Review Article

Effects of coral reef destruction on humans and the environment

Abstract

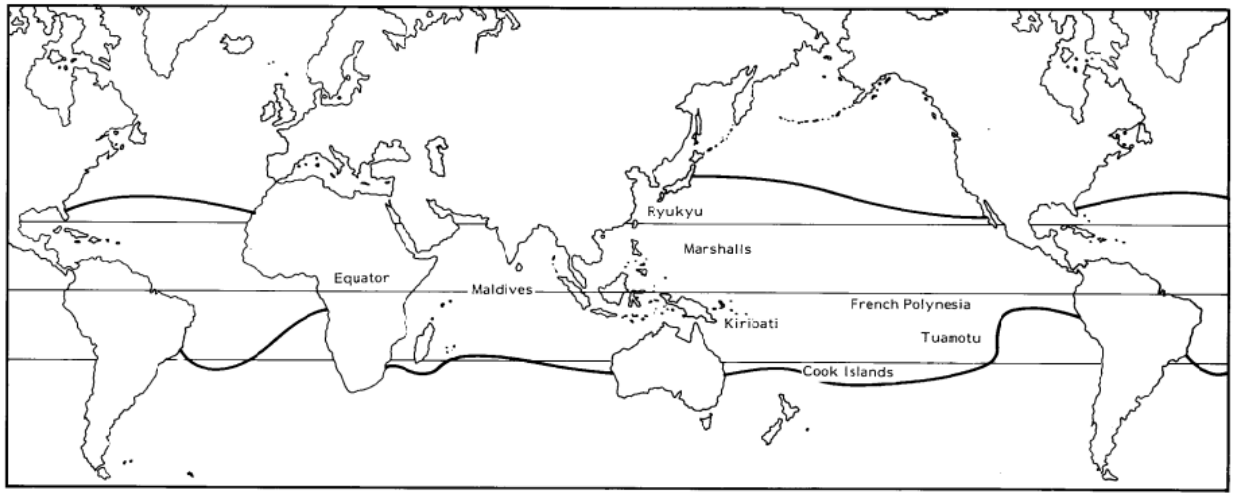
Coral reefs are home to a rich biodiversity density and one of the most diverse ecosystems on the planet. About 35,000–60,000 different species of plants and animals, many undiscovered are found in coral reefs. It provides food, employment, and tourism to peoples, protecting coastal areas from storm surges; act as nesting grounds for many species of fish that are important for commerce. These days, a number of events, including pollution, overfishing, destructive fishing methods using dynamite or cyanide, boat anchor falls, tourist visits, mining coral for building materials, and a warming climate, are destroying coral reefs. To reduce the destruction of coral reefs encourage sustainable fishing, stop deforestation, follow all safety precautions when visiting coral reef areas, remove all trash from the coral area, avoid touching or disturbing, avoid boating nearby, avoid dropping anchor or chains, and educate yourself on the value of healthy coral reefs to the people, fish, plants, and animals that depend on them. If all this is done, we can undoubtedly reduce coral reef damage and its impact on people and ecosystems.

Keywords: coral reef, biodiversity, plants, animals, fish, destruction, effects

Introduction

Coral reefs cover 600,000 square kilometers of the area throughout the Pacific, Indian, and Atlantic Ocean coasts, mainly between 25° north and south of the equator but occasionally up to 30° latitude (Figure 1). Warm water surrounds them and they go down to a depth of 100 meters. The 2200 km long Great Barrier Reef in northeastern Australia is an example of a very large reef. Other massive rocks form protective margins around high volcanic islands or low atolls. Most of the world's 410 atolls are gradually subsiding and migrating as a result of tectonic processes and remain intact only because of the protection provided by growing reefs (Salvat, 1992).

The 'rain forests of the ocean' that provide benefits to millions of people worldwide have been referred to as coral reefs (Mulhall, 2008). Coral belongs to phylum Cnidaria and class Anthozoa. They are part of the oldest eumetazoan phylum, which also includes sea anemones, jellyfish, and hydras (Van den Hoek & Bioume, 2017). The success of this ecosystem depends on a symbiotic relationship between the coral host and the zooxanthellae, or unicellular algae. All other organisms in the community provide important detritus, with corals and calcareous algae forming the primary framework (Salvett, 1992). Coral reefs are highly productive, diverse, and beautiful ecosystems that provide a wide range of benefits to people, the environment, and aquatic life. Despite this, overfishing and other unintended human activities are damaging reefs around the world. A contributing factor to this issue is the low appreciation of the true economic value of coral reefs. The future of coral reefs might not seem so bleak if governments, decision - makers, and people were more aware of their true value when used sustainably (Spurgeon, 1992).



Source: Salvat, (1992)

Figure 1. Geographical distribution of coral reefs

Effects of natural calamities on coral reefs

Apparently, there are several threats to coral reefs. But they frequently undergo deterioration from adverse weather conditions. Hurricanes and cyclones can generate huge aggressive waves that can destroy coral reef. Additionally tidal emersions serve as a threat to reefs. Reefs are negatively impacted by prolonged periods of unusually low tides that expose coral heads in shallow water. Most UV radiation, which can overheat and dry up coral tissues, is absorbed by corals exposed throughout the day. Weather patterns like El-Nino can lead to increased sea surface temperatures, decreased sea level, and increased salinity due to changing rainfall. The combined effects of these factors can drastically alter the physiology of coral (Forrester, 1997; Thangaraj, 2019).

Effects of anthropogenic activities on coral reefs

The most serious threat to coral reefs is anthropogenic activity. Every day, people destroy reefs around the world through pollution, overfishing, destructive fishing techniques using dynamite or cyanide, collecting live coral for the aquarium trade, and coral mining for building materials. Some pollutants can increase nutrient levels in the water, causing algae and other inhabitants to grow rapidly and suffocate corals. Leaking fuels, anti-fouling paints and coatings,

and other chemicals that enter the ocean affect coral reefs. Coral reefs are destroyed in various places when they are collected for aquarium and jewelry industry (Thangaraj, 2019).

Source: https://www.dw.com/en/coral-reefs-rapidly-die-from-marine-heat-waves-study/a 49960345

Figure 2. Coral reef destruction caused by anthropogenic and natural disasters

Effects of coral reef destruction on the aquatic environment and humans

Recent assessments of the condition and abundance of coral reefs show an alarming decline (Bryant *et al.*, 1998; Wilkinson, 2000). According to a recent pattern analysis by Wilkinson (2000), about 30% of the world's coral reefs have disappeared in the past three decades and about 60% of today's coral reefs could be lost by 2030 due to human-caused activities. A wide spectrum of human activities, including resource consumption, tourism development, sale of coral reefs, construction near coral reefs, etc., are directly linked to rapidly declining coral reef populations around the world. The increasing destruction of coral reefs has many harmful effects on aquatic animals as well as humans and the environment.

Table 1. Consequences of the destruction of coral reef ecosystems on the environment and mankind

1. **Depletion of food, shelter, and breeding grounds**	Coral reefs provide vital food, shelter, and breeding grounds for aquatic organisms. Millions of fishes, turtles, and numerous other organisms would become extinct if their natural habitats disappeared.
2. **Depletion of human economic generation**	According to the United Nations, around one billion people worldwide depend on coral reefs for their nutrition and livelihood. Their extinction would be catastrophic, depriving hundreds of millions of populations around the world of their basic source of food and income.
3. **Declining coastline tourism industry**	Coral reefs fascinate tourists concerning over 100 countries and territories across the world. A 2017 study concluded that coral reef tourism generated $36 billion in revenue annually. Tourist numbers would plummet if the coral reef will decline and the impact would be devastating to local businesses
4. **Shoreline erosion**	Coral reefs also show their wonders on land. Unsurprisingly, they play a vital role in preserving coasts by acting as a natural barrier against huge waves and harsh weather conditions. Without them, shorelines would be at risk of erosion, and sea level rise would force communities living along the coast to relocate from their homes.
5. **High medicinal properties**	Coral reefs are commonly referred to as "the drug stores of the sea". Reef-dwelling plants and animals may hold the key to developing novel treatments for a variety of diseases and elements. New anti-carcinogenic, anti-inflammatory and advanced UVC sunscreens discovered in coral reefs (Stein-Roesteng, undated). This goes to show that the health of our coral reefs is closely related to our own. To

	put it another way, losing them all is a terrible idea.
6. Hypoxia	The oceans produce 50-80% of the oxygen on our planet. Plankton and other photosynthetic bacteria produce most of this oxygen. This oxygen is used by marine life and humans through the air we breathe. As a result, a healthy climate requires a healthy ocean, and a healthy ocean requires healthy coral reefs.

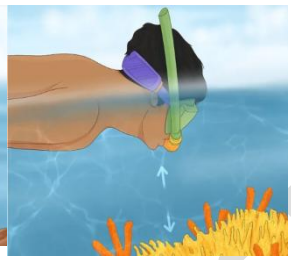
Challenges for coral reef management and restoration

Due to a combination of natural and human-caused processes, destruction of coral reefs and depletion of their living resources is already well-developed throughout the ecosystem. The most affected coasts are those of least developed and emerging countries. It is now impossible to verify that the disappearance of reefs is the result of global climate change, although it is certain that coral reef ecosystems are extremely sensitive to even minor temperature fluctuations. It is possible that coral reefs will serve as markers of climate change on a global scale. It is clear that managing coral reefs will be extraordinarily challenging for both current and potential human societies. It is certainly important to manage tropical coastal ecosystems and monitor coral reefs in light of potential greenhouse effects.

Coral reef management strategies





1. Recycle and appropriately dispose of trash
2. Reduces the use of fertilizers
3. Use eco-friendly ways of transportation
4. Reduce stormwater runoff
5. Refrain from buying live coral
6. Explore coral reefs knowledge and educate your community
7. Avoid colliding or touching a coral reef
8. Use caution when snorkeling and scuba diving
9. Avoid near-shore development and construction
10. Act against global warming

Source: https://www.epa.gov/coral-reefs/what-you-can-do-help-protect-coral-reefs

Conclusion

Coral reefs are vital to both animal and human survival, so it is important to protect them. The past several decades have seen an imminent threat to coral ecosystems on every continent of the world due to global warming and other influencing factors. There is an urgent need to review current management strategies in light of the global decline of coral reefs. Many researchers have concluded that coral reefs need protection, and they need it without delay. Thereafter,

natural processes are difficult to regulate effectively, requiring more research to recover coral reefs. A long-term, more effective strategy would involve coral reefs, which are rapidly disappearing and are currently out of balance. Research studies for the coral ecosystem and its conservation receive significant attention from global environmental protection initiatives. According to a recent study from the University of Queensland in Australia, dead coral reefs are just as important as living reefs, as they can support more life than living corals.

References

Salvat, B., 1992. Coral reefs—a challenging ecosystem for human societies. *Global environmental change*, *2*(1), pp.12-18.

Spurgeon, J.P., 1992. The economic valuation of coral reefs. *Marine pollution bulletin*, *24*(11), pp.529-536.

Van den Hoek, L.S. and Bayoumi, E.K., 2017. Importance, destruction, and recovery of coral reefs. *IOSR Journal of Pharmacy and Biological Sciences*, *12*(2), pp.59-63.

Thangaraj, Kongeswaran. (2019). Natural and Anthropogenic Threats to Coral Reefs.

Forrester, A. 1997. The Effects of El Niño on Marine Life. Cambridge Scientific Abstracts Web site.

Stein-Rostaing, R. (undated) Coral Reefs, a Review. (accessed 12.06.12.)

Mulhall, M., 2008. Saving the rainforests of the sea: an analysis of international efforts to conserve coral reefs. Duke Environmental Law & Policy Forum 19, 321e351. Spring 2009.

Bryant, D., Burke, L., McManus, J., and Spalding, M. 1998. Reefs at risk: A map-based indicator of threats to the world's coral reefs. WRI/ICLARM/WCMC/UNEP. World Resources Institute, Washington, DC, 56 p.

Wilkinson, C., ed. 2000. Status of Coral Reefs of the World: 2000. Australian Institute of Marine Science, Townsville, Australia. Web version: http:/ /www.reefbase.org/Summaries/GCRMN2000.htm.