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CHAPTER 7
DISCUSSION AND CONCLUSION

7.1 DISCUSSION:

As mentioned earlier in the aim of the study that here in the interest is to understand and evaluate coral reef of Narara, part of Gulf of Kachchh. This document represents holistic information on the diversity and distribution pattern of scleractinians. The objectives were set forth to generate multidimensional information on hard corals.

The Narara reef was studied for the intertidal coral diversity, distribution. Total 26 species of hard corals is reported from this area which is good for a GoK reef as the GoK region has the least diverse coral reefs of Indian subcontinent (Venkataraman *et al.*, 2003). The family Faviidae is represented by 09 species from 06 genera which is the most diverse amongst the total families recorded during the study. Same dominance of Faviid corals was reported from Gulf of Oman. It was opined that the geographical isolation and extreme environmental conditions are the main factors which lead the Faviids and other massive families to preside over the Acroporids – the most diverse family of the corals. The genus *Acropora* was reported earlier from the GoK reefs (Pillai and Patel, 1988), but recent studies concluded doubtful extinction of the genus from the GoK waters as the encounter of live *Acropora* is become rarest (Dixit *et al.*, 2010). Large quantity of the dead remains of *Acropora* corals at Narara reef was evident of the fact that this reef was also thriving with the branching corals. Over all scleractinian diversity of Narara is reported to represent 12% of total scleractinians reported from the Indian reefs. The reefs dominated by massive corals are classified into conservation class CC1 as per (Edinger and Risk, 2000). As the massive corals' growth is slow and due to larger polyps they can cope up with increased sedimentation and eutrophication, they are defined as stress tolerators.

Distribution of scleractinians on Narara reef was found more or less heterogeneous, corals were abundant near the LTL. However, instead of contiguous coralline area, here the good coral assemblages were recorded to occur in definite patches only. Good coral growth is reported at the wave protected lagoons than the subtidal areas with clear water (Veron, 2000). On Narara, sub-sites S2 and S4 were dominated by more number of species of corals (n=20 and n=24 respectively). This may be because of the presence

of larger boulder on the reef crest zone which protects the back reef lagoon from the rigorous waves.

The physico-chemical analysis for basic water quality parameters showed no significant changes in the water quality of the reef area during the low tides. This phenomenon is common for an open system like marine waters. However, the average salinity was reported higher than other reef areas of the country (Sukumaran *et al.*, 2005). The corals of GoK reef have adapted themselves to such higher gradient of salinity. Such adaptations of the corals are reported from the Gulf of Oman and Arabian Gulf reefs were the water salinity is reported almost 15‰ higher than the normal sea water salinity (Coles, 2003). Here, on Narara the distribution was not found to be controlled by water quality, but as opined by (Tazioli *et al.*, 2007) the tidal influence might be the determining factor. However, here competition for space can not be the factor in the controlling the distribution as the reef has been reported to have second largest available suitable substrate for corals recruitment among the GoK reefs. In recent study by GEER Foundation on the coral recruits in GoK reefs, genus *Favia* compete out other genera with the highest number of recruits per unit area through out the GoK reefs (Pandey *et al.*, 2010).

Hard corals of Narara were also found affected with coral diseases and polychaete infestations. The *Porites* were found with Pink Line Syndrome and White Plague. Vulnerability of the genus for the diseases were also reported from the southern Indian coral reefs (Harithsa *et al.*, 2005; Thinesh *et al.*, 2009). Polychaete infestations were reported to alter the normal growth forms of corals (Wielgus *et al.*, 2002). During present study *Montipora, Porites, Symphyllia* and *Leptastrea* were encountered with abnormal growth forms due to polychaete infestation.

The Narara reef harbors with varied fauna and flora. Total 132 species from 11 different animal phyla were observed to be associated in this reef area. Though the figure is less compared to the associated flora and fauna reported from other reefs of GoK (Singh *et al.*, 2004). Variety of sponges was found to be sharing habitat with corals on the rocks or underneath the rocks. The sponges were the dominant group in the

under rock communities. Same was also reported for the open deep reef habitat where the sponges represented nearly half of the total encrusting taxa reported and were the prime competitors overgrowing hard corals. The pelagic cnidarians were encountered within tide pools or lagoon otherwise 12 different species of other non-coral anthozoans (Sea anaemones, Zoantherians, Ceriantherians, Coralimorpharians and Alcyonarian) were recorded from the reef area.

The presence of Coralimorpharians is a significant record as it was never observed or reported by earlier workers from this reef area or from entire GoK. The corallimorpharians are reported as the notorious benthic forms in the reef habitat (Chadwick, 1987; Chadwick-Furman *et al.*, 2000; Kuguru *et al.*, 2004; Langmead and Chadwick-Furman, 1999a). However, during present study, their distribution was found to be very limited in sporadic manner only. The *Palythoa tuberculosa* was recorded from sub-sites S1, S2 and S4. Their distribution was sparse but covering large patch of substratum in sub-site S4. This animal has been reported as competitor of zooanthids as well as scleractinians in relation to habitat sharing. The palytoxin secreted by *Palythoa* is toxic in nature and damages the surviving corals. Compared to other faunal diversity, the molluscans were highest in numbers. Members of the molluscan classes like bivalvia, gastropoda, scaphopoda and cephalopoda were found to have association within coral reef habitat. Phylum Arthropoda was represented as crustaceans like crabs and shrimps. Few Echinoderms were also observed in the reef area. Minor phylum Echiura was reported by *Acanthobonellia pirotanensis*. This worm was found from the lagoons and area below LTL. The puffer fish and mud skippers formed ichthyofaunal diversity during low tides from this reef area.

The main reef vegetation was of seaweeds and other macro algae. The seaweed showed seasonal shift in abundance and dominate the reef habitat (90%) for about 04 months. The algal accumulation was reported to harm the ecology of reefs dominated by *Acropora* corals (Chandrasekaran *et al.*, 2008), however, massive and slow growing corals were not found affected by the native algae influx (Haas *et al.*, 2010).

Active interactions between reef associated fauna and flora is a good sign of healthy reef. Interactions among sea anemones and anemone shrimp, snails; corals and fish, fish and mollucan shells were observed. This kind of interactions are beneficial in effective energy utilization and to get protection from the predators (Fautin *et al.*, 1995).

The reef is easy approachable due to continuity with mainland render more vulnerable to the fishing pressures by traditional practice by near villages. The collection of octopuses and crabs in indiscriminate manner will eventually lead to the depletion of the organisms from the area. The common octopus, *O. vulgaris* breed through out the year, but significant positive correlation was observed between Sea Surface Temperature (SST) (Garofalo *et al.*, 2010; Wodinsky, 1972).