

CORAL GARDEN & REEF REHABILITATION PROJECT, THE ESTABLISHMENT OF MARINE RESERVES AND FISH SANTUARIES OF THE BUREAU OF FISHERIES AND AQUATIC RESOURCES (BFAR) IN THE PHILIPPINES

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ABSTRACT

The vastness of the Philippine waters provides significant supply of food and protein as well as opportunities for development for commercial and municipal fisheries. The utilization of such immense marine resource should be geared along sustainability not only for survival, but also to the country's increasing population, environmental degradation, and the state's commitment to the Global competitiveness archetype. The establishment of non-fishing areas in marine protected areas would double fish catch in 5 years (Roberts, 2002).

■ INTRODUCTION

The Philippines Marine Resources envelops a total area of 220,000 hectares (including the Exclusive Economic Zone), consisting of 193,400,000 hectares of oceanic or off-shore waters, and 27, 000 sq. km. of coral reef areas. At present, destructive/illegal fishing, pollution, sedimentation and other anthropogenic activities mainly cause the destruction and depletion of the coral reefs. 476,900 metric tons valued at P 13.3 billion are lost from illegal fishing activities every year such as poaching by foreign fishing vessels which resulted to the loss of around 80,000 metric tons of fish and other aquatic products valued at P 2.23 billion and coral reef destruction of 396,900 metric tons valued at P11.07 billion pesos. To date, only 4 percent of the coral reefs in the Philippines remain in excellent condition and 70 percent of which are at high risk from human activities. On the other hand, worldwide concern has been raised in order to save, manage, and protect the fast diminishing coral reef resource.

The Bureau of Fisheries and Aquatic Resources (BFAR) launched an innovative coral reef management and regeneration program: The Coral Gardening and Reef Rehabilitation Project in Tangalan, Aklan, the initial implementing strategy for sustainable fisheries management. The Program seeks to

promote alternative livelihood to reduce community pressure on the reefs through "green" coral aquaculture. The BFAR with the LGU of Tangalan, Aklan has identified and delineated the 10 ha. site/area for the said coral rehabilitation and marine resource conservation and protection project. In addition to the 13 identified sites of the NFARMC (National Fisheries and Aquatic Resource Management Council), the BFAR-CO has identified 26 sites from ARMM (Autonomous Region of Muslim Mindanao) and 21 from BFAR-RFO 2. Overall, 60 sites/ areas has been identified which needs prioritization and assessment as basis for introducing management interventions. To date, over 400 marine reserves and fish sanctuaries have been established all over the country with a total area of 8,313.90 has.

■ SIGNIFICANCE OF THE PROJECT

The Nationwide implementation of the establishment of Marine reserves and sanctuaries will protect the coral reefs from further degradation and destruction due to illegal and destructive fishing activities, pollution, sedimentation and human activities. Coastal and Municipal Fisheries has declined its production, from a peak of 1,070,195 (million) m.t. in 1988 to only 924,466 (33.4%) m.t. in 1997. Furthermore, 476,900 metric tons

valued at P 13.31 Billion pesos are lost to illegal fishing activities. This is broken down as follows: poaching by foreign fishing vessels at 80,000 metric tons valued at 2.23 Billion pesos; and coral reef destruction due to blast and cyanide fishing at 396,900 metric tons valued at P 11.07 Billion pesos.

“Coral Garden and Reef Rehabilitation Project of the BFAR”

The BFAR SCUBA Divers Task Force in cooperation with the LGU of Tangalan, Aklan, and the BFAR-NMFDC launched the First of its kind **Coral Garden and Reef Rehabilitation Project** to rehabilitate, manage and protect the said Coral Reef by establishing a Marine Reserve and deploy ARs in the said Municipality which, upon its successful implementation shall be intended in other priority areas.

A survey conducted by the BFAR SCUBA Divers Task Force yielded 12.09% of live corals in Puntod reef is (table 1), an alarming decline compared to the previous survey conducted by SEAFDEC (1998), which registered 58.4% live coral cover. Furthermore, dead corals registered at 27.62, a distressing increase compared to 12.8% as recorded by SEAFDEC (1998).

Table 1. Percent Cover of Major Benthic Lifeform Categories in Puntod Reef, Tangalan, Aklan

Lifeform Categories	Percent Cover (%)
Live Corals	12.09
Dead Corals	27.62
Algae	1.545
Other Fauna	8.287
Abiotics	50.43

The grim scenario of the coral reef of Tangalan, Aklan calls for immediate intervention. The rapid rate of destruction/degradation will ultimately wipe out the coral reefs by the time the year-ends.

The BFAR SCUBA Divers Task Force, Tangalan, Aklan LGU, and the BFAR-NMFDC is charged to rehabilitate, manage and protect the said Coral Reef by establishing a Marine Reserve and deploy ARs in the said site in Brgy. Jawili, Tangalan, Aklan.

Another Twelve (12) sites all over the country have also been identified by the BFAR that needs immediate intervention. The alarming rate of decline and diminishing of fish caught and coral reef species respectively has raised the concern of both the stakeholders and LGUs of the provinces and municipalities but such undertakings though a priority concern on resource conservation and management are at stake in view of the absence of funding requirements, hence the need for grants in aid to support its successful implementation.

■ **OBJECTIVES:**

General

1. To conserve and initiate the rehabilitation of damaged reefs in the fish sanctuary in the Philippines initially in Puntod Reef, Tangalan, Aklan
2. To uplift the standard of living conditions of the fisherfolk in the local fishing communities

Specific Objectives

1. To concentrate marine organisms to allow for more efficient but selective and regulated fishing activities
2. To protect small/juvenile organisms and nursery areas from destructive fishing activities
3. Increase the natural productivity eventually by supplying new habitats for sessile or permanently attached organisms and by allowing the establishment of an associated food chain
4. To create habitats and stimulate natural reefs for desired target species
5. Restore dead or degraded coral reefs
6. Generate income through tourism
7. To educate the primary stakeholders in the local fishing communities in Tangalan, Aklan about coral reef conservation and rehabilitation and build their capabilities to monitor and manage their coral reef resources.

■ DESCRIPTION OF THE PROJECT

The Bureau of Fisheries and Aquatic Resources (BFAR) has formed and organized the BFAR SCUBA Divers Task Force with a primary purpose to monitor, manage, safeguard the Coral Reef Resources of the Philippines and to establish Marine Reserves and Fish Sanctuaries. Initially it will implement the Coral Garden and Reef Rehabilitation Project in Tangalan, Aklan to be followed by other areas upon availability of funding and technical support to pursue said activities. The components of the Project are as follows:

Artificial Reefs

Fifty (50) modules or eight hundred (800) of concrete building blocks (1 module=16 units, 2m x 0.20m x 0.15m) will serve as artificial reefs. The artificial reefs will be installed/sited within the marine park/sanctuaries. The installation will be conducted on fine weather condition; water current is moderate, and good visibility.

1. An ocular survey was conducted to identify suitable/viable sites/area for the installation of Artificial Reef modules/units. The Manta Tow method was utilized in the survey to facilitate a fast and reliable assessment of the reef.

2. The Identified site will be marked with buoys based on the recorded coordinates in the initial survey conducted last Aug. 2-8, 2002.

3. The total area of the proposed LGU marine sanctuary is 370 hectare and is 5.13 kilometers from Casa Blanca, Brgy. Jawili, Tangalan, Aklan. Furthermore, the proposed BFAR Coral Garden has a total area of 15.36 ha. and lies in Puntod-Tungod reef (11° 49.00 N, 122° 16.30 E). Visibility is relatively good and adequate sunlight penetrates to the bottom in all parts of the reef. It was observed though, that a strong surface current surges in the later part of the day.

Coral Fragmentation

The one-square meter quadrant shall be the basic experimental unit because it is

retractable and because ecological processes taking place on this scale can be readily interpreted using human scales of perception. It is also easy to replicate.

1. At least three (3) colonies of coral species will be transplanted to each experimental unit. The particular species to be used will depend on what is available for surrounding reef patches. Colonies form different species will be randomly within each experimental unit.

2. Coral Fragments (will be introduced into selected sites by transporting them in well-aerated water filled containers on-board a banca. Whenever possible, whole colonies rather portions of colonies, will be used. These will be attached to a firm substrate by cement or by tying with plastic coated wires.

Colonies harboring obvious signs of disease will not be transplanted

3. Growth and survival of the fragments will be assessed periodically (once in every 4 months)

4. Survival will be assessed by counting the nos. of remaining healthy coral colonies and dividing the nos. by the original nos. of coral colonies at the start of the experiment

5. Recruitment of reef fishes and other invertebrates into the patches created by the coral transplants will also be observed

6. Indicators/criteria of success in rehabilitation efforts with the proposed project will be:

- 6.1 Survival and significant growth of the transplanted coral colonies

- 6.2 Absence of damage to the source patches from which coral transplants are obtained

- 6.3 Significant enhancement of the diversity and abundance of fish and other invertebrates

Site Selection

The selection of the proposed coral garden site/area were based on the following criteria:

1. At least 500m away from natural reefs

2. Near an alternative food source (i.e. sea grass beds)
3. Constructed on a barren and stable substrate area of flat or gently sloping bottom of relatively good visibility.
4. At depths of 15m to 25m, protected from wave action but still accessible to local fishermen.
5. If coastal management project is already on going, or if site is a successful marine protected area
6. Absence of sources of chronic damage to reefs. Otherwise, reef rehabilitation will not succeed.
7. Relatively protected from wave action
8. Deployment of Artificial reefs (AR's) may be considered in areas where there is no stable substrate available
9. Accessible and manageable to the fisherfolk/stakeholders

Survey and Assessment

A survey of the proposed site will be conducted using the Line Intercept Transect Method (LIT). This will determine the condition/status of the marine benthos communities (English et. al. 1997). Furthermore, the results of the survey will help stakeholders determine the appropriate actions and formulate ordinances, guidelines, etc. in the protection, management, and conservation of the marine sanctuaries and MPAs with the recommendation of the BFAR. In addition, a global positioning system (GPS) will be used to identify and delineate the proposed areas. The BFAR SCUBA Divers Task Force is charged to undertake such duty as well as the trained NGOs.

Marine Reserves and Fish Sanctuaries

Fisheries of all kinds in the country are near or have surpassed sustainable levels of catch. Most of the over-fished are high-value fishes and the volume and economic importance of such are declining. In some cases where fish catch volume is high, composition has changed to a lower-value of catch because of the changes in the ecological

make-up of fishery. The BFAR and the Local Government units have deemed it important to establish marine reserves and fish sanctuaries to rehabilitate, regenerate, manage and protect the remaining fishery and marine resources.

Site Selection

“ Provided however, that in the Municipal waters, the concerned LGU in consultation with the FARMCs may establish fishery refuge and sanctuaries: The FARMCs may also recommend fishery refuge and sanctuaries: Provided, further, that at least fifteen percent (15%) where applicable of the total coastal areas in each municipality shall be identified, based on the best available scientific data and in consultation with the Department, and automatically designated as fish sanctuaries by the LGUs in consultation with the concerned FARMCs”

Section of R.A. 8550 otherwise known as “**The Fisheries Philippine Fisheries Code of 1998**”

Social Criteria

1. Site should be identified/recommended by the community/FARMC/LGU as validated/assessed by the DA-BFAR office to facilitate a well coordinated and fully supported by the fisherfolk/stakeholders
2. Should be accessible and manageable to the community
3. Existing Fisherfolk Organizations, B/MFARMCs and active involvement of the LGUs in the proposed site

Ecological Criteria

1. Preferably the proposed site has mangrove stands, seagrass beds, or corals of no less than twenty percent (20%) live hard coral cover and drop off of slope no less than twenty-two degrees (20°)
2. Should be away from river banks, creek, ports, shipyard landing or grounding area of boats and run-off of no less than (2) kilometers
3. Should be away from fish corrals and other fixed structures and the like; fishing gears of no less than (2) kilometer distance

4. Presence of endangered or threatened species in the proposed site is preferable

5. The site should be diversified with no less than thirty (30) species of fish, 15 families and 550 individuals per 500 sq. m

6. Should have a good water quality free from *E. coli*, heavy metals and other pollutants with horizontal visibility of no less than seven (7) meters.

7. Water depth should be from zero to no more than two hundred (200) meters

Economic Criteria

1. Should be outside the duly designated navigational lanes and not a landing or docking area

2. Abutting and adjacent land area should not be classified as industrial zone.

An area (10 ha.) with heavily depleted demersal/benthic fish stocks, coral, and coral reef species will be delineated using a Global Positioning System (GPS). Local Government Units (LGUs) will be encouraged to formulate Municipal Ordinances with the BFAR recommendation and technical assistance to enact and strengthen the protection, conservation and management of the Marine Sanctuary.

Marker buoys will be installed to delineate the identified sites for the proposed marine reserves and sanctuaries. Fifty (50) units of marker buoys (30 cm diameter, orange sphere, 8 mm thick) will be used.

■ **EDUCATIONAL CAMPAIGN**

Educational campaigns on coral reef conservation, management, and protection as well as the management of the marine reserves/sanctuaries will be the main topics/subject in the said campaign. These seminars/trainings will be conducted with the stakeholders and LGUs based from the identified sites/areas by the BFAR. In addition, issues on coastal resource management will also be tackled.

■ **FLOATING LABORATORY**

The Laboratory is vital in the conduct of research and coral transportation on site.

The Laboratory is designed for “mobility,” a working area for coral transportation and propagation, a guardhouse and a diving platform.

■ **LABORATORY**

The Construction of a 50 sq. m. Laboratory with coral nursery tanks is fundamental in the research, conduct of experiments, and propagation of corals. The Laboratory construction includes 12 aerated tanks for coral acclimatization and propagation.

■ **SERVICE BOATS**

A 25-ft multi purpose boat, equipped with navigational equipments and GPS will be used in the transport of coral fragments for transplantation, monitoring, and SCUBA Diving activities.

■ **ALTERNATIVE LIVELIHOOD PROJECTS**

6 units of 4m x 5m fish cage will be provided for fisherfolk displaced from their fishing ground as a consequence in the establishment of marine reserves/sanctuaries and the coral rehabilitation project. Seminar and hands-on training on the culture of high-value fish produce will be provided for by the BFAR. Revenues from this endeavor will be shared by the affected fisherfolk.

■ **OTHER PROPOSED PROJECT SITES**

Out of the 60 sites identified, hereunder are the 12 priority sites based on the recommendation of the NFARMC and the BFAR-RFOs. The fisherfolk and LGUs who are willing to support the projects and those areas not covered by the Fisheries Resource Management Project (FRMP) but needs funding assistance for implementation in the near future.

Province	Municipality
1. Aparri	
2. Bataan	Mariveles, Samal
3. Bulacan	
4. Catanduanes	
5. Guimaras	Buenavista
6. Antique	Semirara
7. Cebu	Daanbantayan
8. Southern Leyte	Quatro Islas
9. Zamboanga del Norte	
10. Cagayan	Rizal, Sibuco
11. Camiguin (Reg. IX)	Baguio Pt., Camiguin
12. Sarangani (Cotabato City)	San Vicente, Sumnanga Minanga, Maligay