Prepared by:

Vipinkumar V.P, Ramachandran C., Boby Ignatius, Aswathy N., Reshma Gills, Anuja A.R., Rajesh N., Vidya R., Athira P.V., Sary P.S., Nimisha B., Smitha R.X., Ambrose T.V.2022.

Guided by:

Dr.A.Gopalakrishnan, Director, CMFRI &
Dr.Shyam Viswanath, Director, KFRI & Expert member of DST.

STI Hub Technology Information Series: 4

STI Hub Technology Information Series: 4

Artificial Reef
A Glance..

ICAR-Central Marine Fisheries Research Institute
Post Box No. 1603, Ernakulam North P.O.,
Kochi-682018 Kerala, India

Artificial Reef

- Artificial reefs are intentionally placed benthic structures built of natural or man-made materials, which are designed to protect, enhance, or restore components of marine ecosystems and provide a habitat for fishes.
- Artificial Fish Habitats (AFH) are placed on the sea bottom.
- ICAR-Central Marine Research Institute (CMFRI), Kochi has been successfully involved in reef building programmes and developed artificial reef areas in Minicoy, Lakshadweep and different potential coastal belt of the Kerala coast.
- Trainers' Training Centre (TTC) of CMFRI conducted a national workshop on ARs and sea farming technologies at Kochi in 1996. This workshop discussed the reef-building technology in detail and also recommended to the Central government to increase the allocation for reef-building activities along the Indian coastal belt

Site selection

- The depth of the water column and the reef height have a direct relationship.
- It is generally accepted that, the reef height should be at least one-tenth of the water column height.
- Muddy bottoms experience drifting of mud during monsoon months and the modules are prone to sink in mud eventually.
- In such circumstances, periodic depositing of reef modules is required to maintain the effectiveness of the reef.
- Whereas sandy bottom modules are more stable and their effectiveness also remains year after year.
- Triangular modules of 1.5m x1.5m x1.5 m with a 0.60m x 0.60m window on all sides are found more suitable for areas where strong water currents prevail during the monsoon months.

Materials used for designing Artificial Reef Module

- The different types of modules which are used for reef-building in India are triangular modules, rectangular box type modules, circular modules, tetrapods, concrete rings, old tyre fixed on a concrete bed, triangular or rectangular modules with PVC or stoneware pipes fitted inside and HDPE pipe structures.

Reef Construction & Installation

- Reef sites are normally 3-12 km away from the shore. The transportation and installation of the modules are the most important part in reef-building.
- Earlier, catamarans were used extensively in the transportation of modules. Bamboo raft was designed for module transportation in the northern Kerala
- Eight oil barrels of 200 l capacity are used to float the raft of 3m x 3m size and 2 modules are placed on the raft, which are towed to the reef site using a 15 HP outboard motor fitted plywood boat.
- Bamboo poles are used by 8 people to transport the module from the shore to the raft and then towed to the reef site.
- After reaching the reef site, the modules are either lowered to the bottom by using a strong nylon rope or slided to the bottom from the top.
- While lowering the modules greater accuracy is achieved in reef building whereas while sliding down, the modules are dispersed in the reef in a scattered manner.
- Using marker floats on 4 corners of the proposed reef, marks the reef area. Marker floats help the fishermen to locate the reef correctly while installation as well as further in the subsequent period.

Socio-economic aspects of ARs

- Artificial reefs increase the fish availability in the coastal waters and thereby increase the employment opportunity of the artisanal fishermen.
- It also plays a major role in conserving the resources by preventing mechanized vessels fishing in the inshore waters which deprive the livelihood of small and marginal fishermen
- They are more significant in areas where traditional fisherfolk face resource depletion due to overfishing or mechanized fishing
- Provide additional habitat for fishes as well as fish food organisms to attach and grow

- Additional food invariably attracts smaller fishes to the reef which will eventually attract larger fishes. These fishes reproduce and populate in the reef forming fishery resource for the traditional fishermen using hooks and lines and other minor gears

Conclusion

- Artificial reefs are used worldwide to increase the productivity and fisheries potential of relatively barren or unproductive areas.
- Reefs when properly located and structured not only concentrate fishes, but also increase the biological productivity of the area.
- Reefs also often serve as spawning and nursery areas for fishes and shellfishes.
- Artificial reefs are thus required to ensure a stable and dependable livelihood for the traditional fisherfolk and also to ensure the conservation and management of our valuable coastal fishery resources.
- Reefs have a primary function of conserving the resources and hence reef building creates a sense of sustainable and responsible fisheries among the fisherfolk.