

Approximately 60 percent of the population lives within the 832 municipalities situated along 36,289 km of coastline. Coral reefs, mangrove forests, and seagrass beds contribute to the richness, diversity and productivity of coastal and marine fisheries. These resources also attract tourists, creating local business opportunities, and generating income and employment. While the Philippines has some of the world’s most unique marine ecosystems, these have been increasingly threatened by pollution, over fishing, and other anthropogenic activities. This section presents the most recent trends in coral reefs, mangrove forests, seagrass beds, and coastal and fisheries management.

COASTAL AND MARINE RESOURCES

Coral reefs and seagrass beds. The Philippines archipelago lies in the “coral triangle”, the center of the most diverse habitat in the marine tropics. The reef area of the Philippines is about 26 percent of the total reef area in Southeast Asia.⁴² The country’s coral reefs are among the richest and most diverse in the world, with about 464 species of hard corals and more than 50 species of soft corals. However, over 30 percent of the reefs in the country are in poor condition. Moreover, there has been a steady decline in the quality of the coral reefs—and only about 0.24 percent were reported to be in excellent condition in 2004, as compared to 4.3 percent in 2000 and 5.3 percent in 1991 (Figure 19). Ninety-eight percent of these reefs are under medium or high threat (Figure 20).⁴³

Compared to other countries in the Region, Philippine seagrasses are moderately studied (Table 7). A recent survey of 96 sites identified a total of 978 km² of seagrass beds in the country.⁴⁴ These beds are located

Figure 19. Current Status of Coral Reefs

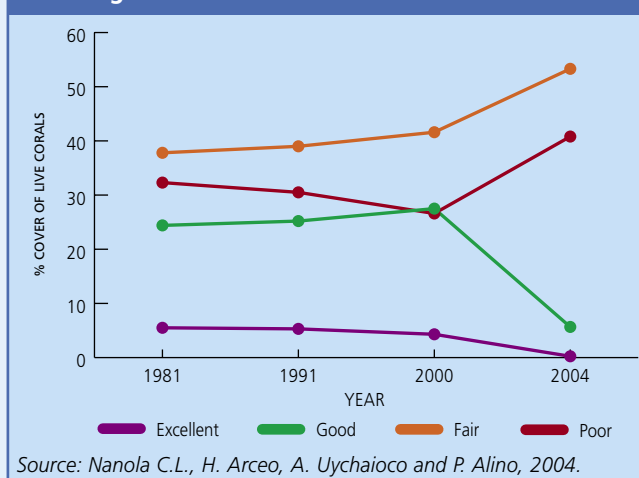
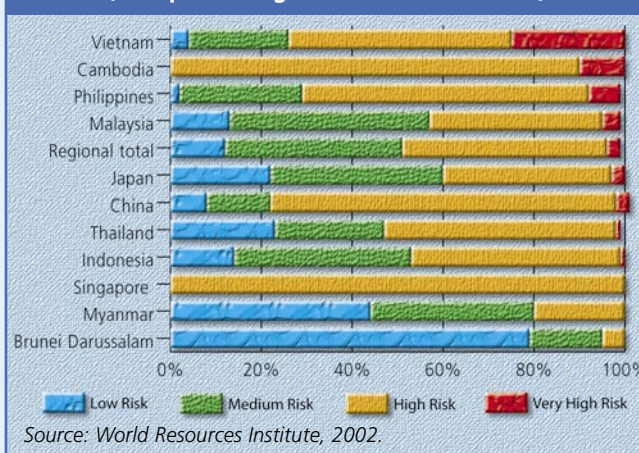


Figure 20. Reefs at Risk in East Asia (as a percentage of total Coral Reefs)



in discontinuous areas along the shallow portions of coastlines.

Despite a sophisticated understanding of the problems associated with seagrass habitats, valuable seagrass beds have declined continuously since the mid-1990s. Natural causes aside, man-made impacts, especially population growth close to shallow bays, lagoons, and islands fringed by seagrass beds, and coastal eutrophication have impacted seagrasses. Rising poverty in coastal areas may be contributing to short-sighted resource overuse and destruction. Destructive fishing (blasting and poison) and over-fishing continue to top the list of anthropogenic impacts on the country’s reefs and seagrass areas. Poaching,

⁴² Nanola et. al., 2004.

⁴³ Licuanan and Gomez, 2000.

⁴⁴ Fortes and Santos, 2004.



Table 7. Status of Information about Seagrass Habitats in the Philippines and other Asian Countries

Country	Species	A	B	C	D	E
Australia	30	XXX	X	XX	XXX	XXX
Philippines	16	XX	X	XX	XX	XXX
Vietnam	15	X	X	XX	XX	X
Indonesia	13	X	X	XX	XXX	XX
Malaysia	12	X	X	X	XX	XX
Thailand	12	X	X	X	X	X
Singapore	7	X	X	X	XX	XX
Cambodia	6	X	X	XX	XX	XX
China	3	X	X	XX	XX	XX

Source: Fortes and Santos, 2004.

Legend:

A: extent of the major beds that may be affected

B: status and uses of the beds

C: quantification of sediment loads, nutrients, organic materials & toxic chemicals affecting the beds

D: identification of other related environmental problems

E: whether there are known solutions for the existing problems

XXX: well-studied; XX: moderately studied; X: not studied/implemented; plans exist

including by local communities, and fishing-related environmental risks were identified as the worst threats to reefs in the Visayan Sea. Sedimentation and tourism-related activities were next in rank. In the Sulu and Celebes Seas, destructive fishing, over-fishing, sedimentation, and pollution were identified as the most common threats causing reef decline in the Philippines.⁴⁵

Nevertheless, the number of marine protected areas is growing. These areas are displaying improved reef parameters of living coral cover and fish abundance and healthy seagrass beds, both inside and adjacent to the sanctuary portion of the protected areas.⁴⁶

Mangrove forests. There are conflicting estimates of the remaining mangrove forest in the country. Estimates using straight line projection of data gathered from 1985 satellite images placed mangrove



Panoramic view of Mangroves before reforestation in 2002.

Source –DENR-Region 9.



Same panoramic view of Mangroves after reforestation in 2002.

Source –DENR-Region 9.

Taken before,1992, when the area was an abandoned fishpond & salt bed, and in 2002, after the mangrove reforestation in Barangay Mampang, Zamboanga City.

⁴⁵ Wilkinson *et al.*, 2002.

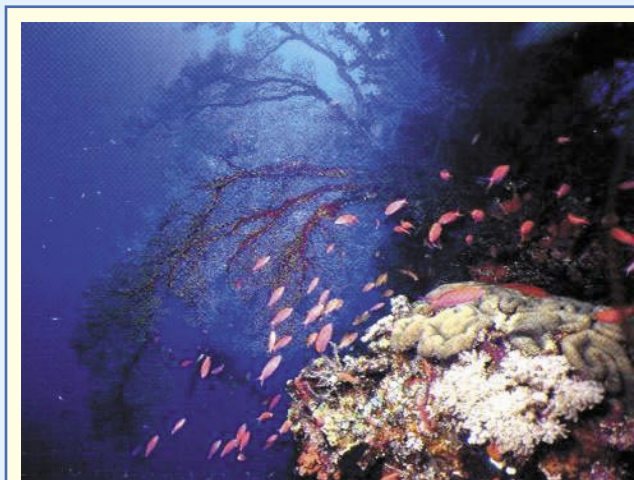
⁴⁶ Nanola *et. al.*, 2004 and White *et al.*, 2002.



cover between 112,000 to 140,000 hectares.⁴⁷ However, 2002 satellite images analyzed by the National Mapping and Resource Information Authority show mangrove forest at 248,450 hectares. The vast majority of the remaining mangroves (95 percent) are secondary growth in areas with mixed uses- and types of forest. Only five percent are old or primary mangroves, and these are mostly found in Palawan.⁴⁸

Conversion to fishponds, charcoal-making and over-harvesting are the major causes of mangrove loss. The most rapid decrease occurred during the 1960s and 1970s when government policies encouraged the expansion of aquaculture. Today, fishponds cover about 289,000 hectares, 80 to 90 percent of which are in areas once covered with mangroves.⁴⁹ This expansion occurred largely during a period when real prices for fish and shrimp were steadily rising. Between 1980 and 1988, despite a 1980 government policy banning further conversion of mangroves to fishponds and mandating the reversion of idle fishponds back to mangroves, the rate of conversion

was still about 8,200 hectares/per year.⁵⁰ Illegal cutting of mangroves for fuel wood, charcoal-making, and construction is probably the second-most pervasive intrusion on the resources.⁵¹



Coral reefs and associated species.

Source: DENR-Protected Areas and Wildlife Bureau.



Mangrove plantation in Pagbilao, Quezon.

Source: DENR-Public Affairs Office.

Fisheries. On a national scale, fisheries contributed 2.2 percent of the GDP and 15.2 percent of gross value added in the agricultural, fishery, and forestry sectors in 2002. In the same year, exports of fishery products amounted to PhP26 billion, with the top commodity exports being tuna, shrimp, and seaweed. In addition, the Philippines is the largest producer of aquaculture products in Southeast Asia, with seaweed production making the biggest contribution. In 2002, a total production of 3.4 million tons of seafood was registered, with an average annual rate of production increase of 2.5 percent between 1990 and 2002. The fishing industry provides employment to about one million people (3.3 percent of the country's labor force), of which 68 percent is accounted for by the municipal fishing sector, 26 percent by aquaculture, and the remaining 6 percent by commercial fishing.

⁴⁷ DENR. Revised Master Plan for Forestry, 2003.

⁴⁸ White and de Leon, 2004 and DA-BFAR, 2004.

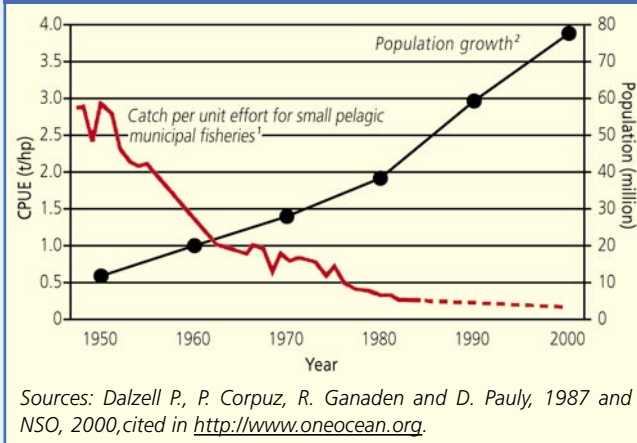
⁴⁹ ADB, 1993.

⁵⁰ DENR, 1988.

⁵¹ White and de Leon, 2004.



Figure 21. Decline in Philippine Fish Catch, 1950 to 2000



It is also estimated that more than one million small-scale fishermen depend directly on reef and other near-shore (mostly benthic)⁵² fisheries for their livelihood. The contribution of reef fish to total fisheries is estimated to be between eight to 20 percent (or between 143,200–358,000 tons per year).

In the early 1980's, municipal fisheries dominated the sector, contributing more than half the national output; but by the late 1990s, this share was down to 30 percent. In addition, the rate of increase in total production of commercial fisheries has slowed considerably, suggesting that there might be resource limitations in fish capture, thereby threatening its long-term sustainability.

There is also clear evidence that over-fishing, accompanied by greater effort needed per kilogram of fish caught, is occurring in all important fisheries of the country (Figure 21). Various country-wide and site-specific fisheries assessments conclude that there is an excessive fishing effort expended in surveyed areas.⁵³ The decline of fishery resources in the country—particularly of coastal bottom-living fish

⁵² "Benthic" describes anything of, relating to, or occurring at the bottom of a body of water.

⁵³ Green et al., 2003.

Table 8. Economic Costs to Municipal Fishery Production, 1997 to 2004

Year	Prod'n (in MT)	Change in Prod'n (%)	Direction of Change (%)	Ave. Unit Prod'n Value P/MT	Prod'n Val. (PhP B)	Loss. (PhP B)
1997	924,466	–	–	29,631	27.4	11.7
1998	891,146	-3.6	–	32,504	29.0	12.4
1999	924,693	3.8	204	33,561	31.0	13.3
2000	945,945	2.3	-39	34,459	32.6	14.0
2001	969,535	2.5	9	35,297	34.2	4.7
2002	988,938	2.0	-20	36,432	36.0	15.4
2003	998,665	1.0	-51	37,807	37.8	16.2
2004	1,015,202	1.7	68	38,895	39.5	17.0
Ave.	924,466	1.4	–	34,298	31.7	14.7

and small surface-living fish (mainly roundscads, anchovies, sardines, mackerels, and round herrings)—may be a combined effect of excessive fishing effort, inappropriate exploitation patterns, and coastal environmental degradation.

A recent study by ENRAP (Knowledge Networking for Rural Development in Asia/Pacific Region) indicates a decline of 30 percent in selected municipal fisheries and five percent in commercial fisheries due to sedimentation, siltation, blast fishing, and muro-ami, among others. The use of cyanide has also been noted as a cause of habitat destruction. A recent United States Agency for International Development



A harvest of Tilapia at Taal Lake in Batangas.

Source: DENR-Public Affairs Office.



(USAID) report estimates that the Philippines loses around \$420 million annually in potential revenues due to mismanagement of fisheries resources (Tables 8 and 9).⁵⁴ Over-fishing alone is estimated to lead to annual losses of about US\$125 million.⁵⁵ Where there have been overall yield increases, they can be attributed to the compensatory contribution of aquaculture. The importance of environmental concerns associated with aquaculture should, however, be seriously considered (see Mangroves in this section).

LEGISLATION AND INSTITUTIONS

The Philippines has numerous laws aimed at protecting coral reefs, seagrasses, mangroves, and their associated resources. Coral collection was banned in 1978, and reefs and seagrass beds are considered environmentally-critical habitats under national law. The Fisheries Code (RA No. 8550) of 1998 addresses the need to manage and protect reefs

Table 9. Cost to Commercial Fishery Production, 1997 to 2004

Year	Prod'n (in MT)	Change in Prod'n (%)	Direction of Change (%)	Ave. Unit Prod'n Value P/MT	Prod'n Val. (PhP B)	Loss. (PhP B)
1997	884,651	–	–	29,317	25.9	1.4
1998	940,533	-6.3	–	31,617	29.7	1.6
1999	948,754	0.9	86	33,984	32.2	1.7
2000	946,485	-0.2	-127	35,795	33.9	1.8
2001	976,539	3.2	1428	36,956	36.1	1.9
2002	1,041,360	6.6	109	37,366	38.9	2.0
2003	1,045,316	0.4	-94	39,563	42.4	2.2
2004	1,070,725	2.4	540	40,908	43.8	2.3
Ave.	956,387	2.8	–	34,295	32.8	2.0

and their related resources (Box 11). Laws have been passed to conserve and protect the remaining mangroves in the country, and policies have been promulgated to provide economic disincentives to the conversion of mangrove forests for fishpond use.

Box 11. Coastal Resources Management and Use Rights

Coastal waters are not subject to the same range of tenurial instruments and control and supervision by the central government, as are forests. The Local Government Code provides a legal basis for local governments to establish use- rights for coastal waters. Both the Local Government Code and the Fisheries code hold coastal local governments responsible for planning, legislating, regulating, enforcing, monitoring, and evaluating sustainable coastal resource-use in municipal waters and coastal areas. The Code uses municipal ordinances to declare certain areas sanctuaries or limit resource-use to particular users. In limited cases, indigenous peoples may be able to use the Indigenous Peoples Rights Act to do the same. Use of the Code, however, has been sporadic, and most coastal waters and resources remain open-access resources and face continued overexploitation and resource degradation.

Fishpond license agreements are the only real tenurial instrument for coastal waters established by national law and policy. These have generally been monopolized by the wealthy. This is because the majority of small-scale fishers have neither the money nor the technical know-how needed to set up aquaculture projects. They also lack the political connections that facilitate the granting of licenses and permits.

Municipal fishers are largely unhampered in moving from one municipal fishing ground to another. Moreover, municipal governments are generally ineffective in protecting their marine waters from commercial fishers and in enforcing laws and regulations. Development of coastal-resources-management best practices should benefit from the lessons learned in use of forest-related tenurial instruments, where such instruments have been effective. Lessons are also available from local governments and communities that have taken steps to establish de-facto tenurial arrangements in the form of marine sanctuaries, zones, fishing regulations, and others using the authority devolved by the Local Government Code or, in some cases, the Indigenous Peoples Rights Act.

Source: Adapted from World Bank 2004b.

⁵⁴ DA-BFAR, 2004.

⁵⁵ ICLARM, 2001 and Green, *et al.*, 2003.



The 1990s saw the issuance of new regulations defining access and conservation of mangrove forests. The Wildlife Resources Conservation and Protection Act of 2001 aims to conserve and protect wildlife species and their habitats, promote ecological balance, and enhance biological diversity. In 2002, the Coastal and Marine Management Office was formalized within DENR to provide coordination both within DENR and among national agencies and local governments for integrated coastal management, and to strengthen DENR's Coastal Environment Program initiated in 1993. In spite of these legislative and institutional innovations, the Philippines still does not have a nationally-recognized coral reef action plan, and the Executive Order for Integrated Coastal Management is pending approval by the President.

The Fisheries Code (1998) devolves protection of coastal and marine resources, up to 15 km of the general coastline, to municipalities and cities. To fully operationalize this, the delineation of municipal waters for local governments with islands needs to be completed and coastal municipalities and cities need to pass their local ordinances. However, guidelines for delineating municipal waters for LGUs with islands have yet to be issued. While some LGUs (100 of the 832 coastal municipalities and cities) are beginning to implement integrated coastal resource management programs that include coral reefs and other habitats, many others lack the training and resources to effectively implement such programs. National government agencies, namely the DENR and Bureau of Fisheries and Aquatic Resources (BFAR), also have limited capacity to assist LGUs in implementing such programs.

Various community-based projects have engaged coastal residents in reforestation, rehabilitation and management efforts. Despite these interventions, mangrove areas continue to be degraded and are threatened with conversion for settlement and

charcoal-making. Boundary delineation of mangrove protection forests is found wanting in most areas of the country.

Current mandates of DENR and BFAR tend to separate fisheries from the coastal ecosystem. Several DENR bureaus have contributed to coastal management implementation, while BFAR considers fisheries management within the realm of its expertise. A Joint Memorandum Order between BFAR and DENR, in principle, coordinates the activities of the two agencies for coastal management; but in practice, this coordinating mechanism has not been adequately operationalized.

Role of NGOs, community-based groups, and the private sector. National and international NGOs, with their local partners, have been key actors in gathering and sharing information on the status of marine resources in the Philippines. Although there has been no systematic official assessment of Philippine reefs since the landmark nationwide survey of coral reefs in the late 1970s, NGOs and academic institutions have been providing data on the status of Philippine coral reefs. In the last decade, Earthwatch teams, fielded by the Coastal Conservation and Education Foundation, have monitored several reef sites in Mabini and Tingloy, Batangas (Box 12); southern Bohol Island and Panglao; Negros Oriental;



Mangrove reforestation.

Source: DENR-Public Affairs Office.



Box 12. Management, Tourism and Conservation at Mabini and Tingloy, Batangas

Mabini and Tingloy areas in Batangas Province are home to diverse and abundant coral reefs. These reefs provide fish to local communities, and attract thousands of tourist scuba divers and snorkellers. This mix of beneficiaries presents a balancing problem for reef managers.

The history of coral reef management in this area is closely linked to tourism. Scuba divers called for protection of their best dive sites when one of the first diving resorts in the Philippines started in 1975. After the first area surveys in 1980, tourist operators concerned about rampant illegal and destructive fishing proposed in 1982 a national marine park for Sombrero Island and parts of Caban and Maricaban Islands. Since then a number of NGOs (Haribon Foundation; Earthwatch expeditions; Biodiversity Conservation Network; Worldwild Fund for Nature; Friends of Balayan Bay Association; and Coastal Conservation and Education Foundation, formerly Sulu Fund) have worked with the local communities to promote reef conservation and develop alternative livelihoods. These NGOs have also monitored the reefs, including recording uses such as the number of fishing boats, dropping of anchors, divers, shoreline development, and any other activities likely to damage the reefs.

Although some damage from anchors, divers, and construction continues to occur, this area has seen success in reducing overfishing and illegal fishing. The condition of the reef sites surveyed has been stable since 1997, with an abundance of new coral growth and little evidence of physical damage. It is important that management in Batangas continue to improve so that coral regrowth is encouraged and sustained. Barangay Sto. Tomas has recently declared the Batalang Bato Reef (known as Pulang Buli Reef to divers) as a marine sanctuary that is off-limits to diving and fishing activities. Coastal Conservation and Education Foundation started a community-based coastal resource management project in Tingloy in late 1999. Conservation was initiated by the tourism sector, and now the community and municipality are accepting responsibility in caring for their surroundings.

Enforcement efforts have yielded several arrests and have expanded to three more towns within Balayan Bay. User-fee collections from divers have generated more than PhP1 million which is enough to cover annual costs of the Bantay Dagat. An integrated coastal management plan for Balayan Bay has been prepared, along with workshops and educational programs for stakeholders.

Source: Adapted from World Bank 2004b.

and Tubbataha Reefs, among others. The Marine Science Institute of the University of the Philippines, and Silliman University have also conducted reef-monitoring in many areas. More recently, Reef Check has used volunteers to monitor reefs in selected municipalities in the Visayas. Monitoring has also taken place under bilateral or multilateral projects, such as the USAID-funded Coastal Resource Management Project. Among the reefs carefully monitored in this project are six declared- and proposed Marine Protected Areas. These are mostly located in the south, such as Calape in Bohol and Kiamba in Sarangani.

In a recent workshop conducted on Ecowatch for Beaches in the Philippines (May 31–June 2, 2004), citizens expressed the view that most successful “blue” initiatives are those that empower communities and

their respective local governments to enforce laws and manage resources within their jurisdiction. There is widespread use of community-based management in the establishment of marine sanctuaries. However, these sanctuaries have only been effective in areas where the local governments work in partnership with the coastal community.

The private sector plays a vital role in supporting adequate environmental compliance and enforcement to improve the country’s existing environmental record in coastal and marine resources management. Tourism operators and small-scale enterprises are highly dependent on the inflow of tourists to beaches, coral reefs, and marine sanctuaries. These resources need to remain pristine in order to sustain interest and appreciation, and spur increased demand.



Environmental Champion — EUGENIO PADEN



The first mangrove plantation in Banacon island, Bohol Province was established by Mr. **Eugenio Paden** on his own. When he started planting mangroves in 1957, Mang Denciong, as he was popularly called, was driven by curiosity and the need for continuous source of firewood and poles for his nipa dwelling and fish coral. He was chided for being “crazy”, since no one in the island could understand what he was doing. His first harvest ten years later yielded raw materials and cash from the sale, prompting other islanders to start their own plantations. But the clamor for more space and boundary-conflicts necessitated the intervention of the Bureau of Forest Development. The island was placed under the Community Tree Farm (CTF) Program in 1980, and the Banacon Fisherfolks and Mangrove Planters Association (BAFMAPA) was officially formed. Field technicians were assigned to the area and mangrove plantations flourished. At the same time, fisherfolk saw the productivity of their area improving, with more crabs, shrimps, shellfish, and fish. They also started seaweed farming. As they harvested mature mangroves, they continued to plant new ones.

In 1989, DENR conferred a Likas Yaman Award (Natural Resource Award) on Mang Denciong for his pioneering efforts. The Food and Agriculture Office (FAO) gave Mang Denciong the “Outstanding Tree Farmer Award” which he received in Bangkok from the Princess of Thailand. In recognition of their accomplishments and dedication, the residents of Banacon were given two community-based mangrove reforestation contracts and two family reforestation contracts for the Paden family. The contracts have been completed and the areas turned over to the DENR. Banacon island now serves as a major source of propagules for the DENR, the local government units, and private plantation efforts in Bohol and Cebu.

In 2003, the BAFMAPA received the first Philippine Wetlands Conservation Award for the people’s organization (PO) category, a plaque, Php50,000 as cash prize, and a nomination to the International Wetland Conservation Award. In 2004, BAFMAPA was issued a Community-based Forest Management Agreement. While Mang Denciong has since passed away, his legacy lives on in Banacon.



Mangrove underwater.
Source: DENR-Public Affairs Office.



Mangrove in Samar.
Source: DENR-Public Affairs Office.

