

Impact of large scale cultivation of seaweeds on coastal environment

Commercial cultivation of *Kappaphycus alvarezii*, an introduced seaweed species is in vogue in Palk Bay, Tamil Nadu since 2003. In the light of the environmental concerns raised on the potential impact of cultivation of this introduced seaweed species on the sensitive ecosystems and the dependence of the coastal community on this sector for their livelihood, this research study has been undertaken with two major objectives viz.,

- (i) to assess the impact of the seaweed cultivation in Palk Bay for about 10 years on the coastal ecosystems in the region including Gulf of Mannar and
- (ii) to develop strategies for ecologically sustainable farming of selected seaweeds viz., *Kappaphycus alvarezii* and an indigenous species, *Gracilaria edulis*.

The detailed scope and methodology of the study including the study sites, parameters of observation and choice of seaweed species for experimental cultivation were finalized during an expert consultation held on 24th June, 2013 with experts from academia, research institutions and industry.

Detailed underwater surveys were carried out in Palk Bay and 12 islands of Gulf of Mannar (GoM). Coral reef and seagrass are the important ecosystems in Palk Bay. The entire seaweed cultivation area in Palk Bay was surveyed, extending from the coast till the reef crest by manta tow survey, for a total length spanning 38.4 km. Altogether, 34 Line Intercept Transects (50 m) were laid for biophysical monitoring of the reef health and 31 quadrats (1 m²) were laid for studying the health of seagrass beds. *Kappaphycus* invasion was observed in 3 islands of Gulf of Mannar viz., Krusadai, Shingle and Mulli.



Fig. 1. Coral reef in Olaikuda region of Rameshwaram Island, Palk Bay



Epiphytic tunicates over

Healthy seagrass bed at

Seagrass patch covered by

Fig.2. Seagrass beds in Palk Bay.

Analysis of the data with respect to the distribution, abundance and status of corals, seagrass, wild seaweed and the benthic community and the status of water quality in the study sites is underway. The factors that contributed to the spread of *Kappaphycus* in GoM are being studied and strategies for conservation of these sensitive ecosystems in GoM and Palk Bay are being evolved.

The second major objective of the research study was to develop location-specific ecologically sustainable seaweed cultivation methods for *Kappaphycus alvarezii*, an introduced species and *Gracilaria edulis*, an indigenous species. Marine Algal Research Station, Central Salt and Marine Research Institute (CSMCRI), Mandapam and Fisheries College and Research Institute (FCRI), Thoothukudi have been involved for establishing the experimental seaweed farms and monitoring the environmental parameters respectively. After the reconnaissance survey, three sites viz., Nagapattinam and Thoothukkudi in Tamil Nadu and Miyani at Gujarat have been identified for establishment of the experimental seaweed mariculture units.

The tube net method for *Kappaphycus alvarezii* and triangular raft method for *Gracilaria edulis* are under evaluation against the conventional rectangular raft method of seaweed cultivation. Further, arrangement of rafts has also been altered with the view to reduce environmental foot prints.



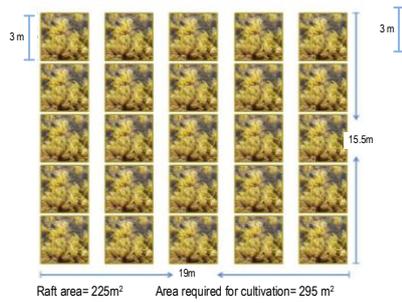
**Conventional rectangular rafts for
*Kappaphycus alvarezii***



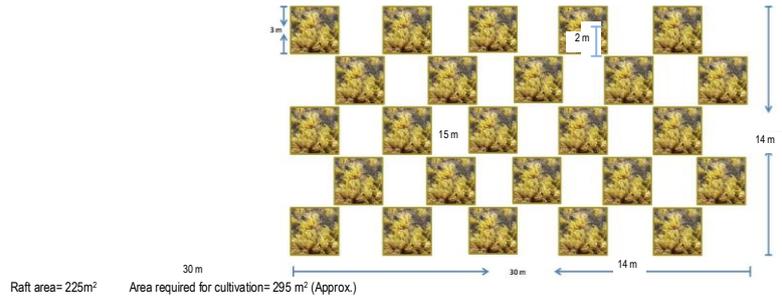
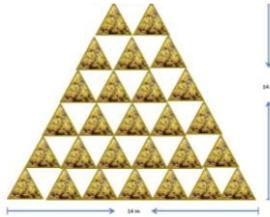
**Tube net method for
*Kappaphycus alvarezii***



**Triangular rafts for
*Gracilaria edulis***



Conventional rafts arrangement



Raft arrangements to reduce environmental foot prints

The research on seaweed cultivation so far were aimed at production maximization and the current study undertaken by NCSCM with CSMCRI and TNFU would help in developing location-specific seaweed farming methods with least ecological footprint.