

A new international order on oceans – Indian perspective

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The arduous work of the League of Nations for a decade (1973 to 1982) to finalize the text that contained provisions to protect the larger interests of the developing nations has been realized with the coming into force of the Third United Conference on the Law of the Sea on 16 November, 1994. A brief account of the history and enumeration of the events and articles, is attempted here. Recognizing the need to conform to the international law, being a major role player in the very evolution of the new international order of oceans, India amended its Constitution enacting the Maritime Zones Act, in 1976. Realizing that oceans are the next 'techno-strategic frontier' to Atomic Energy and Space, India developed a large institutional framework and launched various challenging programmes at sea, on par with other leading nations on the oceans. The living and non-living resources potential within the country's maritime zones, are discussed.

IN the course of time, man is looking more and more towards the sea for substitute material and food. It was believed that a situation would arise wherein the vast expanse of oceans covering 70 per cent of the earth's surface, would be divided into lakes and the more powerful nations would have an unhealthy hold over most of these areas, which are the repositories of both living and non-living resources, that could meet the demands of the world's growing population and rapid industrialization of the developing nations. After the Second World War, mankind realized the importance of a code to regulate the uses of the sea for peaceful and developmental purposes. Although unknown to many, the United Nations made a remarkable achievement in the history of mankind, when the Third United Nations Convention on the Law of the Sea (UNCLOS-III) came into force on November 16, 1994, one year after Guyana brought the total number of ratifications to the required sixty¹.

United Nations Law of the Sea – Retrospect and Prospect

When the League of Nations was replaced by the United Nations in 1945, it was thought desirable to provide for the establishment of a body, i.e. the International Law Commission (ILC) charged with the progressive codification of the International Law of the Sea. ILC submitted a report in 1956 to the UN, which formed the basis for the first UN Conference on the Law of the Sea (UNCLOS-I) held at Geneva, in 1958.

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The UNCLOS-I produced a legal framework of rules governing States rights and duties in the Territorial Sea, Continental Shelf and High Seas. UNCLOS-I had adopted four conventions: The convention on the Territorial Sea and the Contiguous Zone; The convention on the High Seas; The convention on the Continental Shelf and a convention on the Fisheries and Conservation of Living Resources of the High Seas. The first three of these have been ratified by a substantial number of States and are based mainly on the customary International Law, as presented in the ILC's report. Consequently, these conventions formed the core of the generally-accepted rules of the Law of the Sea concerning maritime zones.

The major problem which UNCLOS-I faced was to agree on some definite outer limits for the Territorial Sea. Unilateral assertions of coastal states further and further seaward, followed almost immediately; and the interest of naval powers and distant-water fishing nations was aroused. To overcome this, an UNCLOS II was convened in 1960 to discuss the problem, and also the associated question of fishery limits. It failed by only one vote to adopt a compromise formula providing for a six mile Territorial Sea plus a six mile Fishery Zone.

It was agreed in 1970, in the UN General Assembly to convene a third UN Conference, with the task of producing a comprehensive convention on the Law of the Sea (UNCLOS-III). UNCLOS-III had to negotiate a political package that would be acceptable to all States. It had its origin in the Seabed Committee, established in 1967, by the UN General Assembly at the initiative of the then Maltese Ambassador, Arvid Pardo, to examine the implications of a declaration that the deep sea bed lying

beyond the limits of national jurisdiction is a 'Common Heritage of Mankind'. This involved defining the limits of national jurisdiction, over the sea bed and, therefore, the revision of parts of UNCLOS-I on the Continental Shelf, as well as on the High Seas.

After extensive work spanning about a decade (1973 to 1982), UNCLOS-III was opened for signature in Montego Bay, Jamaica, on December 10, 1982; and was signed by 117 States including India, on the same day. By December 9, 1984, it was signed by 155 States and 4 Entities. UNCLOS-III Regime could not come into force for more than a decade after the Convention was opened for signature. The reasons were many. The main objection came from countries such as the USA, UK, Germany, and other industrialized States; who opposed many of the provisions on seabed mining in international waters (Part XI of UNCLOS-III (ref. 2)). Further, the poor prospects of commercial production of seabed minerals and the lack of economic necessity were the other reasons, for non-implementation of UNCLOS-III.

The Preparatory Commission (PrepCom) was established in 1982 (as per Resolution-I) pending coming into force of the UNCLOS-III. It made commendable progress between 1983 and 1993 and provided a number of fair and viable solutions to the seabed provisions of UNCLOS III. The PrepCom efforts have culminated in a progressive ratification during the last few years, and resulted in the UN Convention on the Law of the Sea (UNCLOS III, 1982) coming into force. On 16 November 1993, the sixtieth instrument of ratification was deposited with the Secretary General United Nations; and the Convention came into force exactly 12 months after, which has a bearing on all States party to it from the midnight of 15 November, 1994.

UNCLOS III (ref. 2) envisages nine different maritime zones with defined and distinct legal status for each zone. The major maritime zones involved in Law of the Sea are shown in Figure 1. Starting from the coast, the nine maritime zones are: Internal Waters; a 12 nm Territorial Sea, a 24 nm Contiguous Zone; a 200 nm EEZ; a Continental Shelf, extending up to the outer edge of the Continental Margin, with outer limits specified; the High Seas beyond the EEZ; the International Seabed Area, beyond the outer limits of the Continental Shelf; Archipelagic Waters; Archipelagic Sealanes; and the Straits used for international navigation. Thus, it seeks to delimit the oceans into a number of maritime zones based on its distance from the shore. The convention also deals with the baselines from which most of these maritime zones are to be measured.

Special provisions were made for the land-locked and geographically disadvantaged countries. Detailed provisions and safeguards on marine environment, marine scientific research, development and transfer of marine technology, and settlement of disputes; are the highlights and new concepts in the Convention. In the wake

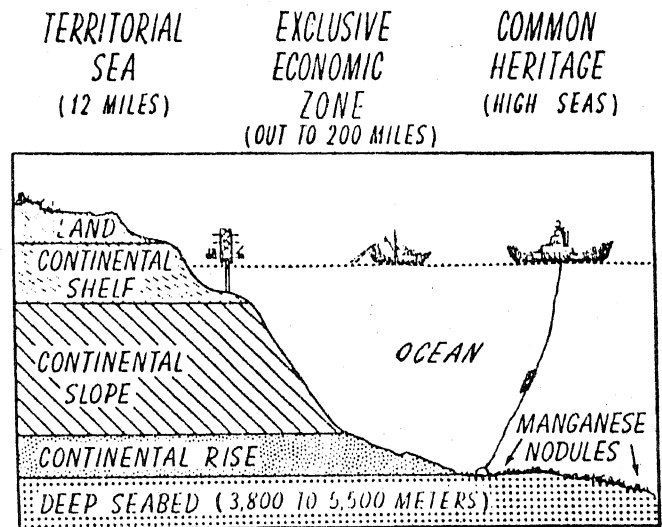


Figure 1. Major maritime zones involved in the Law of the Sea.

of UNCLOS-III coming into force, two UN organizations shall be established, viz. the International Seabed Authority (ISBA) with its Headquarters in Jamaica, to organize and control activities in the seabed area beyond the EEZ, and, the International Tribunal for the Law of the Sea (ITLOS) at Hamburg in Germany to settle the disputes related to Sea.

Every coastal state is entitled to claim these maritime zones. It has sovereignty over the internal waters (i.e. the waters landward of the baselines) subject to innocent passage traditionally used therein; sovereignty in the Territorial Sea and the air above, with the right of innocent passage enjoyed therein by all foreign ships; specific rights in respect of customs, fiscal, immigration and health matters, in the Contiguous Zone, sovereign rights over the living and non-living resources and economic uses of the EEZ, and jurisdiction over marine installations, marine scientific research, and marine environment; sovereign rights over the natural resources of the continental shelf, including sedentary living resources and jurisdiction over certain specified matters.

The High Seas is beyond the jurisdictional limits of Coastal States and is a part of International Waters and in this zone the freedom enjoyed by all is, navigation, overflight, laying of submarine cables and pipelines, construction of artificial islands and installations, and fishing. The seabed under High Seas is the International Seabed Area, and for this, an elaborate regime and an international set-up is provided for in Part XI of the Convention. The International Seabed Area and its resources are the common heritage of mankind and their exploration and exploitation is to be regulated by the Convention.

The Convention lays down that the de-limitation of maritime boundary between States with opposite or ad-

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jacent coasts, shall be in accordance with the median line-cum-special circumstances/historic title role concerning the territorial sea and on the basis of international law in order to achieve an equitable solution in respect of the EEZ and the Continental Shelf.

The Archipelagic State will have sovereignty over its archipelagic waters, with archipelagic sea lanes passage in traditional navigation Straits and innocent passage elsewhere. Like other coastal States, an archipelagic State is also entitled to other maritime zones.

There are other special and specific provisions for the land-locked States, whose right of access to and from the sea, and freedom to transit, is recognized. The land-locked and the geographically disadvantaged States have been given access to the surplus fishery resources of the EEZ in the neighbouring coastal State of the region, and for the conduct of marine scientific research.

A large majority of Coastal States conform to the provisions made in UNCLOS-III on various sea uses and resource utilization and have proclaimed their right to manage and control access to the resources and the use of the sea, and the seabed, up to a distance of 200 nautical miles from their coastlines. Coastal States are also extending their jurisdiction to the same distance in so far as environmental pollution, control of shipping, including supervision of dangerous cargoes and general problems of safety are concerned.

Establishment of International Seabed Authority

The International Seabed Authority situated in Jamaica, is seen in operation, when the UNCLOS came into force on 16 November 1994. Since that time, over two years ago, twenty-five additional states have ratified the Convention¹ (Table 1). India, having ratified the Convention on 29 July 1995, got involved in arduous deliberations and negotiations since then for a place in the Council of the ISBA. A high-level team, headed by A. E. Muthunayagam, had intense negotiations during the State Parties meeting held in New York from March 4 to 8 and again during the first part of the second session of the ISBA at Kingston, Jamaica, beginning March 11 (ref 3). The delegation staked a claim for India under the investor's category based on the country's various plans and activities at sea, particularly the investments made in long-term programmes like 'Polymetallic Nodule Surveys' in the Central Indian Basin, that brought distinction amongst the other developing nations. The election on March 18 entitled India to be a member of the Council for eight years, in two phases – first, for a two-year term from the current year and the next for four years beginning in the year 2000 (ref. 3). The Council consists of 36 members of the Authority elected by the Assembly, the sole and supreme organ of the Authority

Table 1. Details of countries that ratified^{1,*} the UNCLOS III after the 60th instrument of ratification deposited by Guyana in November 16, 1993

Ratification No.	Date of ratification	Name of the Country
61	January 1994	Bosnia
62	June 1994	Comoros
63	July 1994	Sri Lanka
64	July 1994	Viet Nam
65	August 1994	Macedonia
66	October 1994	Australia
67	October 1994	Germany
68	November 1994	Mauritius
69	November 1994	Singapore
70	December 1994	Sierra Leone
71	January 1995	Lebanon
72	January 1995	Italy
73	February 1995	Cook Islands
74	April 1995	Croatia
75	April 1995	Bolivia
76	June 1995	Slovenia
77	June 1995	India
78	July 1995	Austria
79	July 1995	Greece
80	August 1995	Tonga
81	August 1995	Samoa
82	November 1995	Jordan
83	December 1995	Argentina
84	January 1996	Nauru
85	January 1996	Republic of Korea

*Information on ratifications was provided by the United Nations Division of Ocean Affairs and Law of the Sea in New York.

consisting of all the members¹. India had staked a claim and got a seat under the pioneer investor's category based on its various plans and programmes in seabed regime, and the preparatory investments made in polymetallic nodules, which registered India as the Pioneer Investor, with a Pioneer Area in the Indian Ocean. The other competitors for this category were USA, Russia, Japan, Germany, China, France and The Netherlands. China, France and Germany were elected to the Council under the investors' category³.

Establishment of Department of Ocean Development

After Atomic Energy and Space, the Oceans are India's next 'techno-strategic frontier'. Recognizing this, India made commendable progress in developing institutional framework for ocean management since 1978. A Department of Environment was established in 1980. Soon after, appreciating the importance of the ocean sciences, a need was felt by the then Prime Minister Indira Gandhi appreciating the importance of the ocean sciences, to establish a separate department to deal with oceanographic affairs, in the wake of UNCLOS-III coming for

signature. As a result, the Department of Ocean Development (DOD) was established in July, 1981, with the aim of creating a deeper understanding of the oceanic regime of the Northern and Central Indian Ocean and also development of technology and technological aids for harnessing of resources and understanding of various physical, chemical and biological processes. The Ocean Policy was enunciated in 1982.

In order to fulfil the objectives in the Ocean Policy, the Department has been promoting and implementing the following major research and development programmes:

- * Scientific research in Antarctica
- * Exploration and development of technology for exploitation of deep sea bed polymetallic nodules
- * Assessment of living and non-living resources
- * Programmes relating to coastal zone and islands
- * Marine scientific research and development of specialized manpower
- * Development of marine instrumentation and systems
- * Policy relating to Law of the Sea.

Indian perspective

Peninsular India is bestowed with a long coastline of about 7500 km along the Arabian Sea in the West, and the Bay of Bengal in the East, which opens into the

Indian Ocean in the South. It has over 1200 islands comprising the Andaman and Nicobar in the East and Lakshadweep in the Southwest.

A traditionally maritime country, with varied interests in the sea, especially in fisheries, oil and gas, shipping, seabed mining, power generation, protection of marine environment and national security, India participated effectively in UNCLOS-I (1958), UNCLOS-II (1960) and UNCLOS-III (1973-1982). It has amended the Constitution and enacted the Maritime Zones Act in 1976, the Coast Guard Act in 1978, the Maritime Zones of India Act for Regulation of Fishing by Foreign Vessels in 1981; and issued rules in 1982, and the Environmental Protection Act in 1986. Thus, the present Indian legislation on maritime zones largely conforms to the international law. The country has well demarcated and distinct maritime zones such as a 12 nautical mile Territorial Sea, a 24 nm contiguous zone, a 200 nm EEZ, the Continental Shelf that may extend beyond 200 nm (to be demarcated), and a Pioneer Area in the international seabed area for exploitation of polymetallic nodules.

By the year 2000 AD, the Indian population is estimated to be 1021 million, constituting about 16 per cent of an estimated world population of 6351 million⁴. The demand for minerals rises with the population explosion and rapid industrialization. India's demand for mineral resources is expected to increase two to threefold. The growing demand by the turn of the century for some metals awaken in us the desire for further discoveries

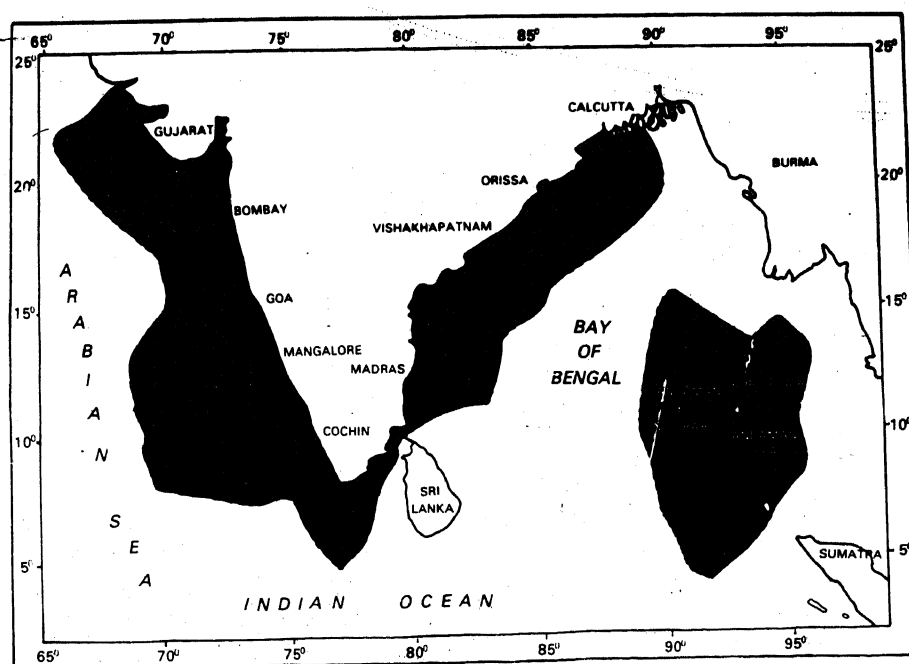


Figure 2. Map showing the Exclusive Economic Zone (EEZ) of India.

and investments. In addition, the production cost is likely to increase with energy prices and may make some low-grade mineral deposits uneconomical to mine on land. A growing need to look for new deposits of minerals at sea, is felt.

India gains a little over 2 million square kilometres of area under the EEZ regime (Figure 2), and this is equivalent to about two-thirds its landmass. In this area, the exclusive right to utilize living and non-living resources vests with our nation. The seafloor of the continental margins of India is covered by a wide variety of non-living resources. In addition to the vast deposits of offshore sand and gravel mainly used for road and building works, heavy mineral placer deposits containing ilmenite, magnetite, monazite, zircon, and rutile are located and exploited on many beaches and shallow waters along the coasts of Maharashtra, Kerala, Tamil Nadu, Andhra Pradesh, and Orissa. The National Institute of Oceanography (NIO), Goa, carried out exploration for ilmenite placer deposits in the Konkan coast extending offshore to a distance of 2 to 8 km at 18 to 20 m water depth and the estimated reserves are more than 12.5 million tonnes⁴.

Biogenic sediments containing offshore limeshells and sand deposits are investigated from shallow waters of the Laccadive islands (712 million tonnes) and the Gulf of Kutch (2 million tonnes), the outer shelf of Bombay and the Backwaters of Kerala (3 million tonnes)⁴. These deposits can be used by the cement, lime, glass, paper and chemical industries. Efforts are being made to identify the rich deposits of phosphorites along the Western Continental Shelf of India. Phosphorite exploitation from the offshore would make India self-sufficient in producing the raw material for the fertilizer industry. The offshore oil and gas scenario is positive. India's offshore oil and gas has overtaken the land production and supply, and is now double that of the land production. Under the new economic policy the Government of India invited bids for oil exploration in offshore blocks of Bombay, Cauvery Basin and the Krishna-Godavari Basin. Thus, India may enter into joint ventures with foreign companies in the form of production-sharing contracts. A joint venture between British Gas and the Gas Authority of India Ltd (GAIL) is a positive step towards offshore gas development for use in power generation and fertilizer industries. The variety and vast deposits available in our vicinity form a part of our resource, under the new international regime as stipulated in UNCLOS III. India has both sovereign rights and jurisdiction over these resources under the provisions of UNCLOS III.

On the living resource front, India's marine fish catch has been increasing since the declaration of its EEZ in 1977. The annual fish production in the country has touched an estimated 4.78 million tonnes in 1994-95 with the marine catch accounting for 2.69 million tonnes

inland catch reaching 2.09 million tonnes. Against the present estimates of maximum sustainable yield in the EEZ of 3.9 million tonnes, the fish catch accounts for only 70 per cent of the potential. It is, therefore, evident that there is scope for exploitation of the country's EEZ to achieve higher levels of production. In the 50 m depth, about 90 per cent of the assessed potential of 2.28 million tonnes is currently exploited, leaving limited untapped potential. But in depths beyond 50 m, exploitation is only at 40% level, leaving substantial scope for increasing the efforts⁵.

The Fisheries Panel Against Permitting Foreign Vessels, produced a draft National Fisheries Policy, which is awaiting Parliamentary approval. It is against permitting joint venture foreign vessels to fish in the EEZ of the country. The policy which was drafted by an Expert Committee and approved by the Central Board of Fisheries, wants the Government to empower more traditional fishermen to own mechanized boats that would go into the deeper waters for fishing, both surface and bottom dwelling species. Yet India has protected the interests of artisanal fishermen by reserving the 10 km area from the shore and between 10 and 23 km reserved for mechanized fishing vessels and beyond 23 km to be exploited by the industrial fishing vessels. This measure is meant to lower the pressure on the nearshore fishery resources targetted by all country-boats using traditional fishermen. The National Fisheries Policy is aimed at raising the fish production to enable a per capita consumption of 11 kg per annum as against 8 kg per annum at present, during the 9th Plan. It also aims at conservation of aquatic resources and genetic diversity⁵.

The traditional fisherfolk comprise about 2 million population along the coastal belts and they spend most of their lives in fishing. Fishing exports, particularly shrimps exports to Europe, Japan and USA, fetch about 1500 crores in foreign exchange. India is making efforts to develop aquaculture and the Indian Ocean Tuna catch. With assistance from World Bank and the United Nations Development Programme (UNDP), extensive hatcheries are planned throughout the country to distribute seeds for aquaculture development. India is actively involved in developing technologies for aquaculture, cage culture, mussel culture and in the use of satellite remote sensing for locating fish schools in an effort to assist the fishermen in improving their fish catch.

India made a claim in another maritime boundary, too. It made a claim in the International Seabed area for the development and exploitation of mineral resource, viz. 'polymetallic nodules'. Polymetallic nodules, commonly known as manganese nodules, are known to contain appreciable quantities of metals; for example, manganese, nickel, copper and cobalt⁶, that are of strategic significance to India. Nodules occur at water depths of 5 to 6 km in the Indian Ocean. Mining of these minerals

from the Indian Ocean would not only make India self-sufficient in strategic metals but also leave us with surplus metals (for instance, cobalt) for export. India's claim for an 'area' in the Indian Ocean was accepted by the United Nations and on 17 August, 1987, India became the first country in the world to get an area of 150,000 sq km allocated for resource development (Figure 3). As a part of our obligation to the UNCLOS-III, India identified yet another area of the same size in the Indian Ocean (Figure 3), for the International Seabed Authority, to exploit the nodule resources, in order to honour and fulfil the principle of the 'common heritage of mankind'. Later, countries such as Japan, the then USSR and France got their allocations in the Pacific Ocean. This achievement was entirely due to the sustained Indian efforts, especially the scientists from the NIO, since 1981. It would be apt to recall the statement made by the then Prime Minister, Rajiv Gandhi in the Parliament on 26 August, 1987, which is as follows⁷:

'The registration of our claim for a deep seabed mine site indeed provides a concrete indication of indigenous scientific capabilities and achievement. I am sure this House will agree to place on record our appreciation for excellent work done by our scientists and engineers who have taken up the challenging task for exploring new horizons of science to unravel the mysteries of the ocean.'

India has the trained manpower to harness seabed minerals lying at water depths of more than 5 km. Training programmes were organized for the UN personnel and India is developing the skilled manpower required for the International Seabed Authority. Our

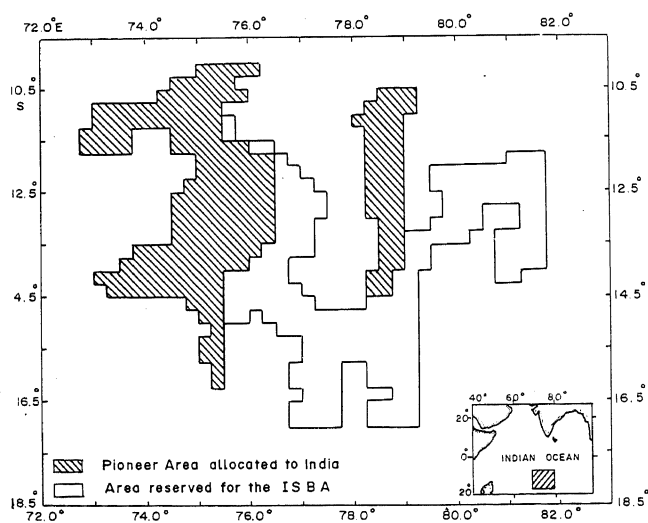


Figure 3. Map showing the two Polymetallic Nodule Areas (150,000 sq km each) in the Central Indian Basin allocated by the PrepCom for the International Seabed Authority on 17 August, 1987.

research vessels were in the Indian Ocean until recently gathering more information on the exact nature of the seabed and viewing the resources with the help of deep-sea photography. This would lead us to earmark the 'areas' for mining in the near future. The Department of Ocean Development (DOD) is currently formulating long-range programmes on all the maritime zones, especially the legal Continental Shelf regime which needs to be demarcated by India, 10 years from the date of ratification of UNCLOS-III. It is estimated that about 1 million sq km additional area may be encompassed under the legal Continental Shelf of India once the demarcations are made. Further, emphasis is laid on the environmental impact assessment studies to understand the effects of future deep-sea bed mining on ocean dynamics and harmonious living of the biota in the deep-sea region of the Indian Ocean.

South Asia Cooperative Environment Programme (SACEP)

The SACEP formed under the aegis of the Marine Environment Programme of the UNEP to discuss and finalize a Regional Action Plan for the protection of the marine environment in the South Asian Seas Region. It became a legal entity on 7 January, 1982 when nine South Asian countries ratified the Articles of Association of SACEP. In a meeting attended by the plenipotentiaries of India, Bangladesh, Maldives, Pakistan and Sri Lanka, held in New Delhi, on March 24, 1995, the SACEP adopted an Action Plan and the DOD was designated as the Nodal Department⁸. The Action Plan specifies the priority activities including

- (a) Integrated Coastal Zone Management,
- (b) Development and implementation of national and regional oil and chemical spill contingency planning,
- (c) Human resource development through strengthening regional centres of excellence; and
- (d) Control of land-based sources of marine pollution.

In conclusion, the ratification and adoption of the Third UN Convention on the Law of the Sea by an overwhelming majority of nations, including India, and more so by the industrialized nations, established a new international order on the oceans. This should contribute to the sustainable use of oceans for the future good of nations, and to unravel the mysteries of mother nature. This marks a beginning for all nations to put concerted efforts and trust in the UN System, to solve problems related to harmonious living of mankind, and for peaceful use of the natural resources.

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Breeding for rice improvement: Where do we stand?

K. Muralidharan, G. S. V. Prasad and C. S. Rao

Rice dominates India's agricultural scene. Rice breeding programmes were started to improve yielding ability, increase efficiency in the use of external inputs and incorporate resistance to biotic and abiotic stresses.

INTRODUCTION of short-statured, non-lodging rice varieties in the mid-sixties led to the green revolution. In rainfed upland, rainfed shallow lowland, semideep water and deep water ecosystems, breeding for rice improvement was aimed at bettering yielding ability, or other traits like maturity duration, resistance to biotic and abiotic stresses or grain quality. From the breeding lines evaluated till 1994, 464 rice varieties have been released for cultivation in India. The grain yield performance data on check varieties and breeding stock, in various co-ordinated multilocational experiments were critically analysed to find the yield gains, if any, in the sequentially released varieties for each ecosystem. Within an ecosystem, there were no significant differences in most of the individual comparison of check variety mean grain yields. A few checks showed low variance and/or low CV, but the variances of the mean grain yields were homogenous. Only a few of these released varieties qualified as rational replacements for the earlier existing checks. Linear regression analyses were performed to find the yield improvement over years in the two floating checks - the mean grain yields of check varieties, both national and local, pooled over all locations tested; and the experimental mean grain yields calculated from yields recorded over all locations by breeding stock

evaluated. The two floating checks showed no yield gain in two decades of rice breeding. The successful incorporation of dwarfing gene in released varieties prevented lodging losses and improved yields harvested in indica rices. Later rice improvement efforts resulted in the diversification of genetic background, maturity duration, grain size and appearance, scent and quality, and incorporation of resistance to biotic and abiotic stresses in varieties released for various ecosystems. Compared to the first released semidwarf varieties in 1966-68, significant yield gain, through exploitation of hybrid vigour or development of new plant type, has not been demonstrated yet. Abandoning of breeding genotypes with similar yielding ability at most centres to fund new initiatives in raising the rice yields are discussed.

Rice dominates India's agricultural scene historically and geographically. Introduction of short statured and input responsive rice varieties during mid-sixties led to the green revolution. The areas under rice cultivation were grouped under five ecosystems: rainfed upland, rainfed shallow lowland, semideep water (< 50 cm depth), deep water (> 50 cm depth) and irrigated. Investments were then made in rice breeding programmes to generate varieties suited to these ecosystems. The aims were to improve yielding ability, increase efficiency in the use of external inputs and incorporate resistance to biotic and abiotic stresses. The multilocational tests of breeding stock developed at dif-

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