POLLUTION IN SOUTHEAST ASIA

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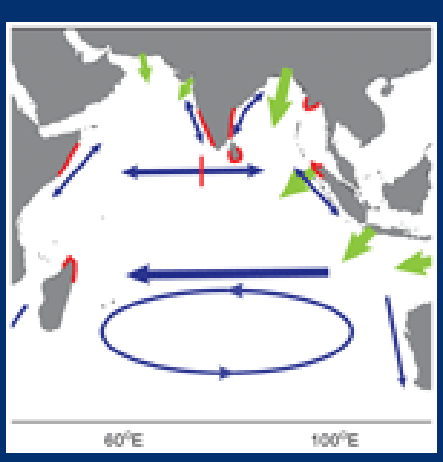
Plastics in the Indian Ocean

Indonesia is the second largest plastic polluter in the world after China, responsible for **3.2 million tonnes** of unmanaged plastic waste a year, **1.29 million tonnes of which ends up in the sea.** Approximately 10 billion plastic bags, equal to 85,000 tonnes, are released into the local environment each year. After the North Pacific Ocean, the Indian Ocean has the second-largest plastic load overall.

One of the worst types of pollutions in Southeast Asia are **nurdles**, pre-production plastic pellets that are easily integrated into the food web due to their size. 230,000 tonnes of nurdles end up in oceans every year due to spills from cargo ships, such as the X-press Pearl which sank while traveling through Sri Lanka. Nurdles cling to highly concentrated toxic compounds that can end up in the digestive systems of marine life and even in people.

Nurdles found in a dead fish in Sri Lanka



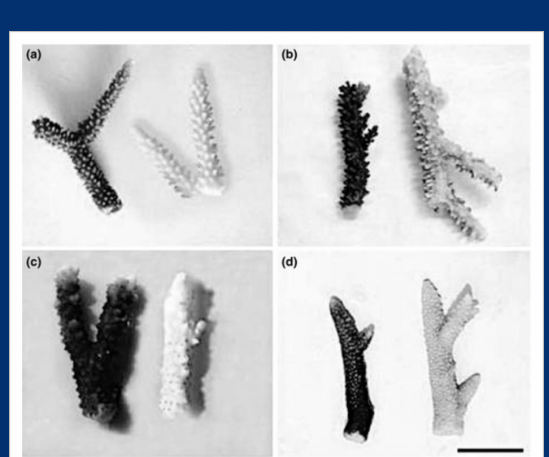
Pathway of plastic pollution in the Indian Ocean

Nurdles on the beach, near the X-press Pearl spill

Corals: A Key Species

The South China Sea and the Coral Triangle support more than **500 species of coral**, and hundreds to thousands of other invertebrates, algae, and reef fish. However, Asia has been experiencing the most rapid coastal population growth globally in recent years. The coral reefs provide an estimated US$ 22 billion annually in coastal protection benefits in this region, and losses just in Indonesia could cost up to 1.5 million dollars.

Plastic litter is also dangerous for coral as microplastics can be uptaken by plankton and incorporated into coral skeletons.



Different coral species experience bleaching effect from poor water quality, OA, and sunscreen

Ocean Acidification

Changes in ocean pH have also placed stress on corals, however, there is a lack of local data on biological impacts. Ocean acidification seems to be one of the drivers for reducing coral resilience, growth, and survival.

Indonesia is the largest coral reef nation, with about 51,000 square kilometers of reef coverage. Many other South Eastern countries depend on tourism, coral reef fisheries, and ornamental fisheries for a living, thus the reef is highly important for their livelihood.

Ocean acidification stems from anthropogenic sources, especially carbon dioxide emissions which then dissolve into forms of inorganic carbon that alter the chemistry of the seawater, but because of extreme rainfall from monsoons and heavy fertilizer use in populated regions, Southeast Asia's reefs are projected to be especially vulnerable to lower pHs with less calcium carbonate available and an increase in eutrophication.

The fisheries industries in this region suffer due to the losses of shell-forming species and the overexploitation of natural resources as a byproduct of ocean acidification, which is also troubling as areas in Southeast Asia majorly contribute to marine aquaculture production, a source of food security and economic stability.

Solutions

The Indonesian government has declared to reduce 70% of the current plastic pollution by 2025. In order to get close to that goal, there is a need to develop different strategies and solutions.

Plastics: Only **14% of wastewater is treated**, and with the majority of sewage systems being open (any pollution can enter), the first priority is to **build more wastewater treatment plants**. Indonesia is beginning to focus on limiting plastic pollution at its source by **taxing the sale of single-use plastic** and switching to biodegradable alternatives. Plastics already present in the ocean require different solutions; one proposed solution is to pay fishermen to clean up trash, and similar incentives could be used in the tourism industry. Organized beach clean-ups, cash incentives, and communication about the issue are great ways to inform the public and engage a variety of stakeholders.

Snapshot of All MPAs in Indo-water (2020 data)
MPAs in purple

Corals and OA: Schools are working to raise awareness by spending more time teaching about their local coral ecosystems. Divers are providing consistent live coverage of the reefs, to better engage stakeholders. Conservation groups are advocating for the end of blast and poison fishing, and for **better management** to enforce these rules. These, along with **Marine protected areas** (MPAs) and the **banning of dynamite fishing** are tools that fisheries can utilize to protect existing coral. In order to rejuvenate damaged reefs, some groups are beginning to regrow coral on constructed metal “spiderwebs” in a method called the **coral spider technique**.