

Destructive Fishing Practices and its Impact on Marine Environment

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SUMMARY

Destructive fishing methods are the fishing practices carried out using different fishing gears which causes damages to the marine environment. Operation of these gears ultimately make very difficult to recover back to the original state. Among the destructive fishing practices, dynamite fishing, cyanide fishing, bottom trawling, dredging etc. are considered as very dangerous. These cause direct ecological damage to the corals and its habitats. Further, these destructive fishing activities are direct threat to both natural habitats and aquatic resources. Thus, it is immediately required to cease these types of destructive fishing practices. Strict implementation of the laws and regulations at local and national levels could help to reduce damages to the ecosystem. Banning of this methods will ultimately protect the integrity of vital and fragile marine ecosystems.

INTRODUCTION

India is blessed with vast coastal line and marine fishery resource. It offers food and employment to millions of people. Hence sustainable harvesting of fishery resource is very much crucial to safe guard the existing stock. Owing to increase in population, drastic increase in introduction of fishing crafts and gears leads to reduction in the fish stock. Further, the fishing practices like destructive fishing practice also one of the important factor responsible for the reduction of stock through loss of habitat. Hence, awareness on the use of destructive fishing methods has to be made among the fisher folks at regular interval. Destructive fishing methods. This will not only end up with loss of stock but also the habitat. Continuous practices will yield irreversible damage to ecosystems and recovering from its damage takes much time. Moreover, these practices are illegal and has to be stopped and advocated to turn to responsible fishing practices among the fisher folks. Coral reef are considered to be the nursery ground of many young ones get first affected while employing dynamite, cyanide, bottom trawl, dredge, etc. Hence, this paper is aimed at addressing various destructive fishing practices prevailing widely in around the world.

Destructive fishing practices

Many fishing methods are considered as destructive since it causes damages to the environment. Mostly they are non-selective, so many species and all life stages of a population are captured; or they are potentially dangerous to the people who use them. Most of the methods are now illegal, such as using dynamite or cyanide to catch fish, but people still persist in their use. Destructive fishing methods can be categorised as follows. Explosives, Modern poisons: cyanide, bleach, pesticides, Physically destructive practices: fish drives, manual breakage of corals, Traditional poisons: plant and animal compounds that stun or kill fish, other methods that lead to overharvest of one or more species.

Explosives

Blast fishing or Explosive fishing is done with help of dynamite or homemade bombs found illegal in many countries (Figure.1). Dynamite fishing is one of the destructive fishing practices used to kill schools of fish (Katikiro & Mahenge, 2016). Later the killed fishes were skimmed from the surface or bottom (Figure. 2). This methods destroys not only the school of fishes but also coral reefs, which act as a natural barriers that protect the coastline against storm surges and erosion. The groupers, rabbitfish, snappers, emperor as well as other reef associates fishes are the primary targets of dynamite fishing because of its high market value.

Bottom trawling

Bottom trawling is the method in which trawl is towed, along the sea floor. It is also referred to as "dragging". The scientific community divides bottom trawling into benthic trawling and demersal trawling.

Benthic trawling is towing a net at the very bottom of the ocean and demersal trawling is towing a net just above the benthic zone. Bottom trawling targets both bottom-living fish (ground fish) and semi-pelagic species such as cod, squid, shrimp, and rockfish. While dragging this net in the seabed of coral reef rich area it breaks the corals into pieces. Continuous operating of bottom trawl in the coral reef area may lead to irrevocable damages (Figure 3 and 4) to the bottom habitat as it take much time to grow in few centimeters.



Figure 1 Dynamite fishing



Figure 2. Mortality of juvenile fishes

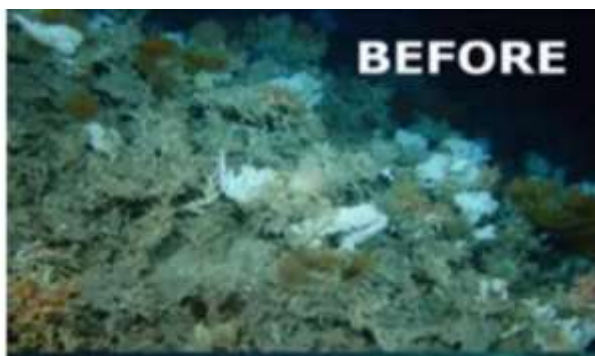


Figure 3. Coral reef before trawling



Figure 4 Coral reef after trawling

Cyanide fishing

Cyanide fishing (Figure 5) is a mainly practiced to collect live fish for use in aquariums, which involves spraying a sodium cyanide mixture into the desired fish's habitat in order to stun the fish (Magdaong et al., 2014). Firstly, the cyanide tablets are broken down and placed into bottles of plastic detergent. The dissolved hydrocyanic acid (HCN) is sprayed on the target area to stupefy aquarium fishes and are collected. A number of colorful species, including the clownfish, wrasses and groupers, etc are targeted by illegal cyanide fishing. Use of sodium cyanide is harmful to non-target aquatic organisms, like corals and other invertebrates especially larvae forms including phytoplankton such as marine diatom and even to the divers. (Rubec & Soundararajan, 1990)



Figure 5 Cyanide fishing

Pesticides

Various fertilisers and pesticides have been used throughout the world to stun or kill fish. Temephos (organic sulphide), paraquat (herbicide) permethrin (insecticide), Benzene Hexa Chloride (insecticide), copper sulphate (herbicide), ammonium sulphate (Fertilizer) was reported to have been used to catch fish from many parts of the world. Unfortunately, these chemical remains in the environment not only kills fishes but also corals.

Fish drives

Muro-ami is a destructive artisan fishing method employed on coral reefs in Southeast Asia. An encircling net is used with pounding devices, such as large stones fitted on ropes that are pounded onto the coral reefs. They can also consist of large heavy blocks of cement suspended above the sea by a crane fitted to the vessel. Banging the bottom by the swimmers with rocks or bamboo, the habitats are being disturbed, and pronounced effects are the corals which are pounded and broken as a result of this mode of operations (White & Wells, 1982). The "crushing" effect on the coral heads has been described as having long-lasting and practically totally destructive effects.

Dredges

Dredges are rigid structures that are towed along the seabed to harvest bivalves such as scallops, oysters and clams (Figure 6). By contrast, hydraulic dredges use jets of water to disturb the seabed and dislodge shellfish. The use of specific mesh sizes and escape panels prevents any undersized or non- target species being retained in the basket. The environmental impact of dredging varies significantly depending on the type of sediment on the seabed and the habitat it supports. As such, there is often strict regulation around the types of dredge permitted, and the frequency with which they can operate in an area.



Figure 6 Rigid Dredge in operation

Traditional poisons

Ichthyotoxic plants are used in tropical areas worldwide to catch fish. Various types of plant products such as leaves of khinna, rambans, stem bark of jamun, and oil cake of mahwa (*Madhuca longifolia*), etc. are used to catch various size of fishes. Fishes take in saponins directly into their bloodstream through their gills and breakdown of red blood cells that help the toxin to spread quickly. Fish soon floated to the surface "exhibiting much the same type of behaviour as in rotenone poisoning. The fish were immobilised, but not killed. They were then very easy to spear and collect.

CONCLUSION

The prolonged physically, chemically and biologically damaging fishing practices followed in coastal fisheries is likely to degrade coastal ecosystems that leads to unsustainable levels of fishing even it endangers the health of fishers. Further the damages caused by the destructive fishing gears on the reef is enormous. Generally, the reef recovery can be anywhere from a few years for minor localised damage to several decades for extensive structural damage of the reef itself. Such damage on the reef will create a less healthy environment for the fish and invertebrates inhabiting the area. Hence, strict enforcement of law on the destructing fishing practices is need of the hour. Further, sustainable fishing practices need to be promoted among the stakeholder through continuous awareness programmes. This will revamp the degraded ecosystem into a sound and healthy environment besides taking care of livelihood of fishermen.

REFERENCES

- Asri, M., Wahyuni, E.S. and Satria, A., 2019. Destructive Fishing Practices. *Sodality: Jurnal Sosiologi Pedesaan*, 7(1), pp.25-33.
- Katikiro, R.E. and Mahenge, J.J., 2016. Fishers' Perceptions of the Recurrence of Dynamite-Fishing Practices on the Coast of Tanzania. *Frontiers in Marine Science*, 3, p.233.
- Magdaong, E.T., Yamano, H. and Fujii, M., 2014. Development of a large-scale, long-term coral cover and disturbance database in the Philippines. *Integrative Observations and Assessments*, pp.83-109.
- Rubec, P.J. and Soundararajan, R., 1990, November. Chronic toxic effects of cyanide on tropical marine fish. In *Proceedings of the Seventeenth Annual Toxicity Workshop: November* (pp. 5-7).
- Tahiluddin, A.B. and Sarri, J.H., 2022. An overview of destructive fishing in the Philippines. *Acta Nat. Sci*, 3(2), pp.116-125.
- Veitayaki, J., Ram-Bidesi, V., Matthews, E., Gibson, L. and Vuki, V.C., 1995. Overview of destructive fishing practices in the Pacific Islands region.
- White, A.T. and Wells, S.M., 1982. Coral reefs in the Philippines. *Oryx*, 16(5), pp.445-451.