COASTAL ENVIRONMENTAL PROFILE
OF THE
SARANGANI BAY AREA
MINDANAO, PHILIPPINES

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Coastal Resource Management Project

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ACRONYMS and ABBREVIATIONS

BFAR	Bureau of Fisheries and Aquatic Resources
BIMP-EAGA	Brunei, Indonesia, Malaysia, and Philippines-East ASEAN Growth Area
CENRO	Community Environment and Natural Resources Office
CRM	coastal resource management
CRMP	Coastal Resource Management Project
DA	Department of Agriculture
DENR	Department of Environment and Natural Resources
DILG	Department of the Interior and Local Government
ENRO	Environment and Natural Resources Office
FARMC	Fisheries and Aquatic Resources Management Council
GSC	General Santos City
GSTTEOI	General Santos Traders and Tuna Exporters Organization
GT	gross ton
ha	hectare
km	kilometer
km^2	square kilometer
LBII	Louis Berger International, Inc.
LGU	local government unit
lps	liters per second
m	meter
mg/L	milligrams per liter
MGP	Mindanao Growth Plan
ml	milliliter
MPDO	Municipal Planning and Development Office
mt	metric ton
NGO	nongovernment organization
NIPAS	National Integrated Protected Areas System
PAMB	Protected Area Management Board
PCG	Philippine Coast Guard
PCRA	Participatory Coastal Resource Assessment
PENRO	Provincial Environment and Natural Resources Office
PNP	Philippine National Police
RA	Republic Act
SOCOPA	South Cotabato Purse Seiners' Association
SOCSKSARGEN	South Cotabato-Sultan Kudarat-Sarangani-General Santos City
SUML	Silliman University Marine Laboratory
t	ton
USAID	United States Agency for International Development
UFLA	Umbrella Fish Landing Association

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General Santos City Agriculture Office
General Santos City Environment and Natural Resource Office
Provincial Planning and Development Office
Provincial Environment and Natural Resource Office
Provincial Agriculture Office
Bureau of Fisheries and Aquatic Resources (BFAR)
Department of Environment and Natural Resources (DENR) Regions XI and XII
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FOREWORD from the GOVERNOR

As early as 1993, Sarangani Province had assumed the lead role as guardian and overseer of Sarangani Bay. Sometime later, this was acknowledged or affirmed by General Santos City, South Cotabato, and Sultan Kudarat by virtue of a gestured designation.

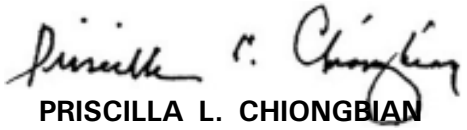
Since then, we have implemented various projects, some of which were carried out with the valued assistance from the United States Agency for International Development (USAID) through the Coastal Resource Management Project (CRMP) of the Department of Environment and Natural Resources (DENR).

The publication of the *Coastal Environmental Profile of the Sarangani Bay Area* will surely help planners, project implementors, and our people as well to forge additional means by which our coastal resources will be effectively managed for sustainable use.

Indeed, this is a welcome and very refreshing development as we move on in our efforts in integrated coastal management. We now take hold of the updated information regarding issues and concerns affecting the bay and this serves as an indispensable tool for future course of action.

It must have been a very straining experience for researchers to come up with this profile. The result is undeniably of tremendous significance—certainly of so much value to all of us whose lives are inevitably connected with the bay's ecosystem.

To all the men and women responsible for the Sarangani Bay Profile, my sincere appreciation and heartfelt gratitude!



PRISCILLA L. CHIONGBIAN
Governor
Sarangani Province

FOREWORD from the MAYOR

Studies and research on the degradation of our coastal habitats and coral ecosystems reveal alarming reports and figures. These statistics are instruments through which the ocean conveys its message. Our seas are crying and we should listen intently to its anguish, or we will wake up one day and hear no more of its cries, because our seas will have dried up.

The Local Government of General Santos City has responded to this juncture with a positive note. Several marine protection programs have been instituted to ensure the sustainability of marine resources. This is the city's modest way of paying homage to the seas for the abundance it has offered. For example, regular funding has been given to the Mangrove Rehabilitation Project in the three coastal *barangays* of the city: Barangays Bula, Baluan, and Buayan. The mangrove habitat has now broadened to 7 hectares. This project is in collaboration with the Coastal Resource Management Project, the Department of Environment and Natural Resources, Bayside Fishermen's Association, and youth clubs from the city's colleges.

Other important marine preservation programs include: the establishment of a fish sanctuary and marine reserve in Barangay Bawing which aims to regenerate fish stocks in the Sarangani Bay and the deputization of fish wardens and the organization of *Bantay Dagat*, which are 2 surveillance and monitoring efforts to control illegal fishing thereby properly implement fishery laws. These projects have been allocated regular funding from the city's Local Development Fund.

I always emphasize the critical importance of a holistic management approach, by preserving and protecting our natural resources, our marine ecosystem for that matter is the fundamental element. Sustainable development is about building a world we can bequeath to our children. The essence of the Sarangani Bay Profile is our regard for sustainability and survival.

If we are resolute in our environmental preservation and protection drive, let us by all means, give conviction to this responsibility. Let us make our ocean breathe again. As Sarangani Province says, "Bring back the fish, bring back the trees, bring back life." Our sea is life itself. We have to co-exist with this life, otherwise, woe will be unto us.

Let this excerpt of a poem from a Burmese book spur hope and incite action:
"Water is far from a simple commodity, water is a sociological complexity... water is life ..."

ADELBERT W. ANTONINO
Mayor
General Santos City

PREFACE

The *Coastal Environmental Profile of the Sarangani Bay Area, Mindanao, Philippines* provides baseline information about the coastal environment of the Sarangani Bay Area and is intended to assist with management planning at the municipal and *barangay* levels within the Sarangani Bay Area. It can also serve as a guide for other coastal municipalities in Sarangani and South Cotabato.

Coastal management problems identified in the Sarangani Bay Area are typical of fast developing coastal areas. Most land areas have been converted to agriculture and fishponds, and very little of the coastal land retains natural vegetation. As a result, the bay suffers from sedimentation. High fishing pressure has also been noted, and there are reports of the use of toxic substance and fine mesh nets, as well as the catching of juvenile fishes in some areas.

The unique biodiversity values of its tropical rainforest and the marine environment make the protection of this integrated ecosystem an urgent task. The Sarangani Bay Area is one of the few areas where endangered marine mammals like the *dugong* (sea cow) and whales are found. The bay is also lined with important coral reef and mangrove habitats that add tremendously to the natural productivity of the bay.

This profile is produced as part of the activities of the Coastal Resource Management Project (CRMP), implemented by the Department of Environment and Natural Resources (DENR), and funded by the United States Agency for International Development (USAID) which aims to develop and encourage leaders among local communities, nongovernment organizations (NGOs), and government units to work for coastal resource management (CRM). CRM is the process of planning, implementing, and monitoring beneficial and sustainable uses of coastal resources through participation, collaboration, and sound decision-making. This is reached by involving the entire affected community, resource users, local and regional government, NGOs, and the private sector. The aim is to promote an integrated coastal management approach that focuses on sustainability in coastal resource use, and minimizing the direct impacts on coastal resources from fishing, aquaculture, and tourism.

The integrated approach of participatory coastal management for the profile area has proven successful in other areas of the Philippines, and in other Asian countries. This approach depends on the dynamic action of community groups with local and national government agencies responsible for resource utilization in the area. This management approach does not dictate to the people, but rather, equips them, who rely the most upon the coastal environment, with the necessary tools to make rational and sustainable decisions. The first step in this process is the development of baseline information for planning. This profile completes this step for the Sarangani Bay Area.

COMMONLY USED LOCAL TERMS

Local Terms	English Translation
FISHING GEAR	
Baling	Beach seine
Basnig	Bag net
Bobo	Fish trap or fish pot
Bubo (pangnokos)	Squid trap
Bunsod	Fish corral
Hulbot-hulbot, sinsuro, baling	Trawl
Pahubas, lam-ba, ta-an, pahangga	Bottom set gill net
Palangre, pamirit, undak	Multiple hook and line
Palaran, pokot, patuloy	Gill net
Pamante, pamangsi	Drift gill net
Pamariles, pahawin, bira-bira	Long line
Pana, dimano, pusil-pusil	Spear gun
Panonton, latak, pasol, lagdong, patungkad, pahawin, pataw-pataw, palaran	Single hook and line
Pukot	Fine mesh net
Sadyap, sudsud	Push net
Sikpam	Scoop net
Sinsuro, likom	Ring net
FISH	
Abo	Rockfish, scorpionfish
Alibangbang	Butterflyfish
Aluman	Emperor
Amag	Anchovy
Amag-amag	Right-eye flounder
Anduhaw	Mackerel
Aso-os	Whiting
Ati	Pomfret
Baga	Soldier fish
Baga-baga	Squirrelfish

Local Terms	English Translation
Bagis	Unicornfish
Bagisan	Surgeonfish
Balaki	Goatfish
Bangsi	Flying fish
Bangus	Milkfish
Bantol	Scorpionfish
Bariles	Tuna
Bat-og	Saurie
Ba-ulo	Jack
Bawak	Mullet
Bayang	Batfish
Bilason	Fusilier
Bilong-bilong	Moonfish
Biyad	Tuna
Bokadolse	Threadfin
Bodboron	Tuna
Bodlotan	Scorpionfish
Bolan	Tarpon
Bolinao	Anchovy
Borot	Scad
Bucao	Scorpionfish, big-eye
Bugaong	Tigerperch, therapon
Bulan-bulan	Moonfish
Bulao	Scad
Bulgan	Big-eye
Caraballas	Mackerel
Dalagang bukid	Fusilier
Dali	Sole
Danggit	Rabbitfish
Dapak	Pomfret
Datu	Big-eye
Dayang	Pomfret
Diwit	Hairtail, scabbardfish
Dugho	Swordfish
Ganting	Squirrelfish
Gapas/gapas-gapas	Monocle bream
Gisaw	Mullet
Haan	Snapper
Haol	Herring
Haol-haol	Pilchard
Hasa-hasa	Mackerel
Hinok	Goatfish
Hito	Catfish

Local Terms	English Translation
Ibis	Glassperch
Ilak	Rudderfish
Indangan	Surgeonfish
Ito	Catfish
Karao	Tuna
Katambak	Emperor, surf bream, snapper
Kawa-kawa	Wahoo
Kitang/kikiro	Scat
Kubal-kubal	Scad
Labayan	Wrasse, rainbowfish, tamarin
Lagao	Threadfin bream
Langkoy	Hairtail
Lapis	Mackerel
Lapu-lapu	Grouper, rockcod, seabass
Lawong	Scorpionfish
Latab	Mojarra
Libgao	Anchovy
Liplipan	Billfish, bailfish
Lipte	Sweetlip, grunt
Lupoy	Herring
Malaguno	Scad
Malapati	Scad
Malmal	Scad
Mamsa	Jack
Marang	Marlin
Maya-maya	Snapper
Mol-mol	Parrotfish, wrasse
Mongit	Surgeonfish
Moong	Cardinalfish
Naniw	Halfbeak
Pakol	Triggerfish
Pagi	Stingray
Palad	Dusky sole
Palata	Lanternfish
Pandawan	Dolphinfish
Pata	Damselfish
Pina	Escolar
Pirit	Tuna
Pugot	Triggerfish
Rolyete	Amberjack
Rompe	Barracuda
Saging-saging	Grouper
Sagisihon	Snapper
Sagoksok	Barracuda
Salanga	Devil ray
Salingukod	Whiptail
Salmon	
Sambagon	Tuna
Sapsap	Ponyfish
Sihag-sihag	Anchovy
Sihagan	Anchovy
Silay	Threadfin bream
Solid	Fusilier
Suwasid	Halfbeak
Tabangko	Sillago
Talakitok	Trevally, scad
Tamban	Sardinella, herring
Tanguigue	Mackerel, wahoo
Tatabal-tabal	Saddlegrunt
Tilapiang-dagat	Tripletail
Tiki	Lizardfish, snakefish
Tigi/tigi-tigi	Jobfish
Turnos	Herring
Timbungan	Goatfish, sweeper
Tugnos	Anchovy
Tulay	Scad, flying fish
Tulingan	Tuna
Ubod	Moray eel, conger
Una	Mackerel

CRUSTACEANS

Banagan	Spiny lobster
Kasag	Crab
Hipon	Shrimp
Lambay	Crab
Lokon	Prawn
Ulang	Shrimp

MOLLUSKS

Kubotan	Octopus, cuttlefish
Kugita	Octopus
Labayan	Cuttlefish
Lumagayan	Bigfin squid
Nokos	Squid
Pusit	Squid
Tabugok	Octopus

GLOSSARY of TERMS

Beach seine. This net measures 50-200 m long x 1-5 m deep, with a mesh size of >3 cm. Four to 8 persons in a motorized or non-motorized *banca* use this at an average of 1 operation per day, 5 days per month. The fishing area is 50-100 m from the shoreline at 10-20 fathoms. When a school of fish is detected, a *banca* lays out the net to form a C facing the shore to half-enclose the fishes. Fishermen slowly pull the ends of the net on the shore so that the fishes are driven into the bag (pocket). Upon reaching the shore, the fishes are picked from the bag.

Bottom set gill net. This gear uses nylon size #4, #6, #8, or #10 weaved into a net. The length may vary, but the depth is often 1.5 m only. It is used in shallow waters close to shore, usually in mangrove, seagrass, and coral reef areas. Floats are attached to the top of the net and sinkers at the bottom so that the net stays open in the water with the bottom touching the substrate. Its operation requires 1-2 people only. The net is left for an average of 3 hours after which it is hauled out of the water.

Crab or lobster trap. This is made up of bamboo or wire traps used to catch crabs or lobsters. Soaking time is a few days to a week.

Drift gill net. This is a long net line ranging from 200 to 16,000 m (16 km) long and 2-3 m deep that "drifts" in open waters. The mesh size ranges from 4.5 to 10 cm made of filament size #4. This gear is used with a big motorized "motherboat" and 10 other smaller boats requiring 2-6 persons to operate.

Fine mesh net. This net is made of nylon (filament #4), with length ranging from 139 to 205 m, depth of 18-31 m, and mesh size of 8 cm. Two people operate this gear.

Fish corral. The fish corral or fish pen is made of bamboo poles or brush set on the substrate in shallow waters (5-20 fathoms) to form a circle or square pen surrounded with nets. This is placed usually 20 m from the lowtide line, and shaped to direct the voluntary movement of fishes into the enclosure (Umali 1950). The opening to the corral faces the shore. This requires 12-30 persons to build and ownership is often communal. When fishes have accumulated inside, these are harvested using some other gear type, usually gill or lift net.

Fishing with light. This is used to refer to any type of fishing done at night with the aid of a petromax (kerosene) lamp. The fishes are attracted to the light and gather around the fisher or the *banca* and then can be easily caught with a spear gun or with a scoop net.

Fish trap or fish pot. This is a rectangular bamboo or wire trap used to catch demersal fishes. Soaking time is 1 week.

Gill net. This net is made of a nylon, synthetic fiber or cotton twine #4, #7, #8, or #10. It measures 30-50 m long and 1-2.5 m deep. The sinkers are light so that the net floats in mid-water following the current direction. One to 3 people are needed to operate this gear. This is left in place usually overnight for an average of 8 hours in 3-28 fishing days.

Jigger. There are various modifications of this gear based on the bait used and target species caught. The *saranggat* is made up of a 30-m nylon line (size #4-12) and a bunch of stainless steel hooks (#1-24) arranged with the spikes directed outwards. The hooks are painted white in order to attract red squids (*lumayagan*) which are its target (and only) species. Thus, these are also commonly called squid jiggers. *Kati* or *hayungkong* resembles the *saranggat* in appearance but uses for bait a black cloth and stones fashioned to resemble an octopus, a crustacean, or shrimp (*kauongkong*). This is often used at night with a light. The line is jerked up and down which

attracts octopus and cuttlefish. As this gear is very specific, fishers may not be able to catch squids when these are not in season.

Lift net. Like the scoop net, the lift net is also used together with other gear, usually the ring net and operating from a boat. It is used to transport fishes encircled by the ring net, out of the water into the boat. This net is 4-100 m long and 5-27 m deep and has a small mesh size of 76 mm.

Long line. The *pahawin* is a long line measuring 200 m and is usually kept rolled around a bamboo tube. A large (size #13, #14, #15, or #17) baited hook is attached at the end of this line. A lead sinker attached to the secondary line keeps the line at the bottom. This gear is towed at depths of 100-200 fathoms for 14-18 hours, usually from late afternoon up to early or mid-morning of the following day, by 1 to 2 persons on a motorized boat.

The ***bira-bira*** is used in deep-sea fishing, often with the tuna handline because its target species, which are scads, are used for tuna bait. The long line is 100-300 m long, made of #130 or #160 nylon for the mainline, and #15 nylon for the secondary line. A sinker and colored crystalet bait are attached before the secondary line. One or more hooks size #15 or #19 are used. The line is suspended at depths of 100-200 fathoms, 1-5 km from the shoreline.

Multiple hand line. This is a single vertical line with a series of small barbed hooks attached to it by "spreaders" spaced at regular intervals.

Multiple hook and line. The *undak* is a line with 50-150 hooks attached 1 m from each other on the secondary line, of any or a combination of the following hook sizes: #569, #572, or #571. The gear is towed at 20-30 fathoms in pelagic waters. The *palangre* is a long filament line (thus may also be classified under long lines) measuring from 800 to 2,000 m and uses from 100 to 800 of hooks of any of the following sizes: #15, #565, #567, or #568. Bait is placed at every hook. This contraption is suspended near the bottom at depths of 3-5 fathoms and is allowed to stay from 14 to 18 hours before it is brought in.

Pull or drag net. This net catches fish by horizontally pulling or dragging the gear.

Push net. The push net is a fine mesh net (similar to mosquito netting) used to catch *bangus* (*Chanos chanos*) fry. This is approximately 1 x 5 m, attached at both ends to a bamboo pole, and is pulled by 2 persons parallel to the shoreline. Another modification of the push net has dimensions of 10 m in length, 4 m in width, and 3 m in depth, and has a mesh size of 0.5 cm.

Rentex. This is a fishing line with bunch of colored fine threads at the end serving as bait. Two to 5 people slowly drag this from a non-motorized boat. Belonid fishes are the target species of this gear type.

Ring net. This net combines the features of a round haul seine (which has a bunt at the center and is flanked by 2 wings) and purse seine (Umali 1950). This is made of nylon of filament size #2-12 measuring 30-40 m long x 2-16 m wide x 2-93 m deep, and has a mesh size of about 10 cm. The bottom of the net touches the substrate and may do damage when it scours the bottom as the net is hauled in. This gear is heavy, and its use requires a manpower of 9-14 persons. The ring net is used to encircle schools of pelagic fishes such as scads, mackerels, tunas, and sardines.

Scoop net. Scoop nets generally have a mesh size of 0.2 cm. Scoop nets are oftentimes used together with ring nets or gill nets to scoop out the fishes encircled by these gear or these may be used at night with a petromax lantern that attracts fishes.

Seine net. This is a net with a bunt or bag, flanked at each side by quarters or wings. The gear is positioned as to encircle a shoal or school of fish and the catch is hauled toward the shore or a boat.

Set line. This is a long line oriented horizontally in midwater from which many hooks are suspended vertically close to the substrate. This gear is anchored to the bottom so it does not move with the current. The length varies from 30 to 180 m and a hundred or more hooks are attached to it. This gear is specific for the belonid, *Tylosorus acus melanotus*.

Single hook and line. Gear with 1-5 hooks are classified under this gear type. There are variations of this gear based on the hook number, the size, and weight of the sinker, and modifications in the appearance and use, which are all geared towards catching specific species.

Pamariles or tuna handline is used in commercial fisheries, i.e., on fishing boats of more than 3 GT. The mainline is made of #180 nylon to which a secondary line (#120 or 130) is attached. A sinker weighing 1 kg or more is attached before the secondary line. Smaller fishes, mostly scads, are used for bait. The line is 200-800 m long and is used in pelagic waters from 100 to 300 fathoms, 15 km from the shoreline. The catch includes tuna, Spanish mackerel, marlin, and sometimes dolphins.

In ***panglatak***, a size #21 hook is used. Crystalet or cellophane strips (*limbag*) are used as bait for species such as mackerel, jacks, and other scombrids. This gear is used at depths of 30-50 fathoms.

The ***paniwit*** uses 1 to 2 hooks of sizes varying from #9 to #14 and #21, attached on a single nylon line #130 or #160 that is about 300-600 m long. A sinker (*tulawog*) weighing less than 1 kg is attached to a secondary line of nylon #30. The target species are hairtails (*Trichiurus* spp).

Skylab. This is a relatively new device for fishing. It is made of a net, with 2-cm mesh size, attached at a steel ring of 1.5-2 m diameter. Bait is made to settle on the substrate at the center of the net. When fishes concentrate at the center to feed on the bait, the net is pulled up quickly. One to 2 fishers are needed to operate the skylab.

Spear gun. There are 2 versions of this gear — the *pana* or spear gun and the *diman* or harpoon. The former is fashioned like a gun with rubber band or spring to trigger a sharpened 1-3 m long steel shaft. The latter is a straight steel rod with a 3-pronged end and is hurled toward the fish. Oftentimes, the spear gun is used in *hookah* or compressor fishing wherein a fisher breathes air from the surface through a long tube, thus permitting him to stay longer underwater.

Squid trap. This is a bamboo or wire trap fashioned into a square used specifically for catching squids. Mangrove branches are laid in 5-7 fathoms of water for squids to lay their eggs on. These are then placed inside the trap in order to lure the squids. The soaking time is aproximately three weeks from the full moon to the last quarter.
Trawl. This gear is used within 100 m from the shore and catches all species and all sizes of fish swept along its path as it is dragged along the sea bottom. It also destroys seagrass and coral reef areas. The use of trawl within the bay is considered illegal.

Troll line. The local name for this gear is *subid*. A troll line is composed of a single hook (size #9 or #10) attached to a 120-200 m nylon (filament size #50-160) with a sinker. It is pulled either by a motorized or non-motorized *banca* at 15-40 fathoms, often near fish shelters (*payao*).