



FISH AND FISHERIES

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SUNDARBANS ALARMINGLY WARMER DUE TO CLIMATE CHANGE

The recent study conducted by the scientists from India and the U.S.A. during 1980-2006 has shown that the water temperature increased to 1.5 ° C above the normal, which is a clear threat to the survival of flora and fauna of the world's largest mangrove forest of Sundarbans. A gradual increase of 0.5 ° C per decade has been recorded in Sundarbans, which is higher than 0.2 ° C per decade in the Indian Ocean during 1970-99, recorded by Intergovernmental Panel on Climate Change (IPCC). The study also indicated that faster melting of Himalayan glaciers have decreased the salinity in the western region of the Indian Sundarbans, while the clogging of various canals of the estuaries with fresh water regime due to heavy siltation and solid waste disposal from Kolkata has resulted in increased salinity in the eastern region. The surface water pH over the past 30 years has reduced, showing more acidity due to highly fluctuated salinity regime and increased temperature. Further, the global warming has accelerated the erosion in coastal and estuarine zones either through increased summer flow from the glaciers or by increased tidal amplitude due to sea level rise, resulting in increased saturation of suspended solids, which in turn has reduced the transparency in the water column. The reduced transparency affected the growth and survival of phytoplankton, the primary producers in the food chain in this mangrove-dominated deltaic complex, which is the nursery and breeding ground of 150-250 species of fish and other organisms. The negative impact of increased water temperature and its associated changes

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in the environment and also the man-made changes will be felt in the coming years.

CLIMATE CHANGE ON INDIAN CORAL REEFS

The recent ISRO (Indian Space Research Organisation) document on Indian coral reefs has indicated that the bleaching of coral reefs in the coastal waters has taken place. The UNEP (United Nation Environment Programme) has also recently declared that coral reefs, which support the majority of marine life, would be the first casualty of climate change. Further, the ISRO report indicated that the reefs around the Indian main land coast are facing the maximum impact, while those reefs in the Andaman and Nicobar Islands will not be affected so much.

FEAR OF DEPLETION OF SEA CUCUMBER IN TONGA, ONE OF THE SOUTH PACIFIC ISLANDS

A 11-year ban on fishing of sea cucumber was lifted in 2008 in Tonga. A limited fishing licenses were issued for a seasonal fishing during April-September, 2008. However, in 2009, more licenses and the extension of fishing season up to November were done. The fisheries officials feel that due to issuance of more licenses, extended season and unlimited fishing of sea cucumber may lead to their depletion again. In India, the ban on fishing for sea cucumbers was imposed in 2001 as a measure of conserving their resource. Since a 9-year post-ban period has passed, the Government can conduct a survey on the present status of abundance of sea cucumber in Gulf of Mannar and decide the future

utilisation of this valuable exported-oriented marine resource.

THE LARGEST BIVALVE FROM OCEAN



The giant clam, *Tridacna gigas* is the largest sedentary bivalve found in the Indo-Pacific region and attains a maximum size of 1.2 m wide and 227 kg in weight. It is a common species found in the near shore-waters of islands in the Andaman-Nicobar group. This giant clam is the most sought after its adductor muscle as a delicacy, its shells for lime and cosmetic preparation and live ones for aquarium trade, which has made it under “vulnerable” list. After its settlement in one place, it is permanently attached to the substratum throughout its life span. The average life span is 100 years.

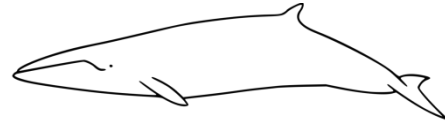
GIANT CRAB FROM AUSTRALIA



The xanthid crab, *Pseudocarcinus gigas*, is known to attain a maximum size of 360 mm in carapace width/13 kg in total weight and is commercially exploited since 1992 from a depth

range of 90-150 m in Bass Strait and eastern coast of Tasmania of southern Australia.

WHALING PROGRAMMES



Amid the protests from the anti-whaling nations, the Japanese whaling ships have left for a 5-month hunting in Antarctic waters in November 2009. During the season in 2008, six Japanese whaling ships caught 679 minke whales (*Balaenoptera bonaerensis*) and 1 fin whale (*Balaenoptera physalus*). From 1987 to the present, Japan has been engaged in whaling in the Southern Ocean to catch Antarctic Minke Whales under Article VIII of the International Whaling Commission (IWC), which allows the culling of whales for scientific research. So far, over 9,000 minke whales were killed by Japan in the last twenty two years. The anti-whaling nations led by Australia, New Zealand and the Netherlands and the environmental groups including Green Peace are planned to protest against the killing of whales in the name of research. On an earlier occasion, the Sea Shepherd Conservation Society has attempted to prevent the whaling by deploying its ships and inflated boats between the harpoon ship and the sea mammals. The Japanese whaling official said that the protest against whaling could be peaceful, but not by violence. Norway and Iceland are the only two other countries that hunt whales against a 1986 IWC moratorium on commercial whaling.

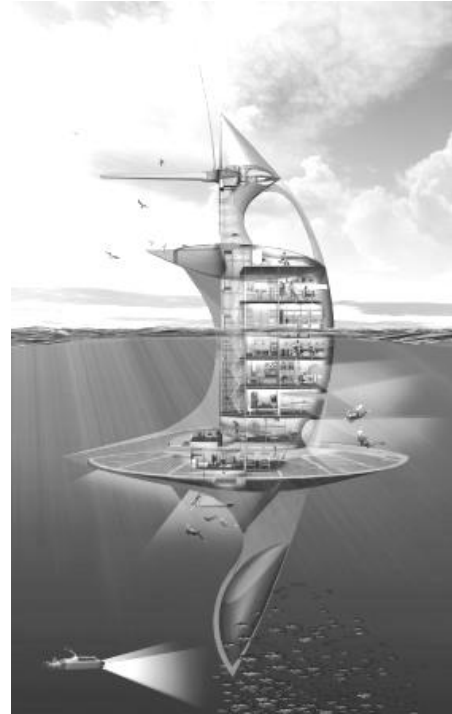
TALE BEHIND THE SHARK FINS



In order to meet the ever-increasing demand for shark fins in Asian markets, 73 million sharks, including 3 million hammer head sharks are killed annually. In most of the countries where sharks are fished, the fins are cut and the finless sharks are thrown back into the sea. The shark fins are used to make soup. The biggest Asian market for shark fins is Hong Kong. For the first time, scientists at the Institute for Ocean Conservation Science, New York State's Stony Brook University have used DNA from shark fins to determine the origin of region from where they were fished and found that the fins of scalloped hammerhead sharks collected from Hong Kong market could be traced back to rare populations in the Atlantic and Indo-Pacific Oceans. The results also showed that 57 of the 62 Hong Kong fins had come from sharks in either the Atlantic or the Indo-Pacific. Among the 57 fins, 27 % have originated on sharks from the western Atlantic, including the Gulf of Mexico and the North American Atlantic coast as far south as Brazil. These populations are considered endangered by the International Union for Conservation of Nature (IUCN). The new DNA technique may be used as a tool for controlling the shark trade by the respective governments in applying DNA-derived finning data, not only to develop quotas for annual fishing but also to prevent overfishing.

UNDERWATER SPACE STATION

A French architect has developed a prototype vertical ship called "*The Sea Orbiter*", which is the first one to drift through the sea allowing the scientists a closer view of the ocean. It measures 51 m in height and provides facilities for 18 personnel (6 each of crew, scientists and others) on board. While drifting in the sea, the *Sea Orbiter* would carry out the marine research under the waves. Only the lookout deck, navigation department and communications would be above the sea level, while the research decks would be pressurised to enable the scientists to do daily dives and other scientific missions.



Further, this ship will also facilitate the training of astronauts in extreme conditions and studying submarine human behavior by medical professionals. At present, the *Aquarius* is the only undersea laboratory of the National Oceanic and Atmospheric Administration (NOAA) and managed by the University of North Carolina at Wilmington (UNCW). It is stationed near the deep coral reefs at a depth of 20 m off Key Largo, Florida and provides life support systems that allow scientists to live and work underwater, in reasonably comfortable living quarters, with sophisticated research capabilities.

INDUSTRIAL FISHING IN ELIMINATION OF RARE SEA BIRDS

The report from the Royal Society of the Protection of Birds (RSPB) has indicated that the large-scale long line fishing in the North Atlantic Ocean and the Mediterranean Sea is indirectly killing the sea birds such as shearwaters and petrels. The long lining which involves hooks with bait is laid for great distances behind the fishing vessels. These birds which swoop on the bait are hooked and

made themselves as “by-catch”. It is estimated that 2 lakhs seabirds are being killed in fisheries in European waters every year, while the great shearwater alone accounts for an annual figure of 50,000 in the Spanish long line hake fishery off the west of Ireland. The RSPB and Bird Life International urge the European Union (EU) to implement an EU Community Plan of Action for the reduction of the incidental catch of sea birds in fisheries, as an urgent measure to save these rare birds.

THE CENSUS OF MARINE LIFE

In 1497, the English fishermen found that the swarming of fish in the sea around Newfoundland, which is the beginning of the census of marine life. The ichthyologists have so far identified about 15,000 species of marine fishes and they also believe another 5,000 species remain to be discovered. The present global marine census has started in 2000 and is due to be completed in 2010. As of 2008, it involved some 2,000 scientists from 82 nations, had a funding of US 500 million dollars and collected millions of samples. When the census started in the year 2000, only 2,50,000 species (marine bacteria to mammals) were known out of the millions estimated to live in the ocean. The present census may bring to the marine science many thousands more new species. The three recent expeditions in the deeper areas of the Mid-Atlantic Ridge of the Southern Ocean have yielded some 700 likely new species.



New octopod species



New sea cucumber

At 7,000 m depth, a comb jelly-fish was recorded, while at 1000-3000 m depth range, the longest octopus (2 m long/13 kg) was collected. Further, 9 new species of octopus were obtained. At 2,750 m in the Northern Gulf of Mexico, a transparent sea cucumber *Eynpniastes* sp. was found. As the coastal population of fish and shellfish is heavily exploited, the present census is likely to bring new resources for future exploitation.

**FISH PRODUCTION FROM INDIA
(lakhs in tones)**

Year	Marine	Inland	Total
2001-2002	28.30	31.20	59.56
2002-2003	29.90	32.10	62.00
2003-2004	29.41	34.58	63.99
2004-2005	27.80	35.20	63.04
2005-2006	28.16	37.55	65.71
2006-2007	30.24	38.45	68.69
2007-2008	29.20	42.00	71.20

During the first seven years of the twenty first century, there is virtually no increase in the marine fish catch, indicating the maximum level of exploitation. However, there was a steady increasing trend in the inland sector, which may be due to intensified willful stocking in the reservoirs and aquaculture ponds.



