

Secret of vibrant water- A Study on Coral Reef around Indian Coast

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Abstract:

Coral reefs are window to the past. They are ocean reefs created by coral (living animals) or especially by stony coral colony. These corals have outer skeleton made up of limestone which is made by carbon di-oxide and calcium which is present in the sea water. The network of these skeleton of dead coral are creates reefs under sea water. There are also the living coral reef as well. Beneath the water the dead coral reefs occupies the lower water are while living ones covers the top .But with the time these reefs are being affected greatly due to human activities. The waste that we are disposing in water eventually meets the ocean and pollute the water as well as its habitat. If we still don't take any step to prevent them, there might be the chance that the future generation won't even able be to witness these alluring window to the past. Affecting reefs will not only affect mankind but also affect the creatures underwater who are dependent on reefs for their survival and we all do know that even a single loop in the food chain will show impact to every individual from lower class to the upmost higher class on the Earth. In this paper we have covered the concerns for reef, impact of pollution on them and their fluctuating population around the Indian coast (Levy, 2008).

Keywords: Coral Reefs, Ocean, Pollution, Limestone, Indian Coasts

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Introduction

A reef considered as the material of ridge present at or adjacent to the ocean surface. It can also occur certainly and naturally. The natural reefs are composed of skeletons of small animals or rocks which is termed as corals (National Geographic)

The chief coral reefs comprise of islands with consisting further 2000 km of ridge of Lakshadweep-Maldives-Chagos; also the patch reefs and fringing in the Andaman and Nicobar Islands all over the place of the Gulf of Mannar in Sri Lanka and India, and consisting the Sri Lanka's south eastern coastline and western coastline. Fewer well established groups of coral happen in different India's parts, particularly in the Gulf of Kachchh, including the Karnataka, coast of Maharashtra, Kerala, Goa, and Tamil Nadu. Adequate or can say poorly studied communities of coral are present around Jinjira reefs in Bangladesh and St. Martins Island/Jinjiradwip, and also including the Baluchistan shore in Pakistan, along with Gwadar and Astola Island. (Tamelander and Rajasuriya, 2013).

Reefs can be of following types:-

Artificially Manufactured Reefs-

Man-made reefs are built majorly for three principal causes. The primary one for the purpose of guarding the coastline. The work of Reefs represent as barriers among the powerful ocean and tornadoes coast. They also responsible in protecting coastlines with the coming erosion. An island, named Maldives considered as state in the Indian Ocean, has built ridges to defend its coastal island of coral with that of the cyclones and other related factors that might formed to erosion in beach.

The secondary reason that the people build reefs is to encourage life in sea for aquaculture and recreation. An ecology related to reef is considered to be very different. Plankton, plants, sponges, algae, fish, eels, sea turtles and crabs are known to be certain organisms that flourish in the reefs which are healthy enough. The widespread fish variety (like sharks) make amusing fishing famous for the ecosystems of reef. Luminously colored fish, sea stars and sea anemones also helpful in making popularity of reefs with connection with the snorkelers and Scuba divers. The artificial reefs belonging to Atlantic coast of the U.S. states of Florida, South Carolina and

Georgia have donated to the wildlife location and stimulate vacation industry. Also the artificial reefs can also formulate sedentary or inactive creatures, like oysters and clams, for the purpose of harvest. Accordingly, Japan is considered as the leader in making of varied artificial reefs for the production of oysters (who are pearl-producing).

A last and foremost purpose for construction reefs is to generate a outline like wave that support the sport of surfing. The surfers ride panels positioned on the top of the waves. With the help of engineers they also have tested shapes of reef for the purpose of improving the conditions of surfing. Hence, these reefs are commonly situated far offshore and consisting the merits of generating a higher, secured zone of swimming nearby the coast.

Natural Occurring Reefs-

There present numerous categories of natural reefs. The reef named "Live-bottom" are projections or ledges of rock. The organisms like seaweeds and sea anemones connect themselves straight to these categories of rocks, establishing a live-bottom reef for plants and fishes. The sharp rocks deliver extends and guard for marine life and fish for example seals.

The oyster beds which is also known as shellfish reefs, are considered as unique or individual kind of reef i.e. live-bottom. The larvae of Oyster connect themselves to big adult oysters at the reef bottommost, to create coatings into column of huge oyster. The shells of Oyster not about rocks, deliver the tough surface on which the organism of reef such as sponges can produce. They used to provide security and preservation for fish i.e. gobies considered as cause of food for animals such as turtles. The major familiar category of natural reef, though, is considered as coral reef. These different colored sand stone edges are built by animals belongs to tiny sea known as corals. Their hard exoskeleton are basically formed coral reefs. There are several diverse types of corals. Either the one who form reefs are called as stony or hard corals or the corals that are not responsible in producing exoskeletons are called soft corals.

These coral reefs develop gradually and normally consider at the amount of only some centimeters every year whereas others may have designed for about millions of years and can be estimated around hundreds of meters dense. The perfect for explaining

this is Great Barrier Reef belongs to northeast coast of Australia and expands for approximately 3,000 kilometers i.e. 1,600 miles.

Formation of Coral Reefs

A coral is termed as polyp i.e. type of lump and produces somewhat a little superior than a fingernail of human and is a lot individual the size of a pinhead. It also consist of a tube like or modest body with positioning of tentacles at one of the end.

Many of the hard corals duplicate by the method of budding, and hence is a procedure of creating minor buds that grow into fresh polyp individual. The polyps shape solid and in the shape of cup skeletons from place to place to their delicate and soft bodies. Occasionally the reproduction of coral to produce eggs also where the egg is formed by larva hatching and placed by a mature polyp. The larva floats in the water up to it influences a point it connect the aforementioned to, typically portion of a current coral reef or other structure of limestone. The undeveloped or young polyp formed a material known as calcium carbonate, also termed as limestone. This strengthens round the polyp and links it to the reef. The outer skeleton is helpful in protecting corals from foreign bodies. As the death of animals, further polyps construct exoskeletons located on remnants top.

The diverse species of corals structured various different shapes of reef. Some gives appearance like branching trees or bushes. Another appear like large fans, antlers or domes, some may even look brain like structure. The living polyp's bodies are often visualized in vivid colors of yellow, pink, purple, blue, and green.

By adding warm water, coral requires water that is transparent and clear for the reason that water occupied with sediment or slit would choke or smooth the polyps.

Certain corals, though, doesn't required algae to live. The type of corals can able to survive in much cold and deep water. The cold-water coral reefs, also recognized as deep ocean reefs and are present from Norway to the Aleutian Islands.

Apart from living or dead, on the basis of the type of formation, there consist three categories of coral reefs such as atolls, fringing reefs and barrier reefs.

A fringing reef which is one of the category of coral reef produce alongside the coast edge and is involved to land. It spreads outwardly after shore i.e. shelf, which is just underneath water surface. It is formed of a reef which is having a reef slope and horizontal plane. The reef flat is found to be adjacent to shore. Because of the dense residue, some of the live corals aware in the reef flat. Hence, frequently comprise of exoskeletons. The reef slope surfaces in the direction of the ocean. The life of sea is originate on the slope of the reef. These fringing reefs are a lot communal kind of coral reef.

A barrier reef is distributed since the shore through a lagoon. The reef formed a fence or obstacle between the Open Ocean or sea and the coast. Certain barrier reefs contain of network of minor reefs detached by constricted waterways. Its best example is The Great Barrier Reef.

The coral reef is a reef in the exposed sea that is hemmed in by a lagoon. This type of reef is made when a circle of coral shapes up on the sides of a volcano underneath the sea that has increased above the ocean exterior. The peak of volcano slowly wear away and descends under the surface of water, and the reef endures to figure. As the time is delivered, portions of the reef seem directly above the marine as a shape of Ring Island or chain of islets.

Reefs are damaged and crumpled by rapid moving, powerful waves that crash into them. When the waves collapse the solid coral of a reef, they attack it into a fine sand. The sand shelters numerous tropical beaches and aids form fresh land. As it increase, a coral reef offers homes for a huge amount of existing creatures. The coral reefs are between the richest, utmost diverse groups of life originate wherever in the ocean.

(National Geographic).

Problems regarding reefs

Agricultural industries and construction also relief the chemical which is injurious into drains and rivers that vacant into oceans eventually. Most of the coastal cities disposed sewage and other type of trashes into the ocean. This type of causing pollution definite categories of algae to promote quite quickly that create thick mats ocean top. These damaging algal blooms hunk daylight and can be lethal to an existing coral reef.

Reefs are also being damaged through submerged water oil drilling and mining. Specific have been smashed by the explosives which are utilizes to unblemished out channels in the seabed for ships for allowance of their way.

Overfishing also make happen abundant harm to some reefs. The cold-water coral reefs are particularly susceptible to overfishing for the reason that of the skill support. The huge searching nets struggle along the bottommost of the ocean, dismissing susceptible habitats of corals. Environment devastation and overfishing have prepared crustacean reefs among many of the rare or endangered habitats of aquatic organism on Earth in the present condition.

Killing tropical fish for diversion or gathering them living to trade to traders of aquarium sets tropical or humid coral ridges at threat. Another reef entities, like the Hawksbill sea turtle, have been gathered in major amount that several are now considered to be endangered or rare. The turtle was frightened for utilizing as a purpose of jewelry with "tortoise shell". The orange and red coral species are also appreciated as a substances for making jewelry.

The artificial reefs have confirmed catastrophic for the atmosphere. One of the named Osborne Reef, close to Fort Lauderdale, Florida, was built of more than a million utilized truck as well as car tires. Between these, some animals has modified to live life about the rubber reef. The tires were not found to be secure appropriately and because of that numerous broke loose. The heavy tires collided into the natural coral reefs adjacent, upsetting for the ecology. Storm and Hurricanes flows and transmit tires to beaches and damage the reefs' natural habitat (National Geographic).

Review of Literature

Mc Clanhan, Maina and Muthiga (2011), majorly worked on connection between climatic coral reef and stress in Western Indian Ocean. Their agenda was to regulate if around was any relations among regions with low-to-moderate climate stress and high coral reef diversity. Their findings suggested that disclosure to pressure was monitored from data of satellite dependent on 9 geophysical– biological oceanographic features that occur coral bleaching which are mostly light, temperature, and current variables. The stress of environmental model and the coral community signify vulnerability index which

were reasonably linked ($r = 0.51$) with southern parts and eastern parts of the WIO acknowledged as parts with small environmental and coral communities stress with larger governance of bleaching stress-sensitive taxa. The amounts of taxa of fish and coral were promising and are considered moderately connected ($r = 0.47$) but high variety regions for fish were in the west part and north part while diversity was uppermost for corals in central regions from Tanzania to northwestern Madagascar. Combining around 3 to 4 variables into compound maps recognized a region from southern Kenya to northern Mozambique across Mascarene Islands and the Mozambique–South Africa and northern–eastern Madagascar border as areas where environmental condition as low-moderate contact overlays with moderately maximum taxonomic variety. There also additional in the present study i.e. controlling labors in these areas should be significantly goals at preserving high-diversity and intact ecosystems and are careful minimum probability to be spoiled by disturbances of climate in the near term. It is also seen, that diminishing the extra disturbances of human, like pollution and fishing, in selected areas is predictable to recuperate the chances for their persistence. These type of reefs are measured as a great priority for developed national, local and international management sweats in creating coral reef refugium for change in impact of climate.

Sheppard et al. (2012) in their paper they have analyzed the technical work and information related to past that established the remaining of standard ecology of the Chagos Archipelago, which was later directed in the year 2010. They testified that coral reef fishes are commands of greatness which more ample in amount as compare with another area in Indian Ocean, irrespective of whether the later are fished or secured. This paper also focused that the disease of coral are very low, and no presence of hostile marine species. Inherently, species of Chagos sea are portion of the Chagos and Western Indian Ocean aids as a 'stepping-stone' in the ocean. It was suggested that Chagos is preferably located for numerous observing programs, and it utilizes progressively exist of the archipelago for controlling of reefs.

Tamelander and Rajasuriya (2013), in their paper basically worked on the current status of coral reef in south Asian Country. These country included Chagos, Bangladesh, Maldives, Sri Lanka & India. They maintained the status of reefs until 2004 and

further until 2008. They witnessed in 2006, a strong retrieval of coral protect after the form impermanence in the year 1998 in the Chagos archipelago. They mentioned that recruitment of larval of Coral was very durable, like the bottommost Chagos novice thicknesses were approximately 10 times progressive than amounts of conscription at maximum other reefs in the western and central Indian Ocean. For the position of Maldives they described that cover of coral is presently at the similar level as in the pre-1998 public at several sites, the size of coral class sharing also reproduces the fact that the reefs are improving, with the mainstream of colonies among diameter ranges 10 and 20 cm which is continued by size 20-40 cm. The diseases related with coral like black band and white band, are less common than earlier shown at certain sites of reef, whereas the sponge *Terpios hoshinota* is shared at selective sites where it overgrows and executes several species of coral. As per as India' status they described that the chief reefs of Indian areas, comprising the Andaman and Nicobar Islands, Lakshadweep Islands, and Gulf of Mannar, with restricted and essentially information of anecdotal for reefs away in the country. There has been a decrease in macro-algal and algal turf cover associated to the previous studies, probably clarified by fit inhabitants of algal eating fish, chiefly acanthurids and scarids, which are stated to enable the recovery of coral though there has been governance of some different species in accumulative population. For the status of Sri Lanka, they stated the maximum rate of retrieval from the mass bleaching in the year 1998 and has been verified at Bar Reef Marine Sanctuary somewhere coral cover improved from 40% in the yaer 2004 to about 70% in initial year 2007, mostly in line for to rapid development of *Pocillopora damicornis* and *Acropora cytherea*. For the study of Bangladesh they have stated that there are around 66 species of scleractinian corals in which 15 families and 22 genera. There present inadequate bleaching coral which has been detected since the year 1998. The area was declared an Ecologically Critical Area in 1999 under the Bangladesh Environmental Conservation Act. And for the status of Pakistan they reported that near Astola Island identified 77 reef fish and 25 coral species. The National capability to review and observer coral reefs remains fragile,

while coastal wetland and mangrove management edges are improved and develop.

Chevallier (2017), this paper addresses some dominating challenges in the West Indian Ocean area related to the comprehensive management which are required to certify that management of resources styles, specifically in and around MPAs, produce consequences for nature and for people as well. The Western Indian Ocean (WIO) area has worthy and varied coastal as well as marine resources, but most of its natural assets is either vulnerable or deteriorating. Countries in the WIO region is making efforts to tackle for a sustainable oceans economy but there is a crucial need for effective tools to ensure the flexibility of marine and coastal biodiversity in order to control resources of viable use and to defend the livelihoods of millions of individuals. Int the end of the paper it was suggested that Key to success is to enhance socio-economic development welfares and in order to connect these aids through detailed economic valuations. Care should be taken for not only in expanding protected areas' coverage but also on improving the capacity of supervision agencies and communities to govern preservation of these areas effectively.

Conclusion

In recent few years, utmost of the tropical or humid ocean and has been severely altered by pollution, over-exploitation and abundant rash types of growth (Millennium Ecosystem Assessment, 2005). Nearly all of the pointers of 'ocean health' remain to demonstrate adverse trails in improvement, and numerous tried curative events have unsuccessful to capture failure of ecosystems and habitat which is vital for both conservation of biodiversity and efficiency and welfare of human as well. If we do not take action for their preservation, we will not be able to witness the window to the past in probably coming 30-35 years which is definitely a great loss to human and other eco-system which are directly or indirectly dependent on these coral reefs for their survival. May be the human won't witness the loss immediately but sooner or later mankind has to suffer. Yet it's not too late for us to save them and to prevent mankind from the consequences (Sheppard *et al.*).



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