CORAL TRIANGLE INITIATIVE

State of the Coral Triangle Report

HIGHLIGHTS

PHILIPPINES

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Executive Summary

The Philippines' commitment to the CTI is expressed in its National Plan of Action (NPOA). Actions in the NPOA are to eventually contribute to achieving higher level outcomes of sustaining coral reef ecosystems and services, establishing sustainable fisheries production, and improved food security.

The Philippines has 7,100 islands with a total land area of about 300,000 km² and approximately 2.0 million km² of sea area in its exclusive economic zone (EEZ). Its coastline is about 35,000 km long. The Philippines has been purported to be the world's center of marine shore fishes. Coastal ecosystems (e.g., coral reefs) provide diverse functions such as coastal protection, fisheries production, and regulation services as well as recreational, educational, and aesthetic values. At least 50 million Filipinos depend on coral reefs and associated ecosystems for food and livelihood.

Poor land use practices have been cited as a major cause of the degradation of coastal ecosystems in the Philippines. The recognition of the country as the hottest of the hot spots highlights the urgent need for marine biodiversity conservation. While considerable gains have been made, challenges remain as a result of increasing population and growing urban and rural development. If these ecosystems are damaged beyond restoration, these would have profound consequences for Philippine society.

Biophysical characteristics

The Philippines has around 26,000 km² of **coral reef area**, the second largest in Southeast Asia. Some 500 species of scleractinian or "stony" corals are known to occur, 12 of which are considered endemic. Around 3,053 **species of fish** are found in the Philippines, of which 2,724 are marine. Pelagic fish species number around 177, whereas demersal species total 2,351, of which 658 are reef-associated and 693 are associated with other nearshore habitats. There are 277 deep sea fish species and 173 freshwater species. At least 16 species of **seagrass** are known to occur in an estimated 978 km² of seagrass beds. There are 42 **mangrove** species representing 18 families in a total natural mangrove area of 2,472 km². On the other hand, several **threatened species** (dugong, cetaceans, whale sharks, manta rays, other sharks, and marine turtles) require immediate attention.

Governance

The 1987 *Philippine Constitution* provides the basic policy and legal framework for food security, livelihood and socioeconomic development; environment and natural resources conservation and development; and

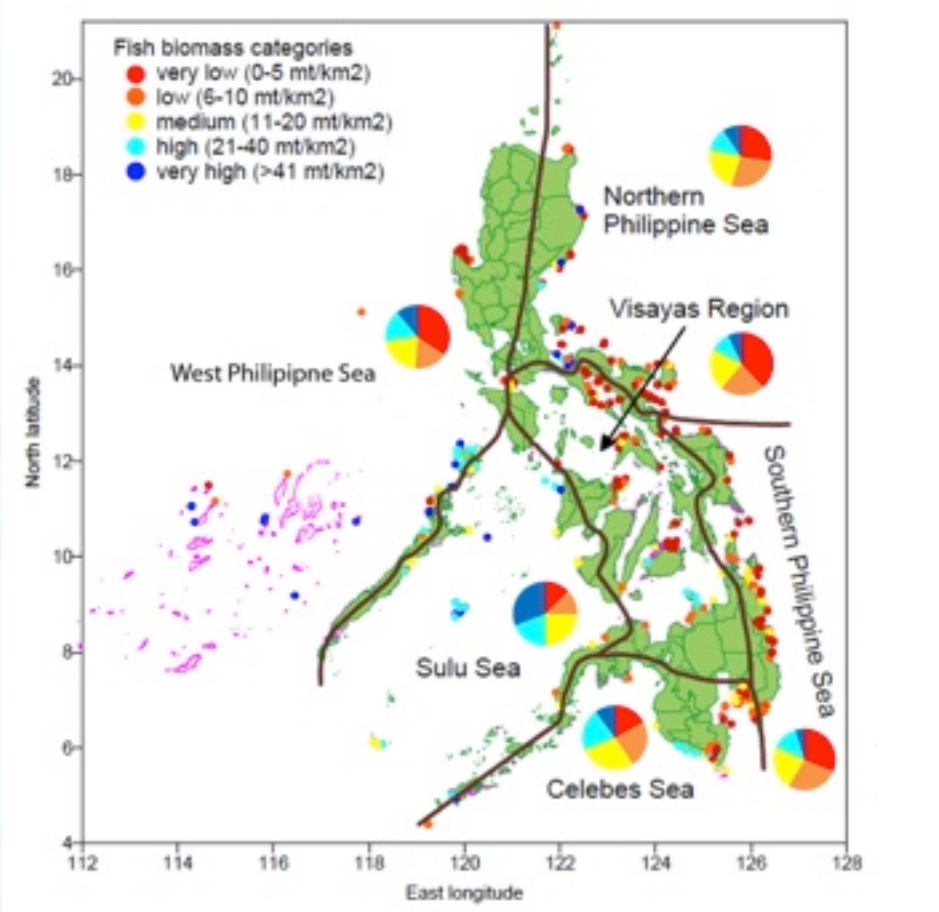

Fig. 1. *On-going studies by the Marine Science Institute (1991-2011) on reef associated fish show the highest biomass and diversity in the reefs of the West Philippine Seas and Sulu Sea.*

Key Statistics

BIOPHYSICAL	
Total land area	300,000 km^2
Total territorial water area including Exclusive Economic Zone	2,000,000 km^2
Total coastline length	37,008 km
Total coral reef area	26,000 km^2
Total mangrove area (2005)	2,472 km^2
Total seagrass area	978 km^2
BIOLOGICAL	
Total number of fish species	3,053
Number of marine fish species	2,724
Number of marine demersal fish species	2,351
Number of coral reef fish and associated species	1,658
Number of marine pelagic fish species	177
Number of coral species	~500
Number of mangrove species	42
Number of seagrass species	16
SOCIO-ECONOMIC	
Population (2009)	92.1 million
Population growth rate (2011)	1.9%
Population at coastal areas i.e. within 10km (60% to total)	55.26 million
Number of people per km. of coastline (2000)	2,467
Poverty threshold per capita income per annum (2009)	P 16,841.00

security, safety, maritime boundaries, and law enforcement. The *Local Government Code of 1991 (Republic Act [RA] 7160)* mandated the devolution and decentralization of service delivery and other functions related to local development to the local government units (LGUs). The *Philippine Fisheries Code (RA 8550)* established and improved the organizational and institutional mechanisms for the fisheries sector. The *National Integrated Protected Areas System (NIPAS) Act of 1992* laid the basis for biodiversity conservation, and *Executive Order (EO) 578* issued by the President in 2006 established the national policy on biological diversity and prescribed its implementation throughout the country, particularly in the Sulu-Sulawesi Marine Ecoregion (SSME) and the Verde Island Passage Marine Corridor.

EO 533 adopts Integrated Coastal Management (ICM) as a national strategy for coastal and marine environment through promotion of food security, sustainable livelihood, poverty alleviation, and reduction of vulnerability to natural hazards, while preserving ecological integrity. To fully implement the CTI National Plan of Action, EO 797 was enacted in May 2009. Other than the formal adoption of the NPOA, EO 797 provides for the coordinating mechanism between the Department of Environment and Natural Resources (DENR) and Department of Agriculture - Bureau of Fisheries and Aquatic Resources (DA-BFAR) and established the CTI National Coordinating Committee (NCC) consisting of government agencies with functions relevant to NPOA implementation.

Socioeconomic features

The Philippines had a **population** of 92.1 million in 2009, with an annual average growth rate of 2.04% from 2000–2007 and 1.9% (pop. in 2011=99 million). The population density in 2009 was estimated at 307 people per km^2, about 10% higher than the population density in 2003. Increasing population is a serious concern since more than 60% of the nation's total population live in the coastal areas, which could lead to the overexploitation of coastal and marine resources. Fishers are the poorest sector of the population, with most earning incomes below the poverty threshold. In 2002, **fisher income** was estimated at PhP11,906 per capita per year, with fisher density ranging from 4.4 to 6.5 fishers/km^2. In 2009, the poverty threshold went up to PhP16,841 per capita per year. The fisheries sector provides employment to about one million people, including fishers, middlemen, traders, fish processors, and those involved in fish transport, among others. Fish continues to be the principal source of protein for the country's population, accounting for 70% of the total animal protein intake and 30% of the total protein intake.

In 2009, the fisheries sector accounted for 2.2% of gross domestic product (GDP) at current prices and 4.4% in constant prices. The reported decline to 3.84% of GDP in 2011 was attributed to the decreased production of the commercial and municipal fisheries. In 2008, the Philippines ranked 9th in the world in terms of capture fisheries production based on 2008 Food and Agriculture Organization statistics; in 2010, the sector produced 2.6 million tons, comprising 51% of total Philippine fish production and valued at PhP138.3 billion. Of this total, the municipal sector contributed PhP77.6 billion from 1.37 million tons of fish, while the commercial sector contributed PhP60.7 billion from 1.25 million tons. Total fish production was stable from 2001–2009, but increased substantially from 2009 to 2010 as a result of the increase in aquaculture production, mainly seaweeds, with capture fisheries showing a decreasing trend.

Tuna fisheries account for about 12% of total fish production in the country. Tuna production gradually increased from 2001–2009, but declined from 2009 to 2010, probably due to the closure of small pockets of fishing grounds in the Western and Central Pacific Ocean.

Small pelagics (sardines, anchovies, round herring, roundscads, mackerels, and fusiliers) are the main sources of cheap protein for the population. In 2003, they comprised about 60% of the total capture fishery production of the country. In the late 1980's maximum sustainable yield (MSY) for small pelagics was estimated at 550,000 tons. Catch Per Unit of Effort (CPUE) for small pelagic fishes has continued to decline since the 1950s. Sardines are one of the commercially important pelagics, with a total catch of 442,045 tons valued at approximately PhP10.5 billion in 2011. The country's sardine stocks are showing signs of depletion.

Demersal stocks have declined in biomass and have shown some changes in species composition. Present exploitation rates for demersal fishes are also beyond the estimated MSY levels in the late 1980's. Other recent data on artisanal catch indicate a shift in the catch composition of demersal fishes, with the predominance of small-sized species of low market value (e.g., cardinal fishes).

Other **major changes in fish catch composition** include an increase in the abundance of squids, shrimps, and small pelagic fish species and substantial declines in the abundance of large commercially valuable species like groupers, snappers, sea catfish, etc.

Another important fishery is the **Live Reef Fish Trade** (LRFT), which mostly targets groupers. While generating significant export revenue and income for fishers and fish farmers, countrywide catches peaked in the mid-1990s and have gradually declined since then. The declining trend in the LRFT is particularly noticeable in Palawan, a major source of live fish.

Aquaculture contributes 38% to annual fish production and is growing rapidly at 10.2% per year. In 2010, the aquaculture sector contributed 2,543,720 tons valued at PhP82 billion, of which a significant proportion came from seaweed production, making the country's production of 1.8 million tons next to Indonesia's 3 million tons.

Coastal tourism has grown significantly, bringing substantial economic benefits to the country. Based on the World Travel and Tourism Council satellite accounting, tourism accounts for 9.1% of the country's GDP.

Domestic production of oil in the Philippines was limited until 2010, when production reached 61,860,820 blue barrel (bbl) of oil, 1,011,267 million cubic feet (mmscf) of natural gas, and 45,312,937 bbl of condensate. The Philippines holds an estimated 3.48 trillion cubic feet (Tcf) of natural gas reserves, most of which are found in the Malampaya gas field in Palawan, where there is an estimated 2.6 Tcf of natural gas.

The Philippines relies heavily on the **domestic and international shipping industry** for the transport of goods and people. In 2009, the gross revenue of the Philippine Ports Authority (PPA) reached PhP7.129 billion, an increase of more than PhP0.5 billion from 2008.

Traditional knowledge has been increasingly recognized in the Philippines for its complementary value to scientific findings in providing insights useful in coastal resource management, e.g., customary marine tenure systems. Around 15 indigenous groups use coastal resources in a traditional manner. Enabling policies and mechanisms that support gender equality are also actively promoted in the Philippines.

Resource valuation

The **value of sustainable production from capture fisheries** (excluding invertebrates and aquatic plants) has been estimated at about PhP 128 billion per year (based on 2006 data in Padilla, 2009). The **annual potential yield from coral reef fish species,** based on a coral reef area of 26,000 km², ranges from 351,000–429,000 tons. The estimated current yield using a reef area of 26,000 km² is placed at over 169,000 tons with potential net values ranging from about PhP2.0–2.5 billion and an actual net value of less than PhP1 billion using the average price for coral reef-associated species of PhP57/kg in 2006. These values were observed to be slightly lower compared to previous estimates using reef conditions. The **gross value of potential production from mangrove fisheries** decreased to PhP1.49–6.09 billion in 2006 , with the estimated contribution of mangrove ecosystems to actual fisheries production reaching 23,269 tons.

Threats and vulnerabilities

The country's natural mangrove cover has declined to 247,268 ha from the original 400,000 ha, while planted mangroves have already reached up to more than 44,000 ha. In spite of the ecological and economic value of seagrasses, between 30% and 50% of Philippine seagrass beds have been lost due to industrial development, ports, and recreation in the last 50 years.

Poor coral cover is found in 40% of the country's reefs, while areas with excellent cover have steadily declined to less than 5% from 2000–2004. Despite considerable improvements in coral reef management, the country's coral reefs remain under threat from **overfishing, destructive fishing practices, unsustainable coastal development, sedimentation, and pollution**. In 2002, overfishing was considered the largest threat (about 40%) to coral reefs in the Philippines, followed by destructive fishing practices (approximately 36%). The impacts of overfishing on coral reefs are evident in the decreasing biomass of reef-associated fish, resulting in considerable local extirpation. At present, however, the threat from destructive fishing has declined, while the other threats have increased considerably, indicating some successes in enforcement activities in marine protected areas (MPAs) and fishery management areas (FMAs) in many municipalities throughout the country.

The **growth in coastal populations** has amplified these threats, compromising food security and socioeconomic stability in coastal areas. Impacts of land-based sedimentation and pollution, poor land use practices, irresponsible mining, deforestation, and urbanization in the watershed areas have also increased significantly over the years. There is an urgent need for a comprehensive and integrated approach to the development of coastal areas in the Philippines, as 78% of the 80 provinces and 56% of the 1,634 cities and municipalities are located along the coast.

Actions and initiatives

Several initiatives are being undertaken to attain the goals of the CTI NPOA. These are being implemented through Philippine CTI

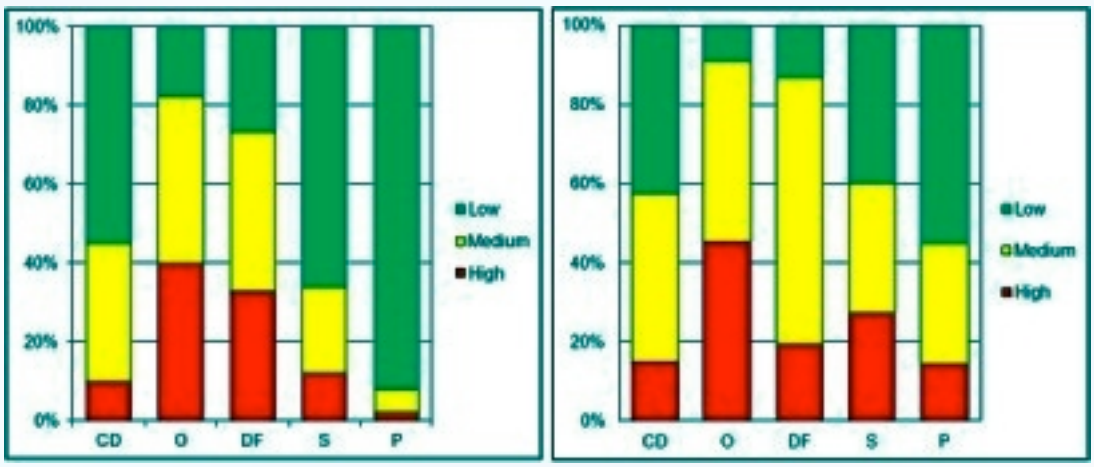

Fig. 2. Estimated level of the major threats to coral reefs in the Philippines in 2002 (left) and 2012 *(right). CD – Coastal Development, O – Overfishing, DF – Destructive Fishing, S – Sedimentation, P – Pollution. (Source: Burke et al. 2002, MSN 2012).*

NCC co-chaired by DENR and DA-BFAR. **Goal 1, Improved Governance and Effective Management, targets two seascapes:** The NPOA captures work on two priority seascapes- SSME and the West Philippines Sea. Investment plans for these two seascapes are being developed. For **Goal 2 (Ecosystem Approach to Fisheries Management [EAFM] Applied)**, national policies on EAFM (i.e., policy on tuna management) and LRFT are being drafted.

For **Goal 3 (Improved Management of MPAs)**, benchmarking of 119 MPAs across the country was conducted by the US Coral Triangle Support Partnership (CTSP) and the Marine Protected Area Support Network (MSN) in 2011. Using the MPA Effectiveness Assessment Tool (MEAT), an assessment of nine out of 33 NIPAS MPAs showed that 33% of the nine NIPAS MPAs are effectively managed. This represent 330,570 ha or 47% of the 700,018 ha of assessed NIPAS MPAs. Using MEAT, the 2011 MPA Awards showed that 70 MPAs or 64% of the 110 locally managed MPAs that sent applications is at least in MEAT Level 2 or are effectively managed. However, the aggregate total area of the 70 MPAs is only 4,305 ha or 14% of the total area of locally managed MPAs assessed using MEAT.

Updating of information for 1,500 MPAs and about 40 MPA networks are being undertaken by the MPA Support Network with the Philippine NCCC. For mangroves, around 57% (80,000 ha) of the remaining mangroves (140,000 ha) is around some form of protection, and mangrove replanting activities continue in many municipalities. Most of the marine key biodiversity areas (MKBAs) are found in the Visayan Sea, Sulu Sea, and West Philippine Sea.

For **Goal 4, climate change research and capacity building in marine and coastal environments** have been initiated to climate change adaptation. The RESILIENT SEAS Program, funded by the Department of Science and Technology (DOST) and involving six institutions led by the Marine Science Institute of the University of the Philippines (UP-MSI), has conducted pilot climate change vulnerability assessments. Together with CTSP, the CTI Climate Learning Adaptation Network was initiated, and Training of Trainers (ToT) was conducted for over a dozen participants each from Malaysia and the Philippines.

Under **Goal 5, Threatened Species Status Monitored,** action plans have been prepared for the conservation and monitoring of threatened species such as sharks, marine turtles, and marine mammals. By 2015, the NPOA aims to produce Species Action Plans for seabirds, wrasses, and other reef fishes. Other threatened species that are being considered for restocking include giant clams, scallops, and top shells, among others.

The NPOA also includes interventions for capacity building, sustainable financing, and public awareness. The university mentoring program aims to transfer knowledge and skills from centers of excellence to mentee higher education institutions for the latter to better assist LGUs on the technical aspects of coastal resource management and enhance NPOA implementation. Mechanisms such as payment for ecosystem services (PES) have also been identified to generate funds for national and local governments to undertake activities meant to facilitate the attainment of NPOA goals.

Linking coral reefs to establishing sustainable fisheries and food security

Coastal ecosystems in the Philippines are in varying degrees of degradation resulting from overpopulation, fragmented governance, and unsustainable coastal development. Historical overfishing, as a result of Malthusian overfishing, and its related manifestations have reduced the individual fisher's catch to very low levels. Increasing evidence of reduced benefits and increased costs can be gleaned from several Philippine examples that can be highlighted to link CTI actions to the positive impacts of coral reef management and conservation leading to sustainable fisheries and food security.

Priority Research Issues

- ☑ Monitoring of interactive impacts of governance responses e.g. impacts of MPAs, EAFM, and CCA on ecological, social, and economic dimensions
- ☑ Value-added benefits from coordinated scaling up efforts to adapt and be resilient to climate change
- ☑ Determination of carrying capacity of "limits" to use of resources derived from coastal and marine resources
- ☑ Development of and mainstreaming incentives for for payment for ecosystem services and other sustainable financing mechanisms

Reduced threats to ecosystem integrity have been demonstrated in increasing numbers of coastal areas as a result of good coastal governance – clear proof that effective action could lead to more sustainable fisheries. **Integrating participatory research with adaptive management and capacity building** has likewise been shown as a good practice in science and management collaboration. **Climate monitoring within the framework integrated coastal management** (ICM), using MPA impact indicators as sentinel entry points, can be used to gauge impacts such as improved livelihood incomes, savings, and spending patterns when used together with EAFM indicators. Strengthening the gains from these initiatives and continuing to forge synergies in actions (e.g., inter-LGU alliances, CT-MPA system and MPA networks) bode well for the future.

It is crucial to communicate the importance of the valuation of resources and ecosystem goods and services and its application in local and national governance practices, such as PES and the development of social enterprises. Building capacities and expanding network partnerships and constituencies through regular state of the coasts reporting, allow the documentation of feedback and response and contribute to the establishment of knowledge-based communities. Impact evaluation is necessary to link EAFM practices to sustainable fisheries and food access and availability in the CTI areas of intervention.

References

Burke, L., K. Reytar, M. Spalding, and A. Perry. 2011. *Reefs at Risk Revisited*. World Resources Institute, Washington, D.C. 114 p.

Availability of Full Reports

This document is to be read as a supplement to the CD version of the complete State of the Coral Triangle Report.

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