

## **Study of Investigating on Coral Reefs, Threatening Factors, and their Conservation Strategies-in Chabahar SE Iran**

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### **Abstract**

Coral ecosystems are a place for feeding and livelihood of many marine species, including invertebrates and vertebrates (algae, seaweeds, sponges, mollusks, crustaceans and fish), biodiversity in this ecosystem are significant and very important in this respect. Given the importance of these ecosystems in preserving biodiversity and, on the other hand, they are fragile against destructive and environmental pollutants and also because of the very long duration and sometimes even hundreds of years to create coral polyps take, keep these shelters is very important because like many environmental crisis that factor, human intervention misplaced in this context also the loss of Coral reefs have become an important crisis as a result of destructive activities of humans, such as contamination from oil and oil compounds, polluted agricultural and industrial waste, global warming , inappropriate harvesting, destructive tourism activities, fishing and so on. Sistan and Baluchistan province has about 360 kilometers of water borders and is ecologically considered one of the most valuable biomes in the world, including coral communities along its coast. Coral reefs, including various types of beautiful and rare corals, have created beautiful islands that can withstand sea waves. The Coral reefs play a very important role in the sustainability and stability of local communities. The most coral reefs of Chabahar are the Cervicornidae, Favidae, Depociloporifamilies. In the observations and studies carried out by the corals of the area, they have been damaged by unproductive industrial activities, and in some areas of the total number of colonies, about 50% of them have been damaged. In this study, in addition to the research on the health status of coral reefs, the most important coral degradation factors in Chabahar Bay have been investigated. The most important factors affecting the destruction of these valuable resources have been determined, including the development without evaluation of commercial jetties and human activities as the most destructive coral habitat in the Chabahar Bay.

**KEYWORDS:** Coral reefs, Chabahar Bay, Threatened Factors.

### **Introduction**

Chabahar is one of the southeastern cities of the province of Sistan and Baluchistan and the only oceanic port of the country. The city is located on the shores of the Oman Sea and the Indian Ocean, and a very specific strategic and commercial location is one of the characteristics that has made this region a lot. the cliffs covered with green algae, small and colorful fishes that came to the shore with waves and were enclosed in small holes on these rocks are the spectacular attractions of the Makren coast.

Coral is of high environmental and economic importance and many types of fish live around them and are considered as one of the largest tourist attractions. Coral reefs, as one of the main sources of oceanic fish food, are a beneficial tool for fishing in the area of fishing and helps to strengthen the fishing industry. Characteristics of biodiversity

coral regions are high, with 33 species of flora and fauna found in marine habitats, 30 branches live in coral regions. Corals, in addition to environmental and tourism capabilities, can protect 25 percent of all life from low-lying islands against the rage of waves and the erosion of the seas. The Chabahar port is located south of Sistan and Baluchistan in the waters of the Oman Sea. Coral reefs are notable, compromised environments that have been in presence for ~500 million years, yet their proceeded with biological ingenuity appears to be far-fetched at present. (Bernhard Riegl al.et., 2009). Iran is one of the richest countries in terms of having a variety of coral reefs as the most valuable habitat for the Persian Gulf marine environment. Continuing the process of infecting the Persian Gulf leads to wider destruction of these rich resources and requires special attention and care. Coral reefs typically range from 10 to 1000 meters wide by sea.

The corals are in the warm, clear, salty, shallow, and almost nutrient-rich waters. They are living in large colonies of millions of small animals, each with a tubular body with a tentacle, and each tent is also equipped with nematocytosis with toxic cells.

Coral reefs are the oldest and richest community of living organisms on earth. Most coral reefs range from 5,000 to 10,000 years old, and many are clustered rocky rocks that are millions of years old. Approximately 60 species of corals have been identified in the Persian Gulf and although the diversity of corals are high in this area, the coral islands have a special position in the Persian Gulf marine ecosystem because they are a special place for breeding animals and for many reasons, of these watercourses are destroyed. Artificial habitats and their use in areas affected by coral reefs are considered, and most of the countries that are located on the coast of the seas and oceans are addressed and through this Have been able in addition to Improvement of damaged environments will also increase sea production.

Coral is used to produce anticancer drugs and bone grafts, and coral reefs produce 12,000 grams per square meter per year. Coral, as marine rare species, is threatened by activities involving deposition of agriculture and forestry, food (industrial and domestic waste), some destructive methods of fishing (for example, explosion) and hanging boats in the Chabahar Bay. The coastal strip of the Oman Sea is within the boundaries of Chabahar and Konarak of the various species of wildlife, including mammals, amphibians, aquatic animals, molluscs, birds and reptiles.

The importance of coral reefs is not only in the coral variety but also in millions of species from the beginning, they have been exclusively associated with them. Unfortunately, the new human civilization and coral reefs are in contradiction So that most human activities (egfishing, deforestation, nutrient enrichment, combustion of fossil fuels and the use of chemicals, etc.) by corrective interactions with rivals, fishermen, pathogens and The symbiosis cause direct destruction or damage (indirect vision).

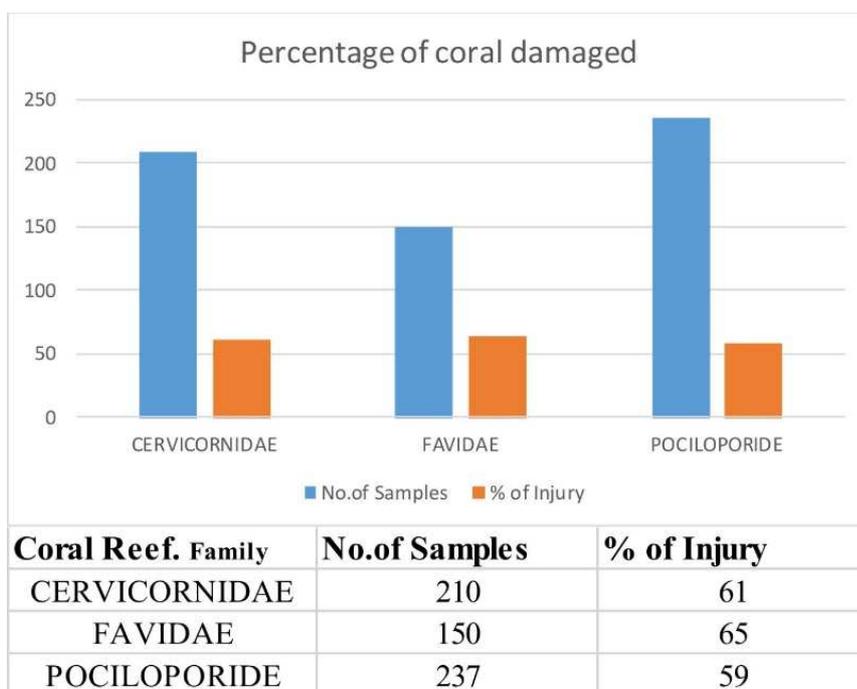
Coral reefs are a sensitive ecosystem due to their high diversity, and since many coral reef organisms are in different periods of life the main food source of fish, shrimp and other species are economically important, our immune of these creatures requires sensitive and fragile ecosystem protection corals.

Iran is among the richest countries in terms of having a variety of reef species, the coral reefs are considered to be the most valuable habitat for the marine environment of the

Persian Gulf. Continuing the process of infecting the Persian Gulf leads to wider destruction of these rich resources and requires special attention and care.

### Coral Reef

The corals are affected by a variety of diseases, which can be mainly referred to as black tape, white tape, bacterial infections, and various parasitic worms. Most of these diseases are due to human stressors. The development of diseases, directly and indirectly, causes changes in the ecology of corals. The Chabahar Bay includes rare and unique species of coral reefs in the country with an area of coral area of about eight hectares, which have been a good habitat for aquatic and ornamental fish species. Chabahar Bay, 17 kilometers long, 20 kilometers wide, and an average depth of 20 meters in the mouth of the Gulf is considered the largest in the Gulf of Oman Sea. One of the remarkable advantages of the region is the existence of various types of soft corals, deer, brains, and black, which, in addition to its high environmental capabilities, also has the potential for investment in maritime tourism.



**Graph no.01:** Percentage of coral damaged by construction in one of the Chabahar quays -Shahid Beheshti quay.

### The Destructive and Threatening Factors of Coral Reefs

Factors that threaten coral ecosystems are as follows:

#### 1. Contamination from oil and oil compounds

Coral reefs are very sensitive to contamination from oil compounds. Each year, 37 million gallons of these compounds were collapsed by tankers, 62 million gallons through the erosion of ocean floor structures, 92 million gallons through machinery and machinery, as a result of rain washing, 137 million gallons through ship

evacuation and 363 million Gallon enters the seas through sewage from various factories.

## 2. Sea Lures

The debris includes plastic, glass, metal, rubber, and through the ships, rivers and streams of water into the oceans and seas, leading to the destruction of coral reefs or breaking them and causing damage to them. They will be returned. This debris, in addition to direct effects, causes various diseases, such as white spot disease on corals. Scarcely any reef of the world isn't overfished, and few have gotten away debasement of them organic segments (Jackson et al. 2001; Sale 2008).

## 3. Increase in population and poverty

With increasing population and demand, the construction along the coastline has increased, resulting in more pollution in the seas and oceans.

The coral reefs provide millions of people economically, but it should be considered that unproductive exploitation will destroy them. Currently, a high population of coral is threatened in developed high-income countries.

## 4. Contamination from agricultural activities

These contaminants include fertilizers, wastewater, pesticides, which flow into surface waters in the form of flowing surface waters and expose coral reefs to high concentrations of these materials. Due to the presence of heavy metals such as lead, mercury and arsenic in agricultural pesticides, and nitrogen, phosphorus and potassium compounds in fertilizers, runoff from these materials is one of the important threats to corals.

## 5. Harvest of coral reefs by the explosion

Dynamite explosion is an unconventional method for harvesting corals, which unfortunately some profitable people use coral for sale with decorative purposes. The main source of dynamite is potassium nitrate, which is a serious threat to coral and other aquatic organisms.

## 6. Fishy by potassium cyanide for catching aquarium fish in salt water

Cyanide is cyanide and very harmful compound used to fish for aquarium fish. Cyanide poisons, coral reefs and many invertebrates are destroyed, as well as 40 percent of the fish used by the aquarium die before they reach the aquarium.

## 7. Tourism

Tourists' misplaced activities like breaking the rocks with the use of various tools and their harvesting as a sailing boat, a creeping boat in shallow areas, and even walking on these rocks for recreation, injuries serious to coral reefs.

## 8. Sedimentation

Deforestation, mining, unstructured construction, create High amounts of sediment and soil that penetrate surface waters into coastal waters and affect coral reefs. It takes a lot of time to build coral reefs. These rocks grow each year from 5 to 200 millimeter. There are more than 2,500 species of them, about 10% of the coral reefs have been destroyed as a result of the activities listed worldwide and 22% are at risk.

## **Coral reef conversion solutions**

One of the new methods for the rehabilitation of coral reefs is the scapegoating with the use of the technology of creating living rocks with the name of electronic structures, which, with the cooperation of Iranian marine researchers, has undergone

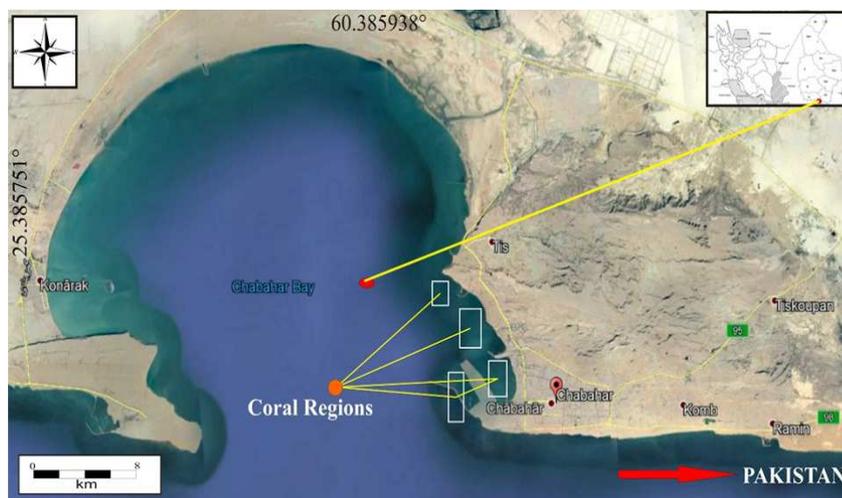
tests and errors in some of the Southeast Asian Islands, and has gained unprecedented success in increasing the biodiversity of the sea. Control and prevention of different wastewater and the use of proper wastewater treatment methods.

- Physical control and protection, and operational training on how to optimally exploit resources.
- Identification and protection of sensitive marine areas.
- Coral Bleaching, (Unusual water temperature is a major contributor to the severe environmental damage of corals(Guldborg-Hoegh al.et., 2009).
- Creation and development of marine parks.
- Regulating the exploitation of water resources.
- Biological factors, In erosion of coral reefs, many creatures are effective. Some mushrooms, sponges, bumps and snails have the ability to pierce the coral limestone skeleton(Schonberg., 2008).
- Encouraging operators to invest and rebuild marine resources.
- Creation and development of artificial marine habitat.

### Coral Reefs of The Region

The Chabahar Bay contains the most valuable and unique species of coral reefs in the country, with an area of about 5 hectares of its coral region, which is an excellent habitat for aquatic and fish species, and as natural shore breakwaters protect coastal areas from sea currents.

One of the remarkable advantages of the region is the existence of various types of soft coral, which, in addition to its high environmental capabilities, also has the potential to invest in maritime tourism. Not just have reefs endure or emerged over and again after extirpation, they have been appeared to be developmental central



focuses, with more creatures advancing inside reefs and spreading to nearby living spaces than the other route around coral polyps. (Kiessling2005, 2008).

**Fig no.01:** Google earth capture - Chabahar region which shows the coral reef area.

There are more than 2400 species of coral in the world. The corals are biologically divided into hard and soft groups. Corals are reproduced in both sexually explicit and non-sexual ways. The most common way to produce food for coral reefs is photosynthesis. The corals of Chabahar beaches are to be considered as 3 families Cervicornidae, Favidae, Pocilloporide.

Species	Families
Acropora arabensis (Hodgson & Carpenter, 1995) Acropora valida (Dana, 1864) Acropora khairanesis (Claereboudt, 2006)	Acroporidae
Favia favus (Froskal, 1775) Favia matthat (Vaughan, 1918) Favia pallidae (Dana, 1816) Favites pentagona (Esper, 1794) Cyphastrea microphthalma (Lamarec, 1816) Cyphastrea serailia (Froskal, 1775) Platygyra daedalea (Elis & Solander, 1786)	Faviidea
Cosciaria columna (Dana, 1846) Siderastre savignyana (Milne Edwards & Haime, 1950) Poseudosiderastrea tayami (Yabe & Sugiyama, 1935)	Sideroastcidea
Porites sp.	Poritidea
Helerocyathus aequicostatus (Milne- Edwards & Home, 1848)	Caryophyllidea
Turbinaria peltata (Esper, 1794)	Dendrophyllidea
Acanthastrea maxima (Sheppard & Salm, 1988) Acanthastrea hempre (Ehrenberg, 1834)	Mussidae
Hydnophora pillosa (Veron, 1985)	Merulinidae
Pocillopora damiconis (Linneus, 1758)	Pocilloporiidae

**Table no.01:** List of hardened coral species in 4 stations studied in Chabahar Bay (Loghmani Devine, 2009).

**Constraining Factors For Coral Reefs:**

Temperature, available light, sedimentation, salinity, effects of waves and exposure time in the air are among the most important determinants of coral distribution. Most coral reefs are in tropical areas. Due to lack of light, coral reefs are rarely found below 60 meters, and mostly located at less than 25 meters in depth, and on the margins of the continents and islands. Salinity also plays an important role in the growth of coral reefs, so that there are no coral reefs in areas with high freshwater inputs such as river mouths.

Waves additionally add to the soundness of coral reefs by giving crisp oxygenated water and expelling stores that are probably going to cause stinging coral polyps. (Baker al.et., 2008) studied the regeneration of coral reefs after bleaching events in a metaanalysis of published data and found variable rates of recovery among sites.

**Methodology:**

In this research, the status of corals has been studied through available statistics and analytical and descriptive analyzes. The effects of various factors on coral societies have been studied. In addition to classifying the factors affecting coral colonies, it is

proposed to provide appropriate solutions to eliminate the effects. The destructive development of coral societies and the expression of favorable conditions have been addressed.

### **Conclusion**

After preliminary examination, it seems that most of the shores of the Chabahar Bay are the sandy-clay type and are not capable of being replaced by more elastic species of coral species. In summary, the coral species of the region were 9 families, 14 genera and 20 species of coral.

The Faviidae family has the highest number of identified species with 7 species.

Achieving the conditions under which the sustainable status of the beaches in terms of the liberalization of beaches and the modification of development plans through the application of environmental laws in the province and all destructive fishing methods will also be eliminated, and on the other hand, the establishment of a complete sewage treatment system in coastal cities Chabahar and Konarak (Jayaprakash, V. 2014). The drying of the sea is mostly for the purpose of land restoration by the maritime organization, a typical example of which is the development of Shahid Beheshti Mortar development and the drying of 700 hectares from the southeastern blue waters of Chabahar Bay and 5 hectares of the best coral habitats. Also, most of the fishing quays are without proper environmental management. Based on surveys, the following precautionary measures can be effective in improving the status of corals on the southern shores of the province and provide the conditions for maintaining the ecological and economic values of corals:

- Proper arrangement of household and industrial wastes of cities and coastal villages.
- Implementation of the sewage treatment system in rural coastal settlements without a wastewater treatment system and creating favorable conditions in terms of environmental standards.
- Complete evaluation studies and present the results of EIA and EIS studies in conducting research projects.
- Control all unauthorized fishing practices on the coast.

Coral reefs are considered to be the most valuable habitats for the marine environment of Chabahar Bay and should be given special care. Coral reefs are very sensitive biological systems that are severely threatened by human activities and therefore have the greatest damage from population density in coastal areas. The coral reefs are slow-growing and have a growth rate of 38% to 12m per thousand years, and the process of repairing them after injury will be very difficult.

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