Chapter 3
NATURAL RESOURCES

Coastal resources have always been the traditional source of livelihood for the communities of Olango Island. However, the availability of these resources is dependent not only on the amount of resource stock but also on the interdependence of the stock with the rest of the ecosystem. Hence, reliable information on the various ecological aspects of resource availability is critical in helping to determine the best resource use, relative condition, and management approaches. This chapter provides an overview of Olango's natural resources, which is dominated by its coastal and marine resources.

MINERAL RESOURCES

Geologically, Olango Island and its satellite islets are surrounded by 2 major lithologic units: Carcar limestone deposits and alluvial sediments. Carcar limestone, which formed during the Pleistocene period (1.8 million years ago), is porous limestone. This is often characterized by the formation of sinkholes, pitted grooves, and branching pinnacle structures. Alluvial sediments are sedimentary rocks, which appeared during the Quartenary period (1.64 million years ago up to present). These are composed basically of calcareous coarse-grained sand (weathering of limestone) mixed with shell fragments, fossilized shells, calcareous algae, and other carbonate materials.

As an island, salt or sodium chloride (NaCl) is a readily available mineral source of Olango. The islanders occasionally produce it by boiling seawater using mangrove and other terrestrial fuelwood species as firewood (resulting in the decline of the latter). The other method is by simple evaporation (Olofson 1992). Other types of metallic minerals (copper, iron, etc.) are not present in Olango.

FOREST AND AGRICULTURAL RESOURCES

In general, the vegetative cover of Olango Island is limited to agricultural plantings (such as coconuts) and scattered patches of brush and scrub growth and indicates the poor soil condition (mainly limestone rock) and long-term human impact. Mangroves, coconut palms and seasonal crops, weeds and sand-binders, and salt-resistant species characterize the limited vegetative cover of Olango. Olofson *et al*. (1989) listed at least 17 species of plants being used as fuelwood in 7 *barangays* of Olango Island (Table 3.1). According to Remedio and Olofson (1988b), much of the island's interior is in long-term fallow and apparently not productive due to its rocky limestone nature.

Table 3.1. Plant resources used as fuelwood in Olango Island and its satellite islets (modified after Olofson *et al*. 1989).

Scientific name	Local Visayan name	Common/English name
Leucaena leucocephala	*Biatilis, ipil-ipil*	Leadwood
Rhizophora spp.	*Bakhaw*	Mangrove
Manihot esculentum	*Kamotingkahoy, tungdan*	Cassava
Cocos nucifera	*Lubi*	Coconut
Unidentified	*Anasil*	None
Pemphis acidula	*Bantigue*	None
Sonneratia caseolaris	*Pagatpat*	Mangrove
Gliricidia sepium	*Madre de cacao*	None
Lantana camara	*Kanding-kanding*	Lantana
Psidium guajava	*Bayabas*	Guava
Astrocalyx calycina *	*Bungaw*	None
Ixora sp*.	*O-on*	None
Camptostemon philippinense *	*Gapas-gapas*	Mangrove
Buchanannia arborescens *	*An-an*	None
Unidentified	*Hamomi-aw*	None
Vitex parviflora	*Tugas*	Molave

* Identification uncertain

Plantable areas for both crops and trees, especially in the north of Olango Island, are severely limited by outcroppings of limerock (karst). Bolinao clay, which is the dominant soil type of the island, causes chlorosis (yellowing of leaves due to iron deficiencies) in coconut palms. This may explain why coconuts are restricted to the periphery of the island and to beach sand, which is extensive in the south and southeastern portion of the island such as in Barangay Sabang (Olofson *et al*. 1989).

Olango Island and its satellite islets may be unique in that their key coastal resources have been mapped under CRMP through the PCRA conducted in 1998 and a geographic information system (GIS). Based on this information provided by community participants, Olango's coastal resources, dominated by wide reef areas, are more than 4 times more extensive than its land areas.

COASTAL RESOURCES

A summary listing of Olango's coastal resources is provided in Table 3.2, including the distribution of seagrass, coral reef, and mangrove habitats described in the following sections.

Table 3.2. Olango Island coastal habitat distribution and condition (CRMP 1998).

Scientific name	Area (ha)
Coral reef	
Inshore reef flat	1,160
Seagrass beds	1,756
Outer reef	1,083
	3,999
Mangrove	424
Mudflat and others	38
Sandy beach	60
Rocky shoreline	53
Olango Island Wildlife Sanctuary (mud and tidal flats and mangrove)	920

Seagrasses and Seaweeds

The seagrass beds in Olango are in good condition and represent important nursery grounds for fish. Much of the intertidal area of Olango is covered with dense seagrass beds while patches of *Sargassum* locally known as *samo* are found in the subtidal areas. So far, 8 species of seagrass and 72 species of macrobenthic algae were identified. Of the total number of algal species, 28 are red, 27 are green, and 17 are brown (SUML 1997). The area sampled with the highest number of species was Poo Bay (Table 3.3).

PCRA surveys rated the seagrass cover in the Barangays Caohagan, Talima, Santa Rosa, and Pangan-an as good (59 to 71 percent). Barangays Baring, Tungasan, and Caw-oy have relatively poor seagrass cover (11 to 24 percent) (Table 3.4).

This extensive and dense seagrass beds is an important resource to the islanders where they gather *sigay*, small cowrie using a gear called *sudsud* to comb the seagrass beds to collect the *sigay*. Some claim that *sudsud* can damage the seagrass beds because of the pressure of combing. Since no studies have been done on the impact of *sudsud*, such contention remains debatable.

Fishes

With regard to fish diversity and abundance, visual census conducted by Gomez *et al*. (1994), SUML (1997), and reef monitoring by CRMP in 1999 around Olango Island's seagrass and coral reef areas resulted in a count of a total of 144 species distributed among 25 families. Of these, 40 are found to be target species. Among families, the

Table 3.3. Number of seaweed and seagrass species per genus at 5 sampling areas on Olango Island (SUML 1997).

Species name	Poo	Talima	Tungasan	Sabang	San Vicente
Algae					
Chlorophyta					
Anadyomene sp.	1	1	1	1	
Avrainvillea sp.	1				
Boergesenia sp.		1	1	1	
Boodlea sp.	1	1	1	1	
Bornetella sp.	1	2		2	1
Caulerpa sp.	2	1	2	1	2
Chaetomorpha sp.	1	1	1	1	1
Cladophora sp.	1	1			
Codium sp.	1			1	1
Dictyosphaerea sp.	1	1	1	1	1
Halicoryne sp.		1			1
Halimeda sp.	1	2	1	1	2
Microdictyon sp.				1	
Monostroma sp.	1	1			
Udotea sp.	1	1			
Ulva sp.	2	2	2	1	1
Ventricaria sp.	1			1	
Valonia sp.	1	1			
n = 18 Sub-total	**17**	**17**	**10**	**13**	**10**
Rhodophyta					
Acanthophora sp.	1		1	2	
Actinotrichia sp.	1	1	1	1	1
Amansia sp.	1	1		1	1
Amphiroa sp.	2	2		1	1
Bostrychia sp.	1	1	1		
Champia sp.	1	1	1	1	
Galaxaura sp.	2			1	1
Gelidiella sp.	1	1	1	1	1
Gelidiopsis sp.	1		1		
Gelidium sp.				1	
Gracilaria sp.	2	2	3	2	2
Hypnea sp.	1		1	2	1
Jania sp.	2	1	1	1	
Laurencia sp.	2	2	1	1	2
Mastophora sp.		1	1	1	1
Pseudolithophyllum sp.					
Pterocladia sp.		1			
n = 17 Sub-total	**18**	**14**	**13**	**16**	**11**
Phaeophyta					
Colpomenia sp.	1		1	1	1
Dictyota sp.	3	3		1	1
Hydroclathrus sp.	1	1		1	
Lobophora sp.	1	1	1	1	1
Padina sp.	2	2	1	2	3
Sargassum sp.	2	2	2	2	2
Turbinaria sp.	3	3	2		
n = 7 Sub-total	**13**	**12**	**7**	**8**	**8**
TOTAL	**48**	**43**	**30**	**37**	**29**
Seagrasses					
Cymodocea rotundata	2	1			
Enhalus acoroides	1	1	1	1	
Halodule uninervis	2	1	1	2	2
Halophila ovalis	1		1	1	1
Syringodium isoetifolium	1	1	1		1
Thalassia hemprichii	1	1	1	1	1
n = 6 TOTAL	**8**	**5**	**5**	**5**	**5**

Table 3.4. Seagrass assessment of the different *barangays* of Olango Island and its satellite islets (CRMP 1998).

Barangay	Percentage live cover	Rating
Baring	24	Poor
Caohagan	60	Good
Caw-oy	11	Poor
Gilutongan	45	Fair
Pangan-an	71	Good
Sabang	42	Fair
San Vicente	45	Fair
Santa Rosa	60	Good
Talima	59	Good
Tingo	45	Fair
Tungasan	21	Poor
Total	**44**	**Fair**

Ratings: Excellent (76-100%), Good (51-75%), Fair (26-50%), and Poor ($\leq$ 25%)

labrids or wrasses were the most abundant with 38 species followed by pomacentrids or damselfishes with 25 species (Table 3.5). In the test fishing activities conducted by Silliman University Marine Laboratory (SUML) in 1997 using beach seine and multi-meshed set gill nets, non-commercially important species or non-target species dominated the catch. For both fishing gear, the average catch was 258.2 g from seagrass beds and 254.9 g from coral reefs, respectively (Table 3.6). Fish species richness and density around Olango Island is shown in Figure 3.1.

Table 3.5. Fish families identified in Olango Island and its satellite islets (Gomez *et al*. 1994; SUML 1997; CRMP 1998).

Fish families	Common name	Local name	No. of species	TS	IS
Acanthuridae	Surgeonfishes	*Indangan*	8	6	
Apogonidae	Cardinalfishes	*Mo-ong/pangan*	3	NTS	
Aracanidae	Filefishes	*Pugot*	1	NTS	
Balistidae	Triggerfishes	*Pugot*	4	1	
Blenniidae	Blennies	*Bugo*	4	NTS	
Caesonidae	Fusiliers	*Dalagang bukid*	4	4	
Chaetodontidae	Butterflyfishes	*Alibangbang*	4	NTS	4
Cirrhitidae	Hawkfishes	*Ungo-ungo*	4	NTS	
Grammistidae	Soapfishes		2	NTS	
Holocentridae	Squirrel/Soldierfishes	*Baga*	1	1	
Labridae	Wrasses	*Lawi-an/tangisan*	38	6	
Lethrinidae	Emperors	*Dugso*	1	1	
Lutjanidae	Snappers	*Katambak*	3	3	
Mullidae	Goatfishes	*Timbungan*	4	5	
Nemipteridae	Breams	*Silay*	3	NTS	
Pinguipedidae	Grubfishes	*Tiki-tiki*	3	NTS	
Pomacanthidae	Angelfishes	*Alibangbang*	5	3	
Pomacentridae	Damselfishes	*Pata*	29	NTS	
Scaridae	Parrotfishes	*Mol-mol*	5	5	
Scorpaenidae	Scorpionfishes	*Lawong/bantol*	2	NTS	
Serranidae	Groupers	*Pugapo*	4	1	
Siganidae	Rabbitfishes	*Kitong/danggit*	4	4	
Syngnathidae	Pipefishes/Seahorses	*Kabayo-kabayo*	1	NTS	
Synodontidae	Lizardfishes	*Tiki-tiki*	2	NTS	
Tetraodontidae	Pufferfishes	*Botiti*	5	NTS	
Total		**25 Families**	**144**	**40**	**4**

TS - Target species of commercial value; IS - Indicator species; NTS - Non-target species

Table 3.6. Average catch, catch per unit effort (CPUE), and number of fish species caught during test fishing activities in Olango Island (SUML 1997).

Habitat/Area	Talima	Gilutongan	San Vicente	Pangan-an	Total average	Fishing gear
Seagrass beds						Beach seine, (400 m²)
Ave. catch (g)	429.5	65.8	258.5	278.9	258.2	
CPUE (kg/manhour)	0.52	0.	0.31	0.34	0.31	
No. of species	21	7	10	13	12.8	
Coral reefs						Multi-meshed set gill net
Ave. catch (g)	157.5	318	289.1	No catch	254.9	(75 m x 2 m)
CPUE (kg/manhour)	0.02	0.05	0.04	-		
No. of species	4	5	10	-	6.3	

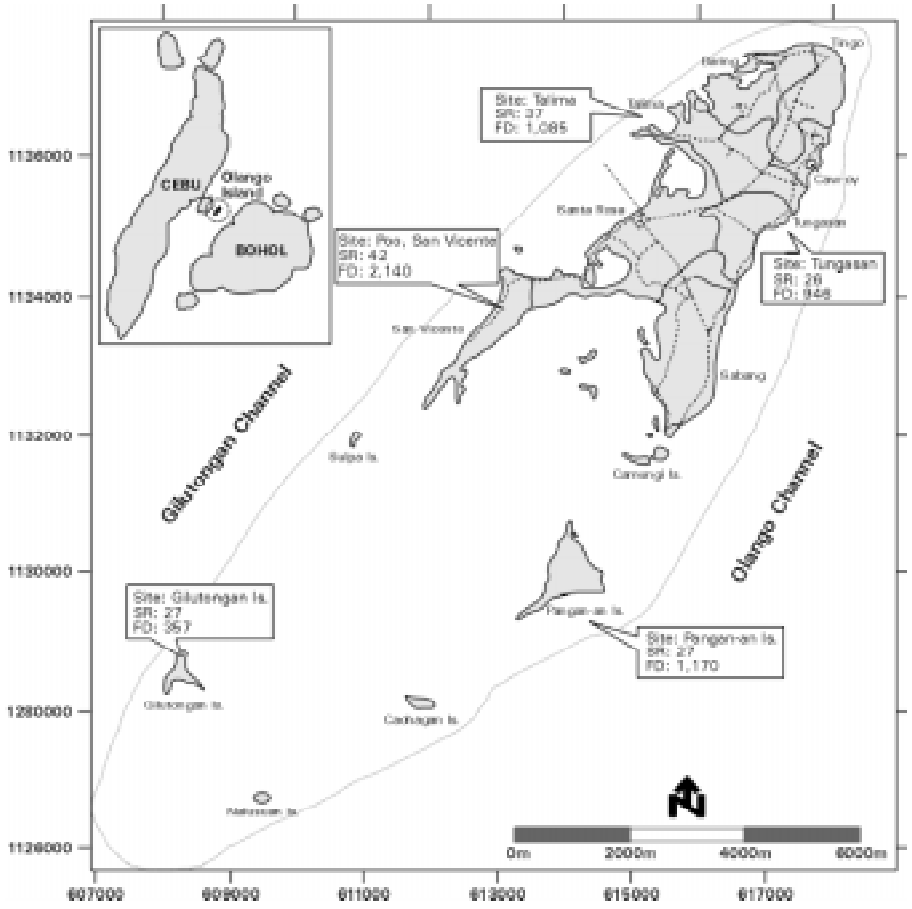

Figure 3.1. Species richness (SR) and fish density (FD) of 5 reef sites around Olango Island and its satellite islets. SR in spp/500 m², while FD in individuals/ 500 m² (SUML 1997).

Corals and Macroinvertebrates

Olango Island has extensive shallow reef flats, which generally 'drop off' at slope angles of 40-50º to the surrounding depths of Gilutongan and Olango Channels. The coral reef covers an area of 841.5 ha with a mean live coral cover of about 24 percent which is considered 'poor' (SUML 1997). The percentage live coral cover in some of the reef sites around Olango Island is shown in Figure 3.2.

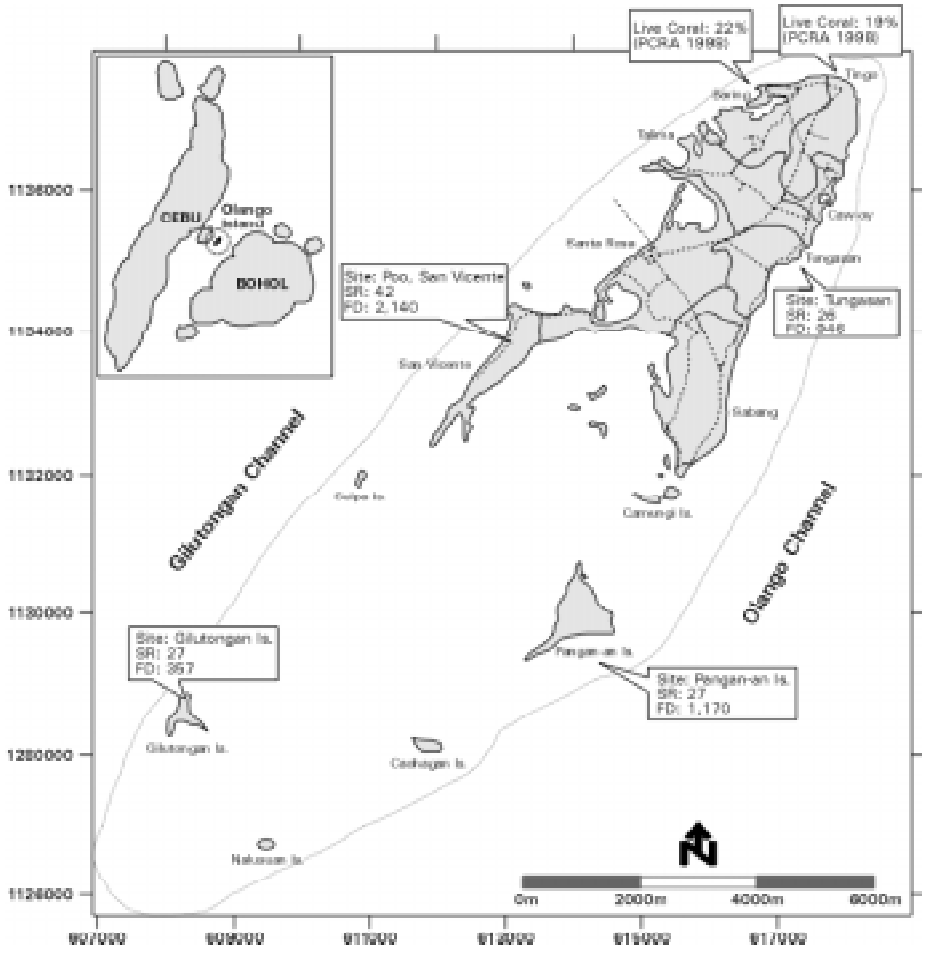

Figure 3.2. Surveyed reef sites around Olango Island (Gomez *et al*. 1981; USC-MBS 1988; SUML 1997; CRMP 1998).

A total of 103 species of scleractinian (reef building) corals, 4 non-scleractinian (non-reef building) species and 4 soft coral species have been recorded to date in the Olango area. The deeper portions of the reefs have relatively higher hard coral cover than the shallow areas. Pangan-an Island has the highest live coral cover at 41.25 percent and the highest number of coral species (Table 3.7). In previous studies (Gomez *et al*. 1981, 1994), the reef fronting Olango Island was classified as "fair" while those of Gilutongan Island was described as "poor".

Table 3.7. Number of coral species per genus at 5 sampling areas around Olango Island and its satellite islets (SUML 1997).

Genera	Poo	Talima	Tungasan	Pangan-an	Gilutongan
Reef building corals					
Acropora	2	5	5	3	4
Astreopora		1			1
Coeloseris	1			1	
Lobophylla	1	1	1	1	2
Cycloseris				1	1
Cyphastrea	2	2	2	2	2
Diaseris				1	
Diploastrea	1		1	1	1
Echinophyllia	1	1			1
Echinopora	1	1	1	1	1
Euphyllia	1	1	1	2	1
Favia	3	3	2	2	4
Favites	2	1	2	2	2
Fungia	1	1	4	6	4
Galaxea	1	1	1	1	1
Gardineroseris				1	1
Goniastrea	2	2	1	1	2
Goniopora			1	1	
Halomitra	1			1	
Herpolitha	2	1	1	1	
Hydnophora	1	1	1	2	1
Leptastrea					
Leptoria	1				1
Leptoseris	1				
Merulina	1	2	1	1	1
Montastrea	1	1	1	3	3
Montipora	1	1	1	4	2
Mycedium	1				
Oxypora	1	1	1	1	1
Pachyseris	2		1	2	2
Pectinia			1	1	1
Physogyra	3	1	2		
Platygyra	1			1	3
Plerogyra	1	2	1		
Pocillopora	3	1	3	2	1
Porites	1	1		2	2
Psammocora		1	2	2	
Pavona	1			3	3
Sandalolitha		1		1	
Scolymia	1		1		
Seriatopora	1	1	1	1	
Stylophora	1	1		1	1
Symphyllia				1	
Trachyphyllia	1	1		1	
Tubastrea	2	1			1
Turbinaria				1	1
n = 46 Total	**48**	**38**	**40**	**59**	**52**
Non-reef building corals					
Heliopora	1	1			
Millepora	1	1	1	1	2
n = 2 Total	**2**	**2**	**1**	**1**	**2**
Soft corals					
Nephthea		1			
Sarcophyton		1			
Sinularia	1	1	1	1	
Xenia				1	
n = 4 Total	**1**	**3**	**1**	**2**	**0**

Assessment surveys by SUML (1997) listed a total of 63 macroinvertebrate species composed of 33 species of mollusks, 19 species of echinoderms, 5 species of sponges, 4 species of crustaceans, and 2 species of cnidarians for Olango.

In the PCRA survey, the participants rated the coral cover of the entire Olango as generally poor to fair at 19 percent, lower than the findings of SUML (1997). The status of coral reefs in Barangay Gilutongan, Santa Rosa, and San Vicente was fair ranging from 27 to 43 percent. Gomez *et al*. (1981, 1994) rated the coral cover of Olango as fair, that of Gilutongan as poor, and Pangan-an as having the highest. Today, Olango's coral reef has poor coral cover (Table 3.8).

Table 3.8. Coral assessment of shallow reef areas of the 11 *barangays* of Olango Island and its satellite islets (CRMP 1998).

Barangay	Live hard coral (%)	Live soft coral (%)	Total live coral cover (%)	Rating
Baring	14	8	22	Poor
Caohagan	11	5	16	Poor
Caw-oy	3	0	3	Poor
Gilutongan	43	0	43	Fair
Pangan-an	6	2	8	Poor
Sabang	7	2	9	Poor
San Vicente	19	8	27	Fair
Santa Rosa	17	17	34	Fair
Talima	10	3	13	Poor
Tingo	10	9	19	Poor
Tungasan	6	7	13	Poor
Average	**13**	**6**	**19**	Poor

Ratings: Excellent (75-100%), Good (50-74.9%), Fair (25-49.9%) and Poor (0-24.9%)

Mangroves

Recent satellite images from National Mapping and Resource Information Agency (NAMRIA) show that the remaining mangrove cover of Olango Island is 366.5 ha, or approximately one-third of its nearshore area (SUML 1997) (Figure 3.3). An inventory by the Protected Areas and Wildlife Bureau (PAWB), DENR-7 in 1988 identified 33 mangrove species and associated species found in Olango. However, a recent survey conducted by SUML in 1997 recorded only 19 mangrove species and associated species. Both surveys found the species *Rhizophora mucronata* present in practically all the mangrove areas visited (Table 3.9).

The decline in the number of mangrove species is indicative of the degree of exploitation by the islanders. But there is also an attempt to reforest the denuded mangrove areas using monospecies stands of *R. mucronata* off the southeastern portion of Olango Island.

PCRA data show that the mangrove forest in Olango is concentrated in the southern portion where the site of OIWS is located.

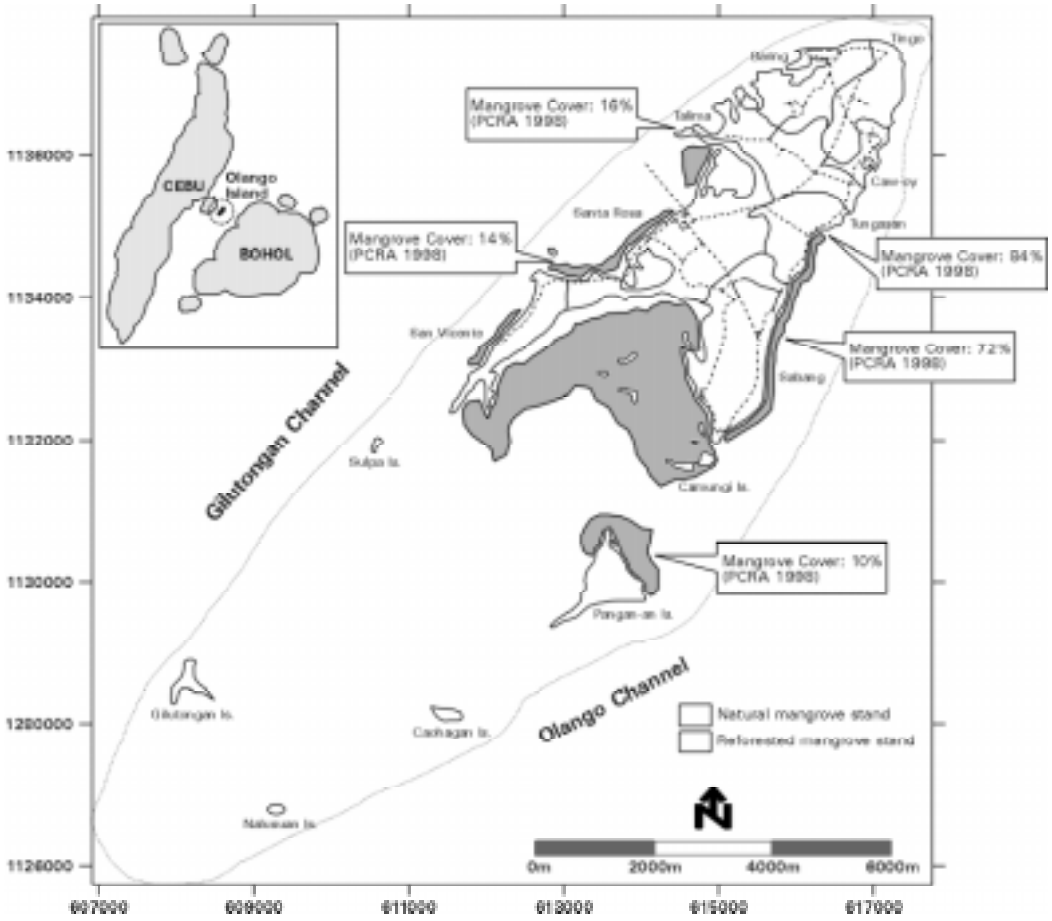

Figure 3.3. Natural and reforested mangrove areas in Olango Island (modified after Magsalay *et al*. 1989 and CRMP 1998).

Extensive sandy mudflats and thick mangrove vegetation (Table 3.10) characterize this area. Among the *barangays*, Tungasan has 84 percent mangrove cover and is in excellent condition, and this is attributed to the reforested area, a project of the DENR Mangrove Stewardship in the early 1990s.

In Sabang, mangrove cover is 72 percent composed of a mixed species of secondary growth mangroves. In the northern *barangays* of Talima and Tingo, which have rugged limestone topography, mangroves occur in small patches, are scattered, or are absent. It is considered poor at 16 percent cover.

OLANGO ISLAND WILDLIFE SANCTUARY (OIWS)

The southern portion of Olango Island is along the path of the East Asian Migratory Flyway where thousands of migratory birds migrate from the northern hemisphere (i.e., Siberia, Northern China, and Japan) to the southern hemisphere (i.e., Australia) and vice versa. The importance of the site to the East Asian Migratory Flyway was discovered in 1987. On 14

Table 3.9. List of mangroves and associated species found Olango Island (PAWD *et al*. 1995; SUML 1997).

Species Name	Local name	PAWB 1995	SUML 1997	Traditional Use
Acanthus ebracteatus	*Pagaypay*	+		
Acanthus ilicifolius	*Pagaypay*	+	+	n.k.u. (vegetable prop)
Aegiceras corneculatum	*Saging-saging*		+	Firewood, fish poison
Aegiceras floridum	*Saging-saging*	+		Firewood, fish poison
Avicennia alba	*Piape laki*	+	+	Firewood, medicine
Avicennia lanata	*Piape laki*	+	+	Firewood, soap-making
Avicennia marina	*Piape baye*	+	+	Firewood, fodder
Avicennia officinalis	*Piape laki*	+	+	Firewood, fodder
Barringtonia asiatica	*Bito-bito-on*		+	Firewood, medicine
Bruguiera cylindrica	*Pototan lalaki*	+		Firewood, vegetable
Bruguiera gymnorrhiza	*Busain*	+		Firewood seasoning
Ceriops decandra	*Malatangal*	+		Firewood, tannin
Ceriops tagal	*Tangal*	+		Firewood, tannin
Dolichandrone spathecea	*Tui*		+	Firewood, timber
Excoecaria agallocha	*Alipata*	+	+	n.k.u.
Lumnitzera littoria	*Mayoro*	+	+	Timber, medicine
Lumnitzera racemosa	*Kulasi*	+		Firewood, medicine
Osbornia octondata	*Taualis*	+		Firewood, timber
Pandanus sp.	*Pandan*		+	Mat weaving
Pempis acidula	*Bantigi*		+	Firewood, fencing
**Ponggamia pinnata*	*Bani*		+	n.k.u.
**Prosopis vidaliana*			+	n.k.u.
Rhizophora apiculata	*Bakhaw laki*	+	+	Firewood, timber, Christmas tree
Rhizophora mucronata	*Bakhaw baye*	+	+	Firewood, tannin, Christmas tree
Rhizophora stylosa	*Bakhaw tigre*	+	+	Firewood, timber, Christmas tree
**Scaevola frutescens*	*Aroma*		+	Natural fencing
**Scyphiphora hydrophyllacea*	*Nilad*	+		n.k.u.
Sesuvium portulacastrum		+		Firewood, fencing, Christmas tree
Sonneratia alba	*Pagatpat*	+		Firewood, fencing, Christmas tree
Sonneratia caseolaris	*Pedada*	+	+	n.k.u. (shade, food)
**Terminalia catappa*	*Talisay*	+		n.k.u. (woodcraft)
**Thespesia populnea*	*Banalo*	+		n.k.u. (construction, furniture)
**Xylocarpus molluccensis*	*Piagau*	+		

n.k.u. - No known use * associate species

May 1992, a 920-ha wetland area was officially declared as Olango Island Wildlife Sanctuary (OIWS). Two years later on 8 November 1994, it was designated as the first RAMSAR site in the Philippines in recognition as a wetland area of international importance. The area currently hosts numerous migratory shorebird and waterbird species, some of which are already endangered. PAWD *et al*. (1995) listed 97 species of birds so far known from Olango Island (Table 3.12). Of the total number of species, 48 are migratory, 42 are resident species while the status of the 7 species is uncertain. DENR-PAWD has established a Nature Center in Barangay San Vicente and developed a proposed management plan for the OIWS (Figure 3.4).

Aside from OIWS, there are several other protected areas found in Olango, which are smaller in size and stature. This includes the 15-ha marine sanctuary in Gilutongan

Table 3.10. The percentage cover and status of the mangrove resources of the 11 *barangays* of Olango Island and its satellite islets (CRMP 1998).

Barangay	Percentage live cover	Rating
Baring	0	Not applicable
Caohagan	0	Not applicable
Caw-oy	0	Not applicable
Gilutongan	0	Not applicable
Pangan-an	10	Poor
Sabang	72	Good
San Vicente	36	Fair
Santa Rosa	14	Poor
Talima	16	Poor
Tingo	0	Not applicable
Tungasan	84	Excellent
Average	**21**	**Poor**

Ratings: Excellent (76-100%), Good (51-75%), Fair (26-50%), and Poor ($\leq$ 25%)

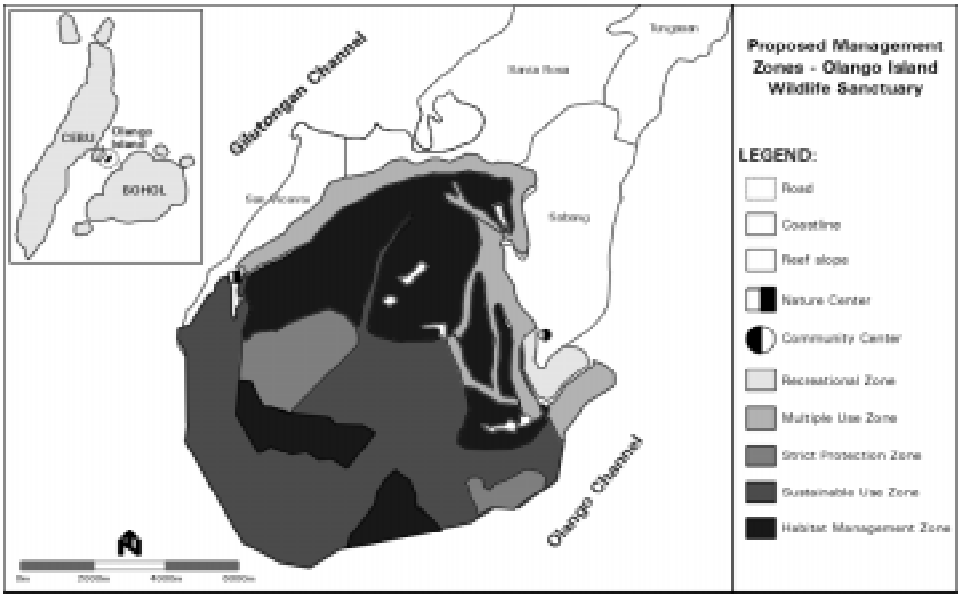

Figure 3.4. Proposed Olango Island Wildlife Sanctuary (OIWS) management zones (PAWB-DENR).

Island, which is now one of the sites frequented by divers and swimmers from Mactan Island. The sanctuary was originally established in 1991 through Municipal Ordinance No. 1 enacted by the Cordova Municipal Council. Recently, the Barangay Council of Gilutongan amended Ordinance No. 1 to include the basic user's fee to generate funds for the effective management of the sanctuary. Other marine sanctuaries like in Nalusuan exist but are not fully functional or have legal problems.

Table 3.11. Transect diagram of coastal resources in Olango Island and its satellite islets (CRMP 1998).

Barangay	Land	Beach	Mangrove	Tidal flat	Seagrass	Coral reef	Oceanic
Baring	coconut, cassava, *pandanus*, bread fruit, neem tree, mango, jackfruit, banana, bamboo	coconut, *talisay*, hermit crab, sand	none	sea urchin, trumpet shell, clam, *sigay*, sea star, strombus	cowrie, damselfish, cardinal fish, sea cucumber	damselfish, cardinalfish, wrasse, parrotfish, catfish, belonids, snapper, spider conch, top shell, giant clam seastar, abalone parrotfish, snapper	fusiliers, sea turtle, silver sides, flying fish
Caohagan Island	coconut, *ipil-ipil*, *pandanus*, guava, banana, papaya, *gmelina*, beach grass, bamboo, *ipomea*, bird	sand, *talisay*, *pandanus*, hermit crab, coconut	none	stingray, parrotfish, wrasse, damselfish, spider conch, strombus, top shell, sea star	cowrie, turret shell, breams, sea cucumber, rabbitfish, mantis shrimp, cardinalfish, catfish, sea urchin, blue crab, barnacle, wrasse	barracuda, fusiliers, grouper, belonids, damselfish, breams, eels, catfish, giant clam, seastar, spider conch, cucumber, butterfly fish, top shell, abalone parrotfish, wrasse	flying fish, belonids, big eye scads, silver sides, mackerel, squid
Caw-oy	bread fruit, cassava, coconut, banana, *gmelina*, *chikos*, *ipil-ipil*, neem tree, tamarind, *noni*	none (rocky shoreline)	none	damselfish, cardinalfish, wrasse, parrotfish, strombus, spider conch	sea urchin, sea cucumber, eels, cowrie, rabbitfish, seastar	catfish, lionfish, butterflyfish, rabbitfish, seastar, abalone, grouper, spiderfish, giant clam, cowrie, fusiliers, strombus, top shell, algae butterflyfish, parrotfish	fusiliers, sharks, mackerel, dolphin, jacks, squid, flying fish
Gilutongan Island including Nalusuan Island	coconut, aroma, *pandanus*, *papaya*, ipil-ipil, *para* grass, *gmelina*, *noni*, beach grass, *ipomea*, bird	coconut, *talisay*, hermit crab, sand	none	spider conch, cowrie, strombus, abalone, top shell, damselfish, catfish, cardinalfish, rabbitfish, breams	sea urchin, cowrie, seahorse, seastar, abalone, rabbitfish, catfish, cardinalfish, seaweed, sea cucumber, mantis shrimp	catfish, breams, snapper, cardinalfish, belonids, wrasse, giant clam, barracuda, strombus, top shell, spiderfish, algae, fusiliers, seastar, abalone	mackerel, fusiliers, flying fish, stingray, dolphin, big eye scads, squid
Pangan-an Island	coconut, neem tree, *cogon*, cassava, *pandanus*, *aroma*, *gmelina*, *ipil-ipil*, beach grass, *ipomea*, birds	coconut, *talisay*, *aroma*, hermit crab, sand, *pandanus*	cowrie, crabs, cardinalfish, algae, seastar, clam	abalone, spider conch, *nassarius*, *ipomea*, sargassum, sea urchin, catfish, cardinalfish, damselfish, wrasse	cowrie, *nassarius*, sea cucumber, sea hare, eels, jellyfish, sea urchin, seastar, catfish, rabbitfish, wrasse	damselfish, grouper, cardinalfish, eels, butterflyfish, barracuda, belonids, wrasse, catfish, parrotfish, breams, spider conch, abalone, clam, top shell, giant clam, strombus	fusiliers, mackerel, sharks, sea turtle, big eye scads, squid, flyingfish

Barangay	Land	Beach	Mangrove	Tidal flat	Seagrass	Coral reef	Oceanic
Sabang	coconut, banana, cassava, guava, para grass, papaya, jack fruit, bread fruit, *ipil-ipil*, bamboo, sugar apple, beach grass, *ipomea*, noni, birds	sand, *talisay*, coconut, hermit crab, *ipil-ipil*, *pandanus*	crab, *imbaw*, eels, algae, mudskipper, cardinalfish, sea snake, birds	cowrie, *nassarius*, sea urchin, sea cucumber, eels, parrotfish, sea hare	cowrie, *nassarius*, sea hare, filefish, sea horse, crab, sea urchin, catfish, cardinalfish	parrotfish, wrasse, rabbitfish, butterflyfish, catfish, grouper, belonids, breams, snapper, lionfish, squid,octopus, eels, damselfish	flying fish, belonids, jacks, big eye scads, mackerel, sea turtle, sharks, dolphin
San Vicente	coconut, papaya, bread fruit, guava, *noni*, banana, *pandanus*, mango, cassava, para grass, sugar apple, *ipomea*, beach grass, *aroma*, birds	sand, *talisay*, coconut, *ipil-ipil*, *pandanus*, hermit crab	crab, cardinalfish, shrimp, clam, birds, *nassarius*, sea snake, algae, mudskipper	seastar, spider conch, *nassarius*, clam, algae, sea urchin, sea cucumber, damselfish, cardinalfish	sea cucumber, sea urchin, seastar, cowrie, turret shell, rabbitfish, parrotfish	sea urchin, sea cucumber, giant clam, spider conch, top shell, eels, damselfish, butterflyfish, lionfish, snapper, parrotfish, breams, belonids, barracuda	big eye scads, jacks, mackerel, barracuda, sea turtle, dolphin, squid, flying fish
Santa Rosa	acacia, bread fruit, coconut, *aroma*, bamboo, banana, *talisay*, jack fruit, cassava, beach grass	*talisay*, coconut, *ipil-ipil*, *aroma*, *pandanus*, hermit crab	seastar, crab, mudskipper, clam, cardinalfish, algae	damselfish, cardinalfish, bream, algae, sea cucumber, seastar	cowrie, *nassarius*, sea hare, filefish, sea horse, crab, sea urchin, catfish, cardinalfish	squid, eels, damselfish, fusiliers, abalone, parrotfish, lionfish, butterflyfish, spider conch, turret shell	mackerel, fusiliers, sea turtle, dolphin, flyingfish, belonids, barracuda
Talima	bamboo, banana, mango, coconut, bread fruit,sugar apple, guava, cassava, *noni*, beach grass, *pandanus*	none (rocky shoreline)	birds, crab, cardinal, clam, damsel fish, sea snake, mudskipper	sea urchin, sea cucumber, damsel fish, bream, cardinal fish, sea star, spider conch	cowrie, *nassarius*, sea hare, file fish, sea horse, crab, sea urchin, cat fish, cardinal fish	grouper, lionfish, giant clam, abalone, butterflyfish, damselfish, fusiliers, barracuda, belonids, squid, seastar	flyingfish, belonids, barracuda, big eye scads, mackerel, squid, dolphin, sea turtle
Tingo	*pandanus*, *noni*, cassava, sugar apple, coconut, jack fruit, bread fruit	none (rocky shoreline)	none	*pata*, *moong*, *balat*, *kuros-kuros*, *dunsol*, *samo*, *lumban*	sea urchin, cowrie, crab, sea horse, rabbitfish	butterflyfish, damselfish, cardinalfish, catfish, snapper, fusiliers, giant clam, abalone	big eye scads, flyingfish, barracuda, mackerel, jacks, silversides, dolphin
Tungasan	aroma, cassava, coconut, beach grass, *gmelina*	*talisay*, *aroma*, coconut	algae, cardinalfish, crab, damselfish	*pangan*, *ibis*, *kapal*, *kuros-kuros*, *pata*, *nasa*, *lumban*	rabbitfish, parrotfish, damselfish, cowrie, catfish, sea	giant clam, abalone, catfish, squid, snapper, cowrie, parrotfish	belonids, sharks, barracuda, mackerel, dolphin

Table 3.12. Birds found in Olango Island Wildlife Sanctuary (DENR-7 1995).

Scientific name	Common name	Status	Abundance
Acrocephalus arundinaceus	Great reed warbler +	R	3
Actitis hypoleucus	Common sandpiper	P/N	3
Alcedo atthis	Common kingfisher	R	1
Anas clypeata	Northern shoveler	N/V	1
Anas querquedula	Garganey	N/P	1
Anthus gustavi	Pechora pipit	R/P	3
Anthus novaeseelandiae	Richard's pipit	R	3
Aplonis panayensis	Asian glossy starling	R	3
Ardea cinerea	Grey heron	N/V	1
Ardea purpurea	Purple heron	R/V	1
Arenaria interpres	Ruddy turnstone	P/N	3
Asio flammeus	Short-eared owl	R	1
Bubulcus ibis	Cattle egret	R/V	1
Butorides striatus	Green-backed heron	R	3
Calidris acuminata	Sharp-tailed sandpiper	P/N	1
Calidris alba	Sanderling	P/N	2
Calidris canutus	Red knot	P/N	3
Calidris ferruginea	Curlew sandpiper	P/N	3
Calidris ruficollis	Rufous-necked stint	P/N	3
Calidris tenuirostris	Great knot	P/N	3
Centropus bengalensis	Lesser coucal	R	2
Centropus sinensis	Greater coucal	R	2
Centropus viridis	Philippine coucal	R	2
Cettia diphone	Oriental bush warbler	R/P	2
Ceyx lepidus	Variable dwarf-kingfisher	R	1
Chalcophaps indica	Emerald dove	R	2
Charadrius alexandrinus	Kentish plover	P/N	3
Charadrius dubius	Little ringed plover	P/N/V	1
Charadrius leschenaultii	Greater sand-plover	P/N	3
Charadrius mongolus	Lesser sand plover	P/N	3
Charadrius peronii	Malaysian sand plover	P/N	1
Chlidonias hybrida	Whiskered tern	P/N	3
Chlidonias leucoptera	White-winged black-tern	P/N	2
Cisticola exilis	Bright-capped cisticola	R	2
Copsychus saularis	Oreintal magpie-robin	R	3
Corvus macrorhynchos	Large-billed crow	R	2
Coturnix chinensis	Blue-breasted quail	R	1
Cuculus saturatus	Oriental cuckoo	P	2
Egretta eulophotes	Chinese egret*	P/N/E	3
Egretta garzetta	Little egret	P/N	3
Egretta intermedia	Intermediate egret	R	1
Egretta sacra	Reef egret	R/V	1
Eudynamys scolopacea	Koel	R	2
Falco peregrinus	Peregrine falcon	R/V	1
Fregata ariel	Lesser frigate-bird	P/V	1
Gallinago megala	Swinhoe's snipe	P/N/V	1
Gelochelidon nilotica	Gull-billed Tern	P/N	3
Geopelia striata	Zebra dove	R	3
Greygone sulphurea	Golden-bellied flycatcher	R	2
Haematopus ostralegus	Paleartic oyster-catcher	L/V	1
Halcyon chloris	White-collared kingfisher	R	3
Heteroscelus brevipes	Grey-tailed tattler	P/N	3
Hirundo daurica	Red-rumped swallow	R/P	2
Hirundo rustica	Barn swallow	P	3
Hirundo tahitica	Pacific swallow	R/P	3
Hypsipetes philippinus	Philippine bulbul	R	3
Ixobrychus sinensis	Yellow bittern	R	2

Continued

Table 3.12 Continued

Scientific name	Common name	Status	Abundance
Lalage nigra	Pied triller	R	3
Lanius cristatus	Brown shrike	P	3
Lanius schach	Long-tailed shrike	R	2
Larus crassirostris	Japanese gull	P/V	1
Larus ridibundus	Common black-headed gull	P/N	3
Limicola falcinellus	Broad-billed sandpiper	P/N/V	1
Limnodromus semipalmatus	Asiatic dowitcher**	P/N	3
Limosa lapponica	Bar-tailed godwit	P/N	3
Limosa limosa	Black-tailed godwit	P/N	2
Lonchura malacca	Chestnut munia	R	3
Loriculus philippensis	Colasisi***	R	1
Monticola solitarius	Blue rocktrush	P	1
Motacilla cinerea	Grey wagtail	R/P	2
Muscicapa griseisticta	Grey-streaked flycatcher+	R/P	2
Nectarinia jugularis	Olive-backed sunbird	R	3
Numenius arquata	Western curlew	P/N	3
Numenius madagascariensis	Far-eastern curlew	P/N	3
Numenius minutus	Little curlew	N/V	1
Numenius phaeopus	Whimbrel	P/N	2
Passer montanus	Eurasian tree sparrow	R	3
Phalaropus lobatus	Red-necked phalarope	P/N/V	1
Phapitreron leucotis	White-eared brown fruit dove	R	2
Phylloscopus cebuensis	Lemon-throated leaf-warbler	R	2
Pluvialis fulva	Pacific golden plover	P/N	3
Pluvialis squatarola	Grey plover	P/N	3
Pycnonotus goiavier	Yellow-vented bulbul	R	3
Rallus philippensis	Buff-banded rail	R	2
Rallus torquatos	Barred rail	R	2
Rhipidura javanica	Pied fantail	R	3
Saxicola caprata	Pied buschat	R	3
Sterna albifrons	Little tern	R/P	3
Sterna hirundo	Common tern	P/N	3
Sterna sumatrana	Black-naped tern	R/V	1
Streptopelia bitorquata	Island collared-dove	R	2
Streptopelia chinensis	Spotted dove	R	3
Tringa glareola	Wood sandpiper	P/N/V	1
Tringa nebularia	Common greenshank	P/N	3
Tringa stagnatilis	Marsh sandpiper	P/N/V	1
Tringa totanus	Common redshank	P/N	3
Xenus cinereus	Terek sandpiper	P/N	3

Legends:
* = Endangered species
** = Rare, near threatened species
*** = Needs verification, probably cage escapee
\+ = Terrestrial birds not found in the Birds of the Philippines (1991)
R = resident, present all year
P = passage migrant, regularly passes through the country on its migration between its breeding and non-breeding areas
N = non-breeding winter visitor, presumed not to breed but remains in the country for several months and breeds elsewhere
L = little known, status is little known but which is recorded regularly in the country
E = endangered
V = vagrant, accidental visitor in the sanctuary
1 = very scarce, fewer than 5 records
2 = uncommon resident or annual visitor, seen fairly regularly
3 = fairly comon to abundant

SUMMARY

With its limited arable lands, Olango's main resource base is from the marine environment, which includes relatively extensive coral reef, seagrass, and mangrove areas as well as the surrounding municipal waters. Because of this, it is inevitable that many islanders traditionally derive their income from the sea. However, like many other areas in the Philippines, during the past years, these resources have been dwindling caused by the interactions of various factors notably:

- the increasing population *vis-a-vis* the carrying capacity of Olango
- a limited natural resource base
- worsening economic and social conditions
- policy biases which encourage resource exploitation rather than conservation.

Consequently, Olango's environment and natural resources are currently in varying states of degradation. Olango is fortunate to have the 920-ha Olango Island Wildlife Sanctuary, the first Ramsar site in the Philippines. Olango has been able to sustain itself despite being resource poor. However, until when is this possible? The answer depends on how the islanders manage and rehabilitate their remaining natural resources.