

REVIEW ON UTILIZATION OF MARINE BIODIVERSITY AND RESOURCES IN THE COASTAL WATERS OF NINH HAI - NINH THUAN

The report made are based on available data and information from several previous studies relating to marine biodiversity conducted in the coastal waters of Ninh Hai. Major projects conducted at the area are followings: Additional surveys and recommendations for sustainable use of coral reefs in coastal waters of Ninh Thuan Province implemented by Institute of Oceanography in 2003 – 2004 (Vo Si Tuan, 2004); Monitoring of coral reefs in coastal waters of Ninh Hai District, Ninh Thuan Province by Institute of Oceanography in 2006 – 2010 (Nguyen Van Long *et al.*, 2011).

The waters offshore southward (less than 50 m deep) have formed some important pelagic fishing grounds. Most of fishing boats in this area are small, mostly less than 45 hp and fish in the waters of less than 30 m deep. Fishing activities including hookah air diving, purse seine and gill net, light fishing with lift/push nets, long line, and collecting organisms on tidal flats are commonly seen in the area with a variety of marine organisms harvested. Pelagic fish such as anchovies (*Stolephorus*), scads (*Decapterus*), mackerel (*Scomberoides sp.*), tuna (*Auxis sp.*) are the main contributors to the total fisheries production landed.

A total of mackerel and tuna landed was about 100 - 150 tons per year (Data from Vinh Hy Fixed Net Station). Anchovies were harvested from April to September around the year and total product can reach up 5 - 7 tons per boat per day. Many commercially reef fish such as groupers, snappers, sweetlips, emperors, parrotfish and triggerfish are being caught because of the big demand of these fish in the market. Live groupers (*Epinephelus spp.*,

Plectropomus spp. and *Cephalopholis* spp.) have become the favoured targets and being over-harvested on the reefs because of their high prices. Other reef fish such as grunts (*Plectorhinchus* spp.), snappers (*Lutjanus* spp.) and emperors (*Lethrinus* spp.) are also being caught in this area. According to information interviewed from local fishermen, commercial fish at size larger than 30 cm long were common in the past but that has become very rare because of over-harvested. About 2 - 3 years ago, each of fishing boat with 3 - 4 hookah divers were caught about 100 - 200 kg of groupers, sweetlips, snappers per night using cyanide, net and spear guns.

Cuttlefish (*Sepia* spp.), and squid (*Sepioteuthis* sp., *Loligo* sp.) are fished on a commercial basis. Lobsters (*Panulirus*) have also become the important species to the fisheries because of high price. During the past five years, hookah divers from My Tan, My Hiep villages - Nhon Hai Commune collected post settled and juveniles of lobster (*Panulirus ornatus*) on the coral reefs of the area to provide seeds for lobster cultured-cages. Local fishermen interviewed did say there are about 50 fishing boats from My Tan and My Hiep villages - Nhon Hai Communes have collected lobster. Number of post settled and juveniles of lobster (*P. ornatus*) harvested can sometimes reach up 50 - 100 individuals per boat per day. However, population of this species are rapidly declined.

Collecting gastropods and bivalves for food or for sale in souvenir shops has appeared commonly. Among them, abalones (*Haliotis ovina*), top shells (*Trochus niloticus* and *T. maculatus*), giant clams (*Tridacna* spp.) are considered as commercially important food and materials for souvenir. Information interviewed from one of the three local salers at My Hoa village in 2001 conformed that there were about 4 tons of shells of gastropods and bivalves to be exported to Nha Trang and Da Lat cities for during 2000 - 2001.

Edible sea cucumbers are also collected on the reefs around the area. Most of these marine resources have been known to be over-exploited.

Harvesting seaweeds and reef-associated organisms such as gastropods and fish on tidal flat during the low tide period have generated income for many young and old women in the area. In average, local collectors harvested marine resources from 4 to 6 days per month depending on the tidal cycle. *Gracilaria eucheumoides*, *G. salicornia*, *Gelidiella acerosa* and *Betaphycus gelatinae* are mainly harvested for food with a total product reaching 300 - 500 kg per day. *Sargassum*, *Acanthophora*, *Hypnea*, *Gracilari*, *Ulva*,... occur with very high biomass and they are harvested for producing fertilizers for agriculture cultivation.

Some 10 species of living organisms were listed as extending to different levels of threats (Table 2). Of which 3 species of giant clams and seaturles were extended to the vulnerable and endangered levels following IUCN Criteria (IUCN 1993). Although, trumpet triton (*Charonia tritonis*), abalone (*Haliotis ovina*), lobster (*Panulirus ornatus*) and pearl oyster (*Pinctada margaritifera*) have not listed in the IUCN Red Book but they have become very rare on the reefs in this area.