 175,000 dirhams, of which 45,000 is for research laboratories, the rest being allocated in principle for operation of the aquarium and building maintenance. This budget does not include:  
    Personnel costs  
    Operation of the vessels attached to IFMM.  
I have no information on the budget for these two items. As far as we are concerned, it is not possible to identify separately the sums spent on basic and applied research.
2. (b) Three professional research workers are at present employed by IFMM:  
    One oceanographer/physicist  
    One oceanographer/biologist  
    One biochemical engineer

2. (c) This question does not come within the competence of IFMM.
3. The shortage of specialized personnel is one of the reasons for the limitation of activities in Morocco in marine science, both basic and applied.

The Faculty of Science at Rabat is able to provide basic instruction for training research workers, but specialized training in marine science must be obtained abroad.

#### 4. Co-ordination

At the national level, a Moroccan oceanographic committee is in the process of being organized.

At the international level, Morocco supports and has participated, although not for the last two years, in the work of IOC and FAO (General Fisheries Council for the Mediterranean), among others.

5. (a) (b) IFMM receives documentation from the main international organizations dealing with marine science. It replies regularly to questionnaires and inquiries organized by them on activities within its competence.

5. (c) The hydrological work in the sea of Alboran which IFMM is carrying out is in principle related to a Spanish-Moroccan programme proposed by the General Fisheries Council for the Mediterranean.

5. (d) None as far as IFMM is concerned.

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