

**Table 7.** History of Indian patent regulations  
(Source: Patent Office, Government of India)

Year	History of Indian patent regulations
1856	The Act VI of 1856 protecting inventions. Framework used the British Patent Law of 1852
1859	Modified Act XV
1872	The Patents and Designs Protection Act
1883	The Protection of Inventions Act
1888	The Inventions and Designs Act
1911	The Indian Patents and Designs Act
1972	The Patents Act (Act 39 of 1970)
1972	The Patent Rules of 1972
1999	The Patents (Amendment) Act of 1999
2002	The Patents (Amendment) Act of 2002

Delhi that in spite of correspondence regarding patent workshops for sensitizing the medical fraternity has 'not responded'. Scientists need to learn about patents for remaining competitive.

Some states in India have fared better in terms of applications for patents filed

in the year 2000–01. A part of the break-up is as follows: Delhi, 663; Maharashtra, 545; Tamil Nadu, 174; Gujarat, 147; West Bengal, 143; Karnataka, 112; Andhra Pradesh, 100; Uttar Pradesh, 90; Kerala, 77; Bihar, 31; Madhya Pradesh, 30; Haryana, 20; Punjab, 15 and the rest in single

digits (Source: Patent Office, Government of India).

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## Marine debris in Great Nicobar

Andaman and Nicobar Islands are situated off the eastern coast of India in the Bay of Bengal and are also called Bay Islands. They are located between 6°45'–13°45'N lat. and 92°15'–94°00'E long., about 1200 km from the mainland. The islands, which have proximity to some of the South East Asian countries like Myanmar, Thailand, Malaysia, Singapore and Indonesia, comprise 572 islands, islets and exposed rocks. The Island coast extends to 1912 km, which is almost one-fourth of the Indian coastline.

The National Institute of Ocean Technology (Department of Ocean Development, Government of India) is carrying out a national programme entitled 'Coastal Ocean Monitoring and Prediction System' (COMAPS) throughout the Andaman and Nicobar Islands. A detailed survey throughout the Andaman and Nicobar group of islands was carried out during April–May 2003, to assess the magnitude of coastal ocean pollution and its impact on the coastal waters.

During this survey, occurrence of substantial quantity of marine debris all

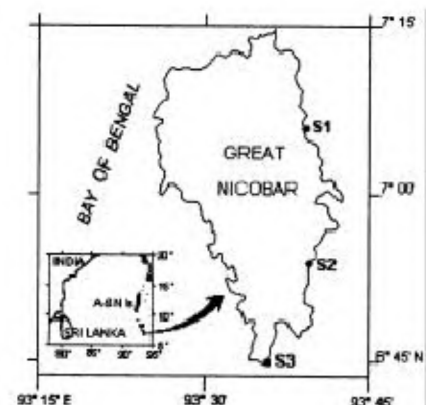
along the shore and coastal regions of Great Nicobar and Nancowry (Figure 1) has been observed. The quantity of debris was large, as seen in Figure 2, although the population in these islands is around 6800 islanders and 1000 tribals, respectively (according to 1992 census). The debris is not of local origin.

Marine debris is defined as any man-made solid material that enters the ocean directly (e.g. by dumping) or indirectly (e.g. washed out to sea via rivers, streams, storm drains, etc.). Of all marine debris materials, plastic debris is one of the most alarming of today's environmental hazards along shorelines, coastal waters and oceans throughout the world. Most plastics are non-biodegradable, as no naturally-occurring organisms can break down these polymers. The process of photodegradation takes longer duration in the ocean than on land because of the cooling capacity of the ocean.

Unexpected quantities of marine plastic debris in this region may be due to improper handling of the solid waste in adjacent foreign countries, since plastics

could be carried by currents and circulated continuously in the open sea and coastal areas, and are subsequently washed ashore.

Marine plastic debris can harm fish species and other aquatic organisms that use the coral reef, and kill coral reefs by continually rubbing against them or



**Figure 1.** Site map of the Great Nicobar Island. S1, S2 and S3 indicate sampling locations.

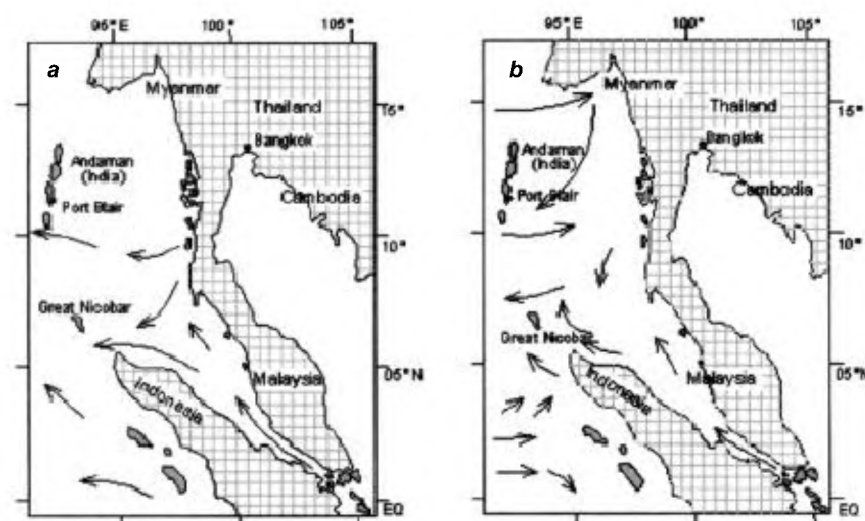
smothering them. Further, plastic pieces can attract and hold hydrophobic compounds like PCB and DDT up to one million times background levels. As a result, floating plastic is just like a poison pill, which is regarded as a potential endocrine disrupter. And most of the plastic floating in the surface is being mistakenly ingested by marine turtles. This may be a potential hazard to the leatherback turtles and their hatchlings in the Great Nicobar, which is one of the important breeding grounds for these turtles. Another major ecological problem contributed by the marine debris is the movement of invading species. Debris floating in the sea can carry many organisms such as small crustaceans, plankton, algae, bacteria and fungi. Rafts of debris can even colonize some land-based species. When organisms from one environment are carried to another part of the world, significant problems can arise.

It is opined that unexpected quantities of marine plastic debris observed in this region might have been due to improper handling of the solid waste from fishing/mariculture activity and ship traffic. MARPOL 73/78 (the International Convention for the Prevention of Pollution from Ships) is the international treaty regulating the disposal of wastes generated by normal operation of vessels. In many countries these regulations are applied strictly and penalty for violations is severe. About 161 countries are parties as of December 2001. MARPOL 73/78 is implemented in the US by the Act to Prevent Pollution from Ships, under the lead of the US Coast Guard. Also, marine bioinvasion is the hot topic now in the shipping industry and International Maritime Organization (IMO) has initiated steps to curb this menace. This accumulation of debris in our waters is a classic problem for bioinvasion.

As shown in Figure 3, sea-surface current prevailing in that region might have resulted in debris being circulated continuously in the open sea and coastal areas, and subsequently washed ashore in our coastal areas. From the above observation, it may be inferred that the garbage generated in the coastal areas of Sumatra, Singapore, Malaysia, Indonesia and other South East Asian countries and



**Figure 2.** *a*, Plastic debris and *b*, fishing buoys observed on the beach.



**Figure 3.** Surface current profile near the Great Nicobar Island during (a) December–February, and (b) March–May.

by international shipping services is not disposed properly and dumped directly into the sea. This is taken by the currents and washed ashore on our pristine beaches of the Great Nicobar and Nancowry group of islands. Apart from this foreign plastic invasion through oceanic circulation, plastic and glass find several ways, like our domestic materials, to enter into our pristine islands and subsequently into the coastal ecosystem, since there is no proper solid-waste disposal practice.

Since it is an international crisis, curbing the marine debris problem in our coast is not an easy task. However, assessment and monitoring of the floatable debris in the coastal water and underwater areas, beach and underwater clean-up campaign

can be taken up periodically to check the marine debris in our coastal water and beaches. Above all, setting up a pilot-scale plastic recycling plant in these affected islands will be advantageous in curbing this problem effectively. This will also generate revenue and improve the socio-economic status of the coastal community. The Andaman and Nicobar administration has initiated some action on this subject.

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