# 40 YEARS OF RESEARCH AND DEVELOPMENT IN MARINE FISHERIES IN INDIA


**A Souvenir issued at the National Symposium on Research and Development in Marine Fisheries held at Mandapam Camp, 16 - 18 September 1987, to mark the 40th Anniversary of**

**Central Marine Fisheries Research Institute, Cochin**
*(Indian Council of Agricultural Research)*
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# Department of Ocean Development

A new regime of oceans has come into being since December, 1982, when, at Jamaica, more than 100 countries affixed their signatures to a new convention to govern the wealth and uses of seas. The laws that have been framed hold an immense promise of development particularly for the developing nations, inasmuch as their rights of sharing ocean wealth are protected.

In such an important situation, India has naturally a new role to play and a responsibility to meet for both exploration and exploitation of the vast ocean located at its door step. As a first measure in this direction, a new DEPARTMENT OF OCEAN DEVELOPMENT was created on 24 July, 1981. Since then, this department has played a key role in effectively projecting India's role in all international meetings, in seabed research, survey or polymetallic nodules and in the organization of successful expeditions to Antarctica.

Its responsibilities cover the following areas of work:

1. Matters relating to the ocean not specifically allocated to any other Department/Ministry.
2. Policy formulation, coordination, regulatory measures and developments relating to the ocean and covering:

— research (including fundamental reaserch) and development of uses relatable thereto

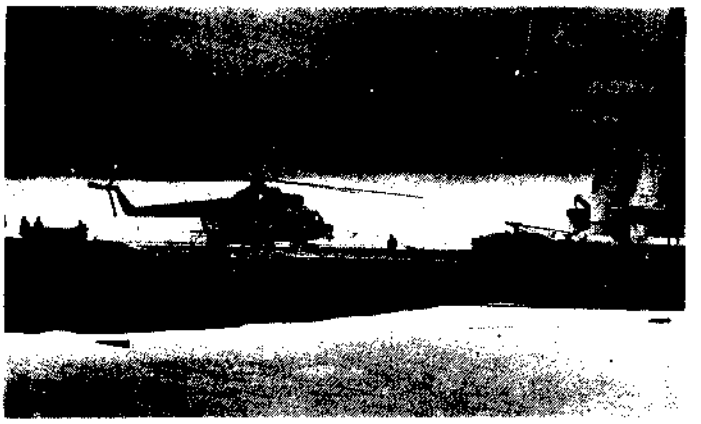
— technology development

— surveys to map and locate non-living and living resources

— preservation, conservation and protection of the environment and marine resources

— development of appropriate skills and manpower

— collaboration, including technical collaboration laws realatable to the above

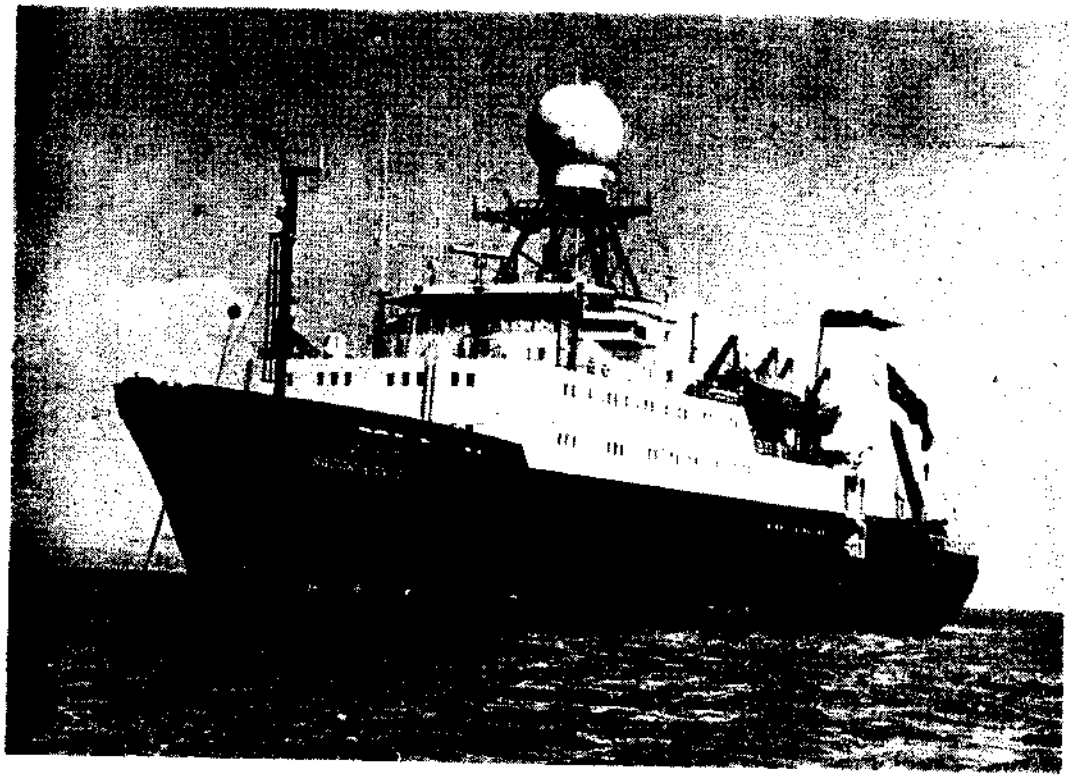


**Ship moored close to ice shelf with helicopter on board for transport of men and material to the Antarctic continent**

## ANTARCTIC PROGRAMME

The Antarctic landmass and the adjacent waters are not only of immense scientific interest but also of much economic value. It is now well known that conditions in Antarctic significantly influence the weather patterns and circulations in Indian Ocean, which in turn affecting the yield of living resources. Thus, India was prompted to carry out a modest but vigorous research programme by launching expeditions to Antarctica, the first of which landed on the continent on 9 January, 1982. India has so far sponsored 6 expeditions to the continent. The seventh is to start in November 1987. A well-equipped permanent station was established in Antarctica during the third expedition, which has been named "Dakshin Gangotri" (latitude 70° 05'S and longitude 12° 00'E). The expeditions initiated studies on different scientific disciplines which include meteorology, glaciology, geology, geophysics, geomagnetism, oceanography, radio-wave propagation, chemistry, physics, biology, etc.

The Antarctic research programme is being pursued in a systematic manner. Organisation of the expenditions, running of permanent research station, operation of the supply vessels, enhancing research facilities and participating in International Antarctic research programmes and sharing the data are some of the main components of the Indian Antarctic pro-



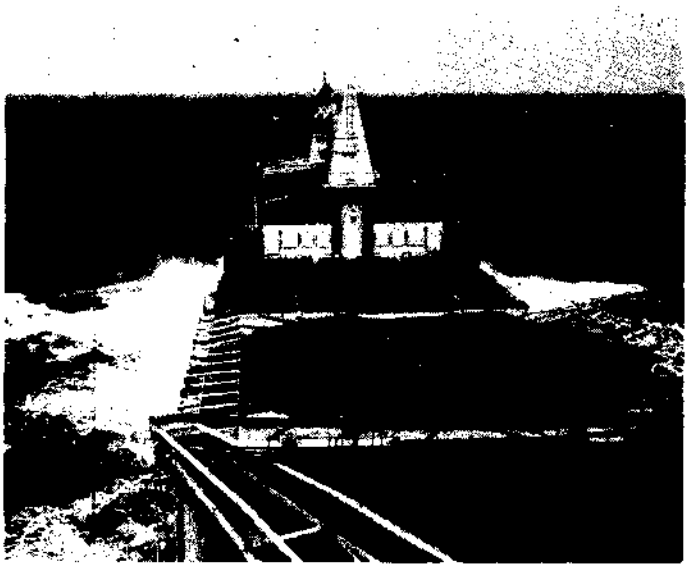
O.R.V. Sagar Kanya

gramme. India has already acceded to the Antarctic Treaty in August, 1983, joining thereby the earlier signatory countries of the Treaty. In September 1983, India was admitted as a Consultative party to the Treaty. After joining the Treaty, India is able to fully share and exchange the scientific information on Antarctica and thus promote its own Antarctic research.

## NON-LIVING RESOURCES

Oceans have enormous potentials for mineral resources. Ilmenite, zircon, monazite, rutile, garnet and magnetite are some of the stable minerals found along the coast and most of these are being exploited at present.

As a future oceanic resource, the polymetallic nodules have exciting possibilities. Lying carpetted on the deep ocean floor over thousands of square kilometres, the nodules are potatoshaped, largely porous lumps 3 to 5 cm in diameter. These nodules are of much economic importance because, besides much manganese and iron, they contain nickel, copper, cobalt, lead, molybdenum, cadmium, vanadium, titanium and other metals. The economic potential of some of these metals is known to be enormous. Occurring though in minor fractions, some often unmixed and some of them in combination, they can easily be extracted. The nodules are mostly deposited in depths ranging from 3500 m to 6000 m over a very large area. About 15 million sq. km of the Indian Ocean has nodules, which are of different size and quality. The total resource of nodules in the world oceans have been estimated at several trillion tonnes. After a very intensive survey, India has identified two sites of nodule deposit suitable for mining. Further detailed surveys in these areas are in progress. As a result of a massive effort put in, involving a very sizeable expenditure, India has been given the status of "Pioneer Investor" by the Third U.N. Conference on the Law of the Sea in 1982. India is now the only developing country to acquire this status. It shares this privilege with 3 developed countries — France, USSR and Japan — and 4 multi-national consortia. India has applied to the Prepara-



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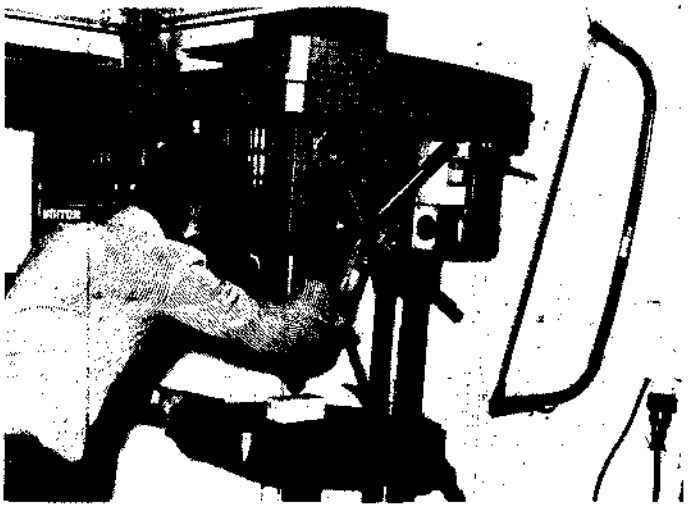


Drilling machine at the seismic shop

tory Commission of the International Seabed Authority for registration of a mining site in the Indian Ocean.*

* The news has come while the article is in press that India has been assigned the exclusive rights over 1.5 lakh sq. kilometers of the ocean with immediate effect — Ed.

## UNDERWATER TECHNOLOGY

To know more and more about the deeper parts of the ocean man is trying for long, devising better and better methods of making observations. Submersibles, diving systems and sophisticated instrumentation devices have been developed for exploring and studying the seabed and the deeper layers of the water mass. India proposes to acquire the know-how and technology needed to design, build and operate such underwater vehicles.

## ACQUISITION OF NEW RESEARCH VESSELS AND SHIP MANAGEMENT

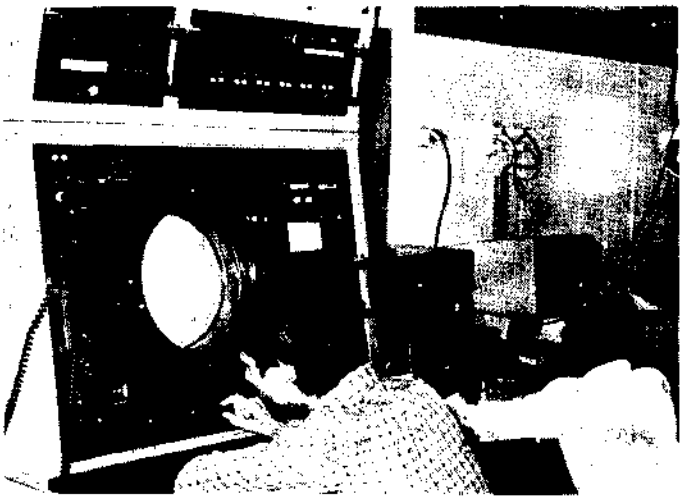
FORV SAGAR KANYA has been recognised as one of the most modern oceanographic research vessels in the world. Equipped to carry out geological, geophysical, meteorological, biological, physical and chemical oceanography, she can operate in all the parts of Indian Ocean. She has a very modern design and is equipped with most sophisticated equipments. Since her arrival, she has completed a series of cruises in the Indian Ocean. She is also being used for the survey of polymetallic nodules.

Another new fishery-and-oceanographic vessel FORV SAGAR SAMPADA has joined the Indian fleet recently. Being ice-strengthened, the vessel can do fishing in Antarctic waters.

The Department had also chartered ice breakers, such as "POLAR CIRCLE" and "FINNPOLARIS" for the Antarctic expeditions and M. V. FARNELLA and M. V. SKANDI SURVEYOR for the survey of polymetallic nodules.

## MARINE POLLUTION

The Department has an active programme on monitoring pollution, keeping close contact with all organisations and agencies involved in the protection of the sea.



**Wind/weather recorder**

## ROMOTE SENSING

Remote sensing of oceans, using aircrafts and satellites, has been recognised as a potentially powerfull tool in oceanography, particularly for coastal-zone management. From a more practical point of view, maritime activities such as shipping, offshore mining, and oil drilling require effective short-term as well as long-term forecasting systems. Such forecasts had been greatly hampered because of the paucity of data over large stretches of the ocean. With the advent of remote sensing it has now become possible to collect high-density and high-frequency data on a synoptic and global scale. The Department is likely to undertake a comprehensive programme during the Seventh Plan to suit many important and urgent needs.

## LIVING RESOURCES

Fish, shellfish and seaweeds form the major living resources of the sea. Exploration and monitoring by the research vessels SAGAR KANYA and SAGAR SAMPADA are hoped to yield a wealth of information for extending fishing activity to deeper waters, from where the yield is expected to add substantially to our annual production. Seaweeds form another source of food and fertilizer and also raw material for certain chemicals and pharmaceuticals. Programmes in this area include large-scale seaweed cultivation along the coast, using various indigenous methods for giving a much needed boost to the young seaweed industry in India.

## MANPOWER DEVELOPMENT

During the next 5 to 7 years about 1,000 additional scientists, engineers and technicians will be required to man the ocean development programmes. This need is expected to be met by strengthening the existing courses in the universities and Indian Institutes of Technology (IITs), introduction of new need-based syllabi in the educational institutions, organizing in-house training, and by providing fellowships, associateships and new positions in universities and technical institutions. Organizations such as the Council for Scientific and Industrial Research, the Indian Council of Agricultural Research, The Bhabha Atomic Research Centre, the IITs, the University Grants Commission, the Geological Survey of India, Universities and many other training institutes are participating in the effort to build up an adequate manpower of scientists and engineers for the fast developing programme in the ocean sector.

## COLLECTION AND MANAGEMENT OF OCEANOGRAPHIC DATA

Data pertaining to the Indian Ocean collected by many national agencies engaged in ocean sciences, as also those available outside the country, will have to be obtained and stored at one place from where they can be disseminated. Such a responsibility has been entrusted to the Indian National Oceanographic Data Centre set up as a national facility for oceanographic data and information management at the National Institute of Oceanography (NIO), Goa. Sensitivity of the oceanographic data will be examined by a committee before these are released for dissemination.

**Krill of Antarctica**
**the largest single species resource**
**in the world**

## ENERGY FROM THE SEA

Oceans are known to be a source of immense energy. The Department of Ocean Development has an active programme on (a) wave energy and (b) ocean thermal energy conversion (OTEC). India has an excellent OTEC potential and some of the most promising sites are known to be located in the islands of Lakshadweep and Andaman and Nicobar.

## DESALINATION OF SEAWATER

Various types of desalination techniques are available in the country, namely distillation using solar power, flash distillation, electrodialysis and reverse osmosis. Desalination technology has an important role to play both in coastal cities and in rural areas where brackish water is available and the supply of good quality water is an important objective of the national programme. The Department is promoting desalination programme using the technology developed by several organisations in the country.

## LEGAL REGIME

For conserving marine resources and protecting the country's interest in the field of ocean exploration and exploitation, there is need for legislation besides developing expertise in the various facets of international law. In view of the complexities of the problems, the Department is building a competent group on the new emerging regime of the oceans and Antarctica.

## MARINE RESEARCH AND DEVELOPMENT FUND

A marine research and development fund (MRDF) has been created in the Department as a part of its effort to encourage meaningful ocean-related activities in different institutions including private bodies in the country. Assistance provided includes grants for the purchase of equipment for holding exhibitions, symposia, conferences, workshops, etc. and for bringing out publications.

Subjects considered for the support under the fund include physical and chemical oceanography, marine biology, marine geology, marine geophysics, ocean engineering, marine ecology, meteorology, marine instrumentation, etc. Besides purely scientific projects, assistance is also extended to projects which have politico-geographic or social dimensions of the Indian Ocean and Antarctica.

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Adopted from DOD's publication *Activities of the Department of Ocean Development in the field of Ocean Science & Technology.*