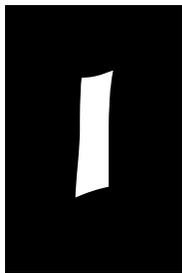


Chapter 5

ECONOMIC CONDITION



In general, small islands have special characteristics that typically include high diversity, limited land resources, and relative isolation. Because of these special characteristics, ecologically and economically sustainable development options are more difficult to find. In the case of Olango, some indicators have shown that the maximum limits have already been reached in terms of resource use. If Olango and its surrounding waters are considered as a closed system, its economy should have collapsed by now due to the improper and uncontrolled utilization of resources coupled with increasing population growth.

But even with Olango's already dwindling resources, the islanders are still able to sustain their economy. This is only possible by relying on outside sources to support their own needs. Among the significant island-based sources of income are small-scale fishing, fishing laborers and aquarium fish collectors, shellcraft workers, and as employees in tourism-related establishments. This chapter presents data on economic conditions and livelihood as important considerations in improving management of the coastal resources of Olango and its satellite islets.

FISHERIES

The importance of fisheries and fishery-related activities to Olango islanders cannot be overemphasized. Fishing and other fishing-related activities are traditional forms of livelihood of Olango islanders based on various small-scale surveys of Olango coastal residents (Remedio and Olofson 1988b; SUML 1997; CRMP 1998). Remedio and Olofson (1988b) reported that 73 percent of all households have fishing as their primary or secondary occupation, while SUML (1997) reported that 62 percent of their respondents are dependent on the marine environment with 83.8 percent as full-time fishers, 11.1 percent as part-

time fishers, and 5.05 percent as occasional fishers. All the respondents are considered as municipal or small-scale fishers and the majority (61.1 percent) use motorized boats. Ninety-two percent own their boats while the remaining 7.8 percent either rent or borrow pumpboats.

Trends in the Catch Levels and Species Composition

Fishing has been the traditional source of livelihood of Olango people since early times, when fishery resources were more abundant. The significant decline in fishery resources, as indicated by trends in average catch, was detailed during the series of PCRA seminar-workshops conducted in 1998 by the CRMP. The participants were able to document a sharply decreasing trend in the volume of the fish catch and over the last 50 years (Figure 5.1).

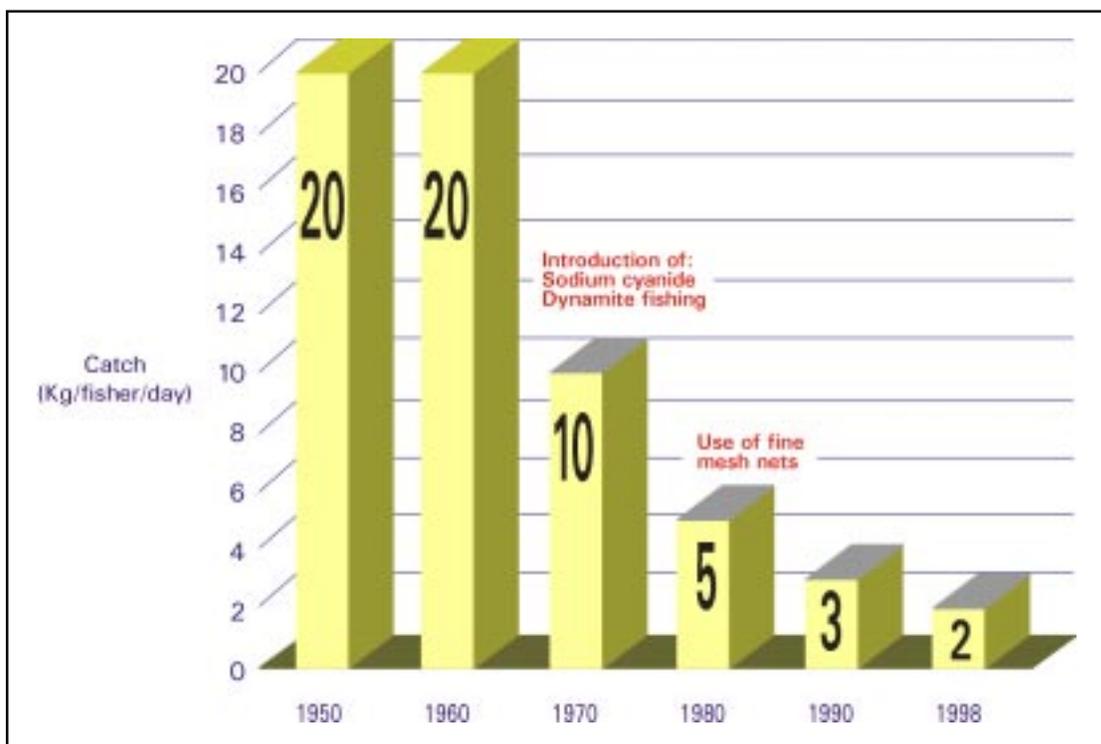


Figure 5.1. Trend diagram of fishery resources from the 1950s to 2000 in Olango Island and its satellite islets (CRMP 1998).

From the 1950s to the 1960s, the reported fish catch was still high and composed largely of pelagic, high quality fishes such as jacks and tunas and reef fishes e.g., parrotfishes, rabbitfishes, fusiliers, and mullets. During those years, there were just a few fishers and their average catch was between 20 and 25 kg per fisher per day. A sharp decline in the volume of catch was observed in the 1970s when fishers started to engage in illegal fishing methods such as the use of sodium cyanide, blast fishing, fine mesh nets, and *tubli*,

a local vine for fish poisoning. During those years, the average fish catch decreased to 16.5 kg per fisher per day.

In the 1980s, the number of fishers continued to increase while the corresponding average fish catch further declined to 10.3 kg per fisher per day. The 1990s were difficult years for the fishers as their incomes declined due to decreasing fish catch, now averaging 5 kg per fisher per day.

Today, most of the fish caught are small reef fishes (e.g., rabbitfishes, damselfishes, blennies, eels, scorpion fishes, and needlefishes, and various invertebrates such as sea urchins) and some pelagics (small mackerels). In the past, these fishes were not utilized but because of the decline in the volume of fish catch, they are now harvested.

Capture Fisheries

Olango's capture fishery is not the typical fishery found in many parts of the Philippines because Olango fishers are probably the only municipal fishers who generally do not fish within their own municipal waters. The reason for this is that the fish resources in the island are already scarce. Instead, they go fishing in the waters of Bohol, Surigao, Palawan, and even as far as Malaysia in order to catch their target species (CRMP 1998). They cannot also be classified as commercial fishers because most of their methods/gear fall under the municipal fishing gear category.

The Fishers of Olango and Their Fishing Gear/Methods

There are 2 groups of fishers in Olango based on fishing duration — the "one-day" and "many-day" fishers. These fishers use highly diversified fishing gear/methods specialized to catch certain species (i.e., octopus, abalone, etc.) that usually command a high price. There are about 16 kinds of fishing gear commonly used in Olango waters. Other gear and methods may be present but are not common, and involve mostly modifications of the 16 methods. These variations in fishing gear among Olango fishers could be a survival strategy and adaptation to their already resource-scarce marine coastal environment.

"One-day" Fishers

The "one-day" fishers fish 5 to 8 hours daily. Their usual fishing grounds are the waters of Cebu and Bohol. They provide the daily protein needs of Olango residents. However, their catch is not enough to meet the fish protein requirements of the islanders as their catch is decreasing every day. To augment this shortage of fish catch, fish vendors in Olango resort to buying 80 to 150 kg of fish daily from Pasil Market in Cebu City. A market flow diagram of a typical "one-day" fisher is presented in Figure 5.2. The usual practice is that their catch is sold offshore to the "*mamangga-ay*" (middlemen) from Cebu City and Cordova town or *lab-ase* (fish vendors) from Olango. The "*mamangga-ay*" sell the catch directly to the islanders since Olango has no wet market.

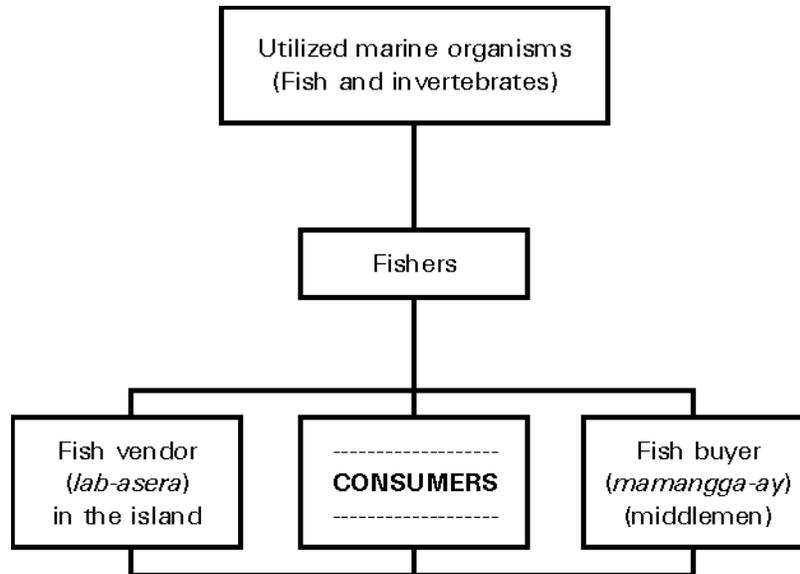


Figure 5.2. Market flow diagram of the "one-day" fishers of Olango Island and its satellite islets.

Described below are the fishing methods/gear commonly used by "one-day" fishers, with daily average earnings based on 1997 exchange rates of approximately US\$1 = PhP26.

Fishing method	:	<i>Panggal</i> or fish trap
Barangays found	:	Caw-oy, Caohagan, Gilutongan, and San Vicente
Fishing areas	:	Waters between Bohol and Cebu
Target species	:	Demersal fishes
Average CPUE	:	4-8 kg/day
Daily average earnings	:	PhP245
No. of fishers involved	:	150-200

Description: *Panggal*, or fish trap, is made of bamboo strips woven into a square basket with varying dimension depending on target species. It is said to have been introduced by Muslim fishers in Barangay Caw-oy a long time ago (Albert *et al.* 1996). A fisher retrieves, one at a time, 35 to 40 pieces of *panggal* usually from 5:30 to 8:30 a.m. Right after taking the catch, the retrieved *panggals* are set out again and are submerged for about 20 hours. Fishing duration depends on the number of *panggals* deployed and their location in the different habitats, like coral reefs and seagrass beds. Some *bobo* (larger size *panggal*) are set to a depth of 40 to 100 m using compressor diving. The cost per bamboo *panggal* bought from Bohol is PhP35 to 40 with a life span of 80 to 90 days. *Panggals* made of chicken or aluminum wire, which usually last longer, are rarely used, because they are more expensive. In the fish trap, or *panggal* fishery, it is reported that about 12 percent of the catch is kept by the fishers for their own consumption and the rest are sold within Olango (Gatus *et al.* 1997).

Fishing method	:	Multiple hook and line
Barangays found	:	Pangan-an, Caohagan, and Sabang
Fishing areas	:	Waters between Bohol and Cebu
Target species	:	Pelagic fishes
Average CPUE	:	3-4 kg/day
Daily average earnings	:	PhP90-120
No. of fishers involved	:	90-120

Description: Multiple hook and line is probably the most common fishing gear used by the municipal fishers of the Philippines. This could be due to its simple construction, affordability, and ease of use. There have been modifications made from the basic hook and line design intended to catch target species. In Pangan-an Island, fishers use multiple hooks on a single line with artificial bait made of chicken feather or a glossy, synthetic material. This is often used during *habagat* or southwest monsoon.

Fishing method	:	<i>Sudsud</i> or push nets
Barangays found	:	Sabang, Caohagan, Talima, San Vicente, and Pangan-an
Fishing area	:	Seagrass beds of Olango
Target species	:	Cowrie or <i>sigay</i> (<i>Cypraea</i> spp.) and poca (<i>nasa</i>) shell
Average CPUE	:	2-3 " <i>caltex</i> " (1 L, plastic oil container) or 2.4-3.6 kg/day
Daily average earnings	:	PhP14-21
No. of fishers involved	:	150-200

Description: This fishing gear is commonly used without boats and expensive accessories as it has been described as *pinobreng panagat* or poor man's gear. *Sudsud* is made of a simple triangular frame with a fine mesh net and is provided with a handle for pushing. Even unskilled persons, including children, can operate this simple shallow water fishing gear. It is usually deployed in seagrass beds with sandy and muddy substrate. The species caught by *sudsud* are shellfish, particularly *sigay* (*Cypraea* spp.) which is the raw material for the shellcraft industry.

Fishing method	:	Drift net or <i>pamalo</i>
Barangay found	:	Gilutongan
Fishing areas	:	Vicinity of Gilutongan Island and Olango Channel
Target species	:	Needle fish or <i>balo</i> (<i>Exocoetus</i> sp.)
Average CPUE	:	3-4 kg/day
Daily average earnings	:	PhP90-120
No. of fishers involved	:	25

Description: A drift net 50-100 m in length with a mesh size of 30 mm in diameter is used in *pamalo*. The net, equipped with a pressurized gas lamp (petromax) used to attract the fish at both ends, is set in pelagic waters using a pumpboat. The net is allowed to drift with the current, while being regularly checked for fish catch. This is done for 3 to 4 hours per setting, during both day and

night. During periods of calm weather they make 2 settings usually from 7 to 10 pm and 2 to 5 am. In between settings, the fishermen take some rest.

“Many-day” Fishers

The “many-day” fishers, locally known as *mobiyahe-ay* or *modayo*, are the Olango fishers who go fishing for many days or months in distant seas away from their families. They are out fishing for 3-6 months a year and return home when the weather no longer allows them to fish. On board a pumpboat, 12 to 22 fishers per trip set out for fishing bringing with them a *baroto* (small paddled boat) and other gear. They have no fixed fishing areas but once the group finds an ideal fishing ground, they disembark from the “mother” boat and start fishing. They come back to the mother boat to store their catch and to rest. Fishing trips are not done the entire year since there are months when the weather is not favorable. During those months, the fishers support their families by merely fishing around Olango or finding other jobs aside from fishing. Described below are examples of fishing techniques used by “many-day” fishers.

Fishing method	:	Tropical Aquarium Fish Collection
Barangays found	:	Santa Rosa, San Vicente, and Sabang
Fishing areas	:	Visayas Islands, Palawan, and Northeastern Mindanao
Target species	:	Aquarium fishes
Average CPUE	:	3-5 kg (live weight)/day
Daily average earnings	:	PhP100-160
No. of fishers involved	:	approximately 600

Description: Olango fishers are major contributors to the aquarium fish trade. Aquarium fish collectors use motorized pumpboats with a capacity of 14 persons per boat for non-compressor users and 5 persons per boat for compressor users. They collect aquarium fishes along the coast of Olango and the neighboring islands. For species that are in high demand, they have to fish as far as Camotes, Siquijor, Leyte, Bohol, Negros, and Surigao Sea at depths ranging from 1 to 20 m. Collecting techniques include the use of sodium cyanide and barrier and scoop nets or *sapyaw*, which have recently been employed after these collectors have undergone a seminar-training workshop under the Cyanide Fishing Reform Program (CFRP) conducted by the International Marinelife Alliance (IMA). Of the 52 total collectors, one-third are cyanide users who claimed that they catch 1,000 fish per day composed of 10 to 20 species, which are sold directly to the middlemen. The prices are variable, depending on the species. For example, *Hemiscyllid* sharks (banded shark) fetch a higher price compared to the damselfish *Pomacentrus* sp. These aquarium fishes are first stocked live in a storage facility in Lapu-Lapu City and Manila, prior to shipment abroad. Of the 19 aquarium fish buyers, 12 from 3 *barangays* in Olango are funding this fishing venture. The financier shoulders the expenses incurred during travel, packaging, airfreight fees, and boat maintenance.

Fishing method	:	<i>Panglapas</i> or abalone collection
Barangays involved	:	Tungasan (major), Caohagan, Pangan-an, Sabang, Baring, and Tingo (minor)
Fishing areas	:	Olango vicinity, Bohol, Palawan, Borneo
Target species	:	Abalone or <i>lapas</i> (<i>Haliotis asinina</i>)
Average CPUE	:	Palawan: 6-8 kg/day, Bohol: 3-5 kg/day, and Olango waters: 1-2 kg/day
Daily average earnings	:	Variable; pegged at PhP120-150/kg
No. of fishers involved	:	75 percent of male labor force in Brgy. Tungasan, 110-150 persons in the other <i>barangays</i> mentioned

Description: Abalone or *lapas* collection is the main fishery in Barangay Tungasan. Collecting sites are outside of Olango, preferably in Palawan and Borneo waters. Collection is done at night using pressurized gas lamp and metal hooks while at daytime they overturn rocks and pry the abalone with hooks. The duration of the trip varies from 2 to 3 months for a good catch and 4 to 6 months for a fair catch. Eighteen to 20 fishers are recruited per boat per trip with 1 captain or *arais* who directs the overall activity. Once they arrive at their collecting sites, fishers would then go their separate ways using the small outrigger boats or *baroto* to look for abalone. They would only return to the "mother" boat to rest and eat.

Fishing method	:	<i>Pandayo</i>
Barangays found	:	Talima, Baring, and Tingo
Fishing areas	:	Palawan, Mindoro, Quezon, Camarines Norte, Zambales, and Malaysia
Target species	:	<i>Kinhason</i> (shells), <i>kugita</i> (octopus), <i>balat</i> (sea cucumber)
Average CPUE	:	shell: 5-6 kg/day; octopus: 3-5 kg/day; and sea cucumber: 8-10 kg/day
Daily average earnings	:	PhP60-120
No. of fishers involved	:	400-800

Description: *Pandayo* literally means "to go to someplace". Older fishers say that *pandayo* started in the late 1950s primarily to collect *kinhason* (shellfish), *kugita* (octopus), and *balat* (sea cucumber), both for export and local consumption. Olango islanders engaged in this fishing activity go to far away places for months to collect target species which are dried on-board to allow their storage. The fishing crew is composed of 18 to 20 members, including the captain or *arais*, per boat per trip. Collection is done by hand tools e.g., scoop nets, metal hooks, bolo, spears, and bare hands. In deeper waters, collection is by "hookah diving" using improvised compressors (such as a painting compressor) equipped with spears and collecting bags. The estimated initial capital for this type of fishing is PhP150,000. From this amount the crewmembers can make cash advances of PhP3,000-4,000 to support their family while they are gone fishing. The fishing trip lasts between 3 to 6 months to a year. Most often the boat owners provide the financing of the trip and buy the catch, then sell it to buyers in Palawan while the shellfish

are sold to a buyer in Barangay Baring. Average maximum harvest is 1,000 kg of dried sea cucumber sold at a price of PhP60-500 per kg depending on the species. For dried octopus, a typical harvest reported is 300-400 kg at a selling price of PhP75-80 per kg. Shell harvests range from 200 to 500 kg at PhP100-800 per kg (for higher value shells such as *Pinctada* spp.), while the average catch of less expensive shells, like *sigay*, averages 10-20 sacks at a price of PhP2-3 per kg.

The Socioeconomic Structure of the “Many-Day” Fishing Activities

While covering extensive areas for extended periods at time, the fishing methods used by "many-day" fishers are still categorized as “small-scale” municipal fishing activities. Although most "many-day" fishers own their gear, they still depend on the financiers for the operating capital for their fishing expedition and the boat captain in marketing their catch. Because of this dependency, they have little or no control in the pricing of their catch. In short, they get less of the profit while doing most of the work.

The sharing system of costs and profits practiced by the “many-day” fishers is as follows: the financier provides the initial capital outlay, which includes the repair of the boat before the trip, initial fuel and food needs, and a cash advance or *va/e* by the fishers. The cash advance is for their families’ daily expenses during their absence.

The usual marketing practice of “many-day” fishers is to sell their catch to the boat captain who sells it to a trader/exporter stationed in Palawan or Cebu at prices up to 6 times higher than the buying price. The exporters either process the catch or sell it fresh to their respective buyers (Figure 5.3).

This system of profit sharing is based on the volume of the catch per fisher. At the end of the fishing expedition, expenses on food, gasoline, repair, and maintenance are shared equally among the crewmembers except the boat captain. In case of accident or untoward incidents (i.e., capsizing of the boat, deaths, injuries, boat damage due to typhoons, etc.), all expenses are also to be divided equally among them. After all the expenses are deducted, the net income is divided proportionate to catch. Then, each member pays for cash advances and other personal expenses incurred before and during the trip. Some opportunistic financiers add 10-20 percent interest not to the principal amount advanced for operating expenses but to the financier's share of the gross profit of the entire fishing expedition putting additional burden on the fishers. Furthermore, with the progressive implementation of the Closed Access System under the 1998 Fisheries Code (RA 8550), it is expected that these “many-day” fishers will have difficulty looking for more productive fishing grounds, making their already marginalized situation worse.

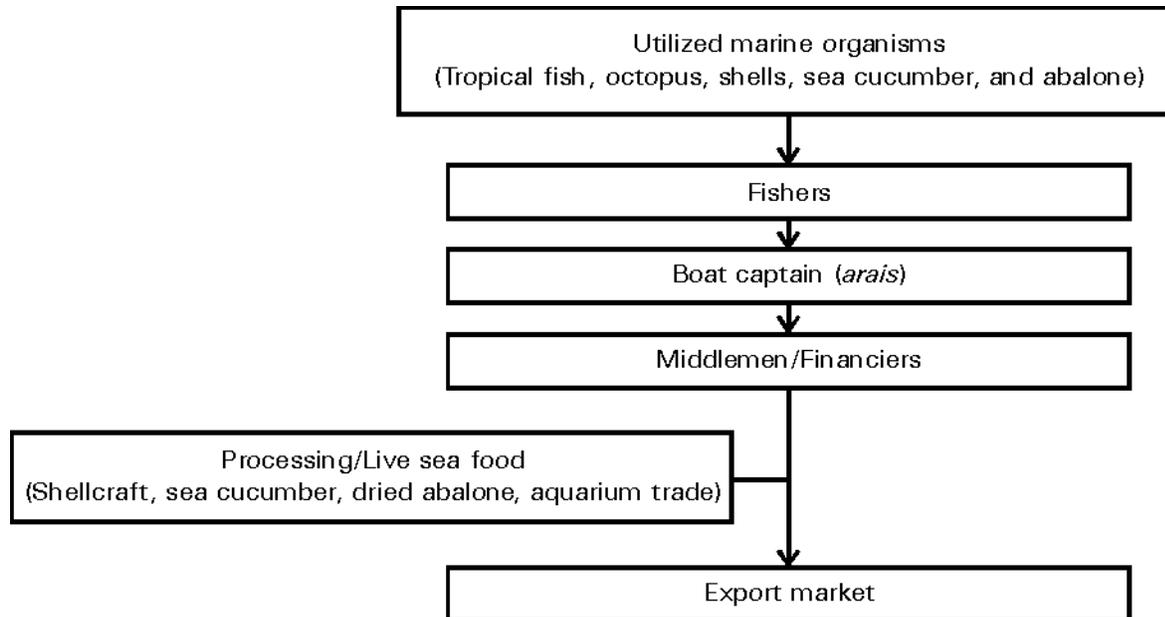


Figure 5.3. Market flow diagram of the "many-day" fishers of Olango Island.

OTHER FISHING-RELATED ACTIVITIES

Gleaning

While most of the fishing techniques practiced by the Olango islanders involve men, women and children are more active in collecting or gleaning edible marine life from the intertidal flats of Olango during low tides. The contribution of this gleaning activity to the economy of Olango is often not seen as there are no clear monetary benefits derived from it. However, gleaning is important because it supports the people's daily protein needs. This gleaning activity becomes important to the islanders during periods of strong winds and high waves when offshore fishing becomes difficult.

Mariculture

Mariculture ventures in Olango are few and some are still at the initial or pilot phase (Table 5.1). Aquaculture development is limited by the rocky, limestone condition and inadequate fresh water sources of the island. However, with its extensive intertidal zone, some mariculture activities, such as seaweed culture, look promising. In the past, seaweed cultivation was tried in some parts of Olango but this was not sustained due to financial constraints and lack of technical skills. But, in 1996, the seaweed or *guso* (*Eucheuma spinosum* and *Kappaphycus alvarezii*) was successfully grown in the reef flats adjoining Gilutongan Island. Now, former fishers are joining the venture as an income-generating project. The mariculture activities existing in Olango are described below.

Seaweed (*Guso*) (*Eucheuma spinosum* and *Kappaphycus alvarezii*) Farming

Barangays involved: Gilutongan Island, Pangan-an Island, and Caohagan Island

Description: The total seaweed farm area is about 45 ha with no approved foreshore lease for the farm by BFAR/DENR-7 or the respective local government units. At present, anybody interested to cultivate seaweed can do so. Seaweed

Table 5.1. Mariculture activities found in Olango Island.

Mariculture type	Barangay involved	Remarks
Milkfish or <i>bangus</i> cage culture	Pangan-an, Tingo	Closed because it was not profitable
Fish cages	Caw-oy, Pangan-an	Usually invertebrates and fish (i.e., abalones, giant clams, groupers, etc.) caught from the wild and fattened in the cages
Seaweed (<i>guso</i>) culture	Gilutongan	Started in 1996, approximately 45 ha total area farmed, 35 tons/month dried seaweed production
Coral farming	Caw-oy	Started in 1998, 2 ha total area with about 20,000 fragments being grown

planters use initial seedlings of 100 g *guso* which can yield 2-3 kg after 2 months of favorable growth. Harvested seaweed is dried in the sun for 2 days, with a maximum storage limit of 2 months to prevent quality degradation.

Seaweed planters produce 500 sacks averaging 70 kg per sack of dried *guso* per month when the season is good and 400 sacks when it is unfavorable. They sell the dried *spinosum guso* to any of the 6 local buyers operating in the island at PhP5 per kg. The buyers deliver the dried *guso* to the processors in Metro Cebu at a gate price of PhP7.50 per kg. About 200 families are involved in seaweed farming, with an average family farm size of 0.25 ha.

Ice-ice disease, high water temperatures, and storms are among the problems encountered in seaweed farming. A new higher valued variety of the seaweed, *Kappaphycus alvarezii* (also referred to as *cottonii*) and a new planting technique, the "net bag-monoline" method has been introduced by the CRMP. About a kilo of *guso* is placed inside a net bag made of nylon gill net materials and fastened to a monoline. This method prevents seaweed washout, minimizes grazing pressure and promotes easy harvest. The net bag method is also environmentally friendly as compared to the traditional method, as no plastic ropes are thrown during harvest time.

The primary aim of seaweed cultivation in the islands of Gilutongan, Pangan-an, and Caohagan is to reduce current pressures on increasingly limited fishery resources by providing an alternative, environmentally sound and sustainable source of coastal livelihood to fisherfolks. The seaweed farming initiatives of the Gilutongan and Pangan-an communities are being supported by the CRMP while similar initiatives of the Caohagan community is being formed by the island's major land owners. Their total combined production of 1,200 tons of dried seaweed per year is generating about US\$1,875 per family per year or US\$375,000 for all the farmers combined. This is a significant increase in the supplemental income earned from subsistence farming on depleted reefs. This income from seaweed

farming can be factored into the net revenues earned from coral reef areas while assuming the seaweed activity is controlled and not destructive to the seagrass habitat. CRMP has successfully introduced a better yielding, high value variety of *Kappaphycus alvarezii* and new planting technique that increases production. CRMP also assisted in the marketing strategy, which eventually will make seaweed farmers become independent suppliers.

Coral Farming

Barangay involved: Caw-oy

Description: The USC-MBS initiated this activity in January 1998. This pilot project is envisioned to rehabilitate degraded coral reefs, conserve biodiversity and offer an alternative livelihood for fishers who have often been using illegal fishing methods. The farming technique involves cutting of coral fragments from a "mother coral" using pliers for branching corals and a hammer and chisel for massive corals. The donor sites are the nearby Cordova and Talima reefs (Heeger *et al.* 1999). The fragments are attached to a limestone tile substrate (Mactan stones) using chicken wire and placed within a 1-m² coral nursery unit at a depth of 5-7 m. So far, the growth of corals is promising, with an 80 percent survival rate. However, the problems encountered are sedimentation and predation by the crown-of-thorns starfish, *Acanthaster planci*. It is further envisioned that these coral fragments will be marketed to local resort owners who are planning to rehabilitate the degraded corals of their beachfronts. The proceeds will be divided among the fisherfolks and the local government (Heeger *et al.* 2000).

Fish Cages

Barangays involved: Caw-oy, Pangan-an Island, and Gilutongan Island

Description: Fish cages or pens is a sort of a stocking facility of high priced species such as groupers (*Epinephelus* and *Cephalopholis* spp.), stonefish (*Synancea* spp.), snappers (*Lutjanus* spp.), and other mollusks (*Tridacna* spp., *Strombus* spp., *Pinctada* spp., and *Cassis* sp.). The method is dependent on the available natural stocks and mainly focused on fattening not production. The seed stocks are bought from other fisherfolks at a lower price and then fed with trash fish twice daily. Fattening duration is from 4 to 6 months before selling.

TOURISM AND TOURISM-RELATED VENTURES

Tourism is probably the only form of livelihood in which Olango has the most potential. Its foremost attraction is the 920-ha OIWS, white beaches, SCUBA diving, snorkeling, and swimming attraction. Olango's proximity to an international airport, major urban and tourism center is an advantage over other areas. There are already existing tourism establishments in Olango and more places are being considered. The majority of these are privately owned and mostly cater to foreign tourists (Table 5.2).

The number of visitors going to Olango Island on a daily basis for SCUBA diving and snorkeling averages about 80 persons per day travelling on 10 separate charter boats. The main input to the island economy from these visitors is the food or shellcraft bought from islanders.

Table 5.2. Tourism-related establishments in Olango Island and its satellite islets.

Tourism establishments	Location	Class	Major clientele	No. of regular employees	Facilities	Daily rate (in pesos)
Tingo by the Sea	Tingo	A	local tourists	2	4 cottages and 14 rooms	50-100
Nalusuan Island Resort	Nalusuan Island	AA	foreign and local tourists	14	200 carrying capacity	2,200
Island and Sun Beach Resort	Gilutongan Island	AA	foreigners	18	25 rooms	12,950
Caohagan in the Sun	Caohagan Island	AA	foreigners	4	7 cottages	700
Caohagan Community Resort	Caohagan Island	A	local tourists	1	5 cottages	20
Jolly's Beach Resort	Pangan-an Island	AA	mixed	6	3 cottages and 3 rooms	400 700 1,000
Malansyang Beach Resort	Baring	A	local tourists	2	6 cottages and 2 rooms	50 700

Class AAA = First class accommodation; AA = Second class accommodation; A = Third class accommodation
 US\$1 = PhP26 in 1997

Chartered Boat Services

Barangay involved: San Vicente

Description: Barangay San Vicente is a known haven for boat operators engaged in the lucrative business of diving excursion and island hopping activities for tourists. Tourism in Cebu has 2 distinct seasons: July to December as the peak months and April to June as the lean months. During lean months, Olango islanders shift to hook and line fishing and fish traps while during the peak season, they are employed as boatmen and tour guides by boat owners and or tourist operators.

Two types of sharing system are commonly used. In the first system, the boat owner sets aside from the gross earnings an amount for the actual fuel expenses and 15 percent maintenance for the boat. The rest of the earnings is divided equally between the boatman and the boat owner. In the second system, the boatman has a fixed salary of PhP4,000 per month and a supply of 1 sack of rice. Tourist agents who are at the same time boat owners with regular clientele usually adapt this system. Their services include island hopping to nearby islands and diving safaris to dive sites in Bohol, Negros Oriental, Siquijor, and Camiguin. The economic flow diagram is shown in Figure 5.4.

Tourist Vending

Barangays involved: Gilutongan and Caohagan

Description: This activity is a secondary source of income which operates sporadically. In Gilutongan Island, there is the Barangay Gilutongan Vendors Association (BGVA) with 232 members, while in Caohagan Island there is a separate cooperative association with some 60 members. Members of BGVA pay

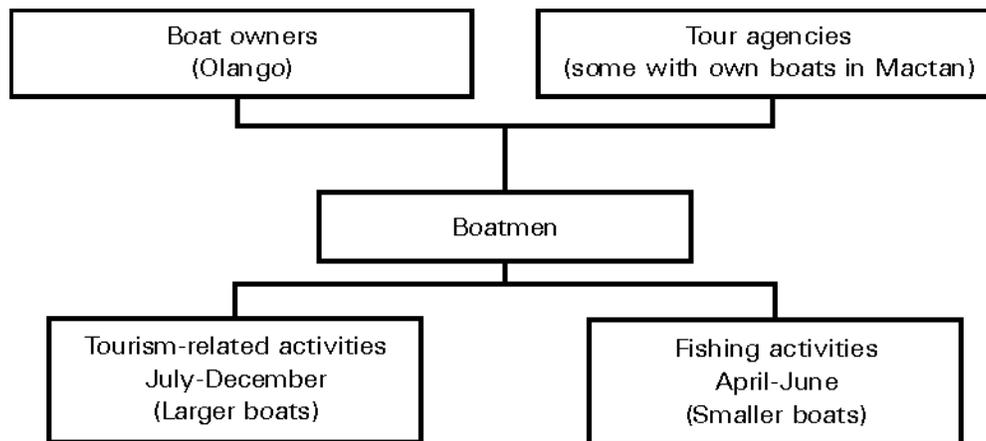


Figure 5.4. Economic flow diagram of the boat owners and tourist agencies in Olango Island.

monthly dues of PHP5 while no dues are paid in Caohagan. The procedure is that members are assigned a number (1-232 in Gilutongan or 1-60 in Caohagan), which gives them the privilege to do business with tourists visiting their island. They do this on rotation basis, each has its own strategy to convince the customers to buy their products which typically consist of shellcraft, seafood, and other souvenirs.

Olango Bird and Seascape Tour (OBST)

Barangay involved: Gilutongan Island and Sabang

Description: This project was launched in 1998 by CRMP as part of its enterprise development, with its main theme on ecotourism. The project is community-based involving Barangay Sabang and Gilutongan Island.

The tour starts with island hopping from Mactan to Gilutongan Island, where tourists learn about the island's marine sanctuary and seaweed farming (the main livelihood of the community). The tour then proceeds to Barangay Sabang where the community welcomes tourists with shell beads and coconut juice. Activities include visits to shellcraft industries, cooking, and fishing gear demonstration as well as boat paddling along the mangrove forest and birdwatching. A sumptuous lunch awaits the visitors after their busy activities. The tour highly depends on the high tide (boat paddling along the mangroves), therefore, the tour itinerary may vary either to Gilutongan Island then Sabang or vice versa.

Coral Farm Ecotour

Barangay involved: Caw-oy

Description: On May 2000, the ecotour component of the coral farm project commenced. One of the objectives in setting up the coral farm is to educate visitors through a hands-on experience on farming coral for reef rehabilitation and conservation. While in the farm the visitors participate in the coral farm

activities carried out by the local fishermen and their wives such as the tying of coral fragments to substrates before placing them in the coral nursery units. After this activity, the visitors are treated to a demonstration on various fishing gear used by Caw-oy fisherfolk and a cooking demonstration on Filipino delicacies. A nicely prepared lunch by the Caw-oy Women's Group is also part of the package.

Seafood Restaurant by the Sea

Barangay involved: Caw-oy

Description: It started with 1 restaurant in 1997 and increased to 3 in 1998. These restaurants are owned and managed by entrepreneurial Caw-oy residents catering live seafood to mostly foreign customers. Their marketing strategy consists of offering incentives and free lunch to boat operators who bring in tourists from Mactan's premier hotels and resorts. Tourists go there not only for nice food but also for a good swim. These restaurants can be reached via Mactan through a 45-minute pumpboat ride.

COTTAGE INDUSTRIES

There are no large industries found in Olango Island. There are, however, some industries existing in the island which can be considered as small-scale or cottage industries.

Shellcraft

Barangays involved: Baring, Santa Rosa, San Vicente, Sabang, Talima, Tingo, Tungasan, and Caw-oy

Description: Almost all Olango residents are involved in the shellcraft industry in Barangay Baring, where the supply of raw materials is based. Housewives and their children usually engage in this activity. For most residents shellcraft contributes significantly to their finances but to some it is only a sideline to beat boredom when husbands go on a "many-day" fishing expedition or are working.

On the average, about 5 to 8 hours per day are spent on shellcraft activity, sometimes less because of child care and household chores. Shellcraft workers can finish 2 to 6 pieces of large items (e.g., chandeliers, centerpiece, umbrella, and *plaka*) or 2 to 4 dozens of smaller items such as necklace and strands, which are the most common products and high in demand. Price ranges from PhP10 to 100 per piece for large items and PhP10 to 12 per dozen for smaller items (Table 5.3). Not all of these are made in a day, but they choose their target design for the day.

Quilting

Barangay involved: Caohagan Island

Description: This cottage industry started in 1995 under the training of the wife of the Japanese owner of Caohagan Island with 50 members to date, mostly women. The Japanese couple provides the materials (assorted cloth, foam, needles, strings, and scissors) and buy their products, while the members provide

Table 5.3. Shellcraft commodities, production rate, and their corresponding prices (in pesos) at Olango Island.

Shellcraft design	Quantity per day	Price per piece (pesos)
Chandelier "basket"	2 pcs.	10
Chandelier "comodium"	2 pcs.	10
Necklace	2 - 4 doz.	10
Centerpiece	3 - 6 pcs.	100
"Umbrella"	2 - 4 pcs.	140
"Plaka"	2 - 4 pcs.	140
Strand	3 - 4 doz.	12

US\$1 = PhP26 in 1997

the labor. Everything is hand sewn to the last detail except for the edging, which uses a sewing machine for closing. The designs vary from plants to marine organisms. Size and price range from small at PhP70 plus 20 percent of the sale, medium at PhP200 and large at PhP2,500. It generally takes a day to finish a small size and up to 2 to 3 months for large size quilt.

OTHERS (e.g., Agriculture, Forestry)

The contribution of agriculture to Olango's economy is minimal because the physical characteristics of the island render it unfavorable for commercial or large-scale agricultural production. Most of the seasonal crops planted are only for home consumption and are not income generating. As a result, most of their staple agricultural products, such as rice, corn and vegetables, are still bought from mainland Cebu.

ECONOMIC VALUES OF OLANGO ISLAND COASTAL RESOURCES

Coral Reefs and Associated Habitats

The sustainable annual net economic revenues per km² of a typical healthy coral reef in the Philippines were calculated by White and Cruz-Trinidad (1998) (Table 5.4). The outcome is a range in potential annual net revenue from US\$29,400 to 113,000 per km² of high quality coral reef and associated habitat. The calculation includes only real and potential revenues occurring directly to the island community. It does not include off-island tourism expenditures. The production range for sustainable fisheries is based on studies of fish yields from around the Philippines and qualified by the condition of the coral reef under consideration (White and Savina 1987; Alcala and Russ 1990; Russ and Alcala 1996).

Net economic revenues in 1999 from the coral reef of Olango Island based on the conditions and situation at Olango Island are shown in Table 5.5. This set of net revenues (with costs deducted) is based on the relative condition of the coral reef for fisheries, tourism, and appropriate seaweed farming. The net revenues from fisheries are lower than the better quality coral reef used to calculate the revenues of Table 5.4. In contrast, the net revenues from tourism are relatively high for Olango because of its proximity to an urban, and major tourism center, and because the calculation includes off-island tourism

Table 5.4. Sustainable annual net economic revenues (direct and indirect) per km² of a typical healthy coral reef in the Philippines with tourism potential (White and Cruz-Trinidad 1998).

Resource use	Production range	Potential annual revenue (US\$) (range)
Sustainable fisheries ^a (local consumption)	10 to 30 ton	12,000 - 36,000
Sustainable fisheries ^b (live fish export)	0.5 to 1 ton	4,000 - 8,000
Tourism ^c (on-site residence)	100 to 1,000 persons	3,000 - 30,000
Tourism ^d (off-site residence)	500 to 1,000 persons	3,000 - 6,000
Coastal protection ^e (prevention of erosion)		5,000 - 25,000
Aesthetic/Biodiversity value ^f (willingness-to-pay)		2,400 - 8,000
Total	600 to 2,000 persons	29,400 - 113,000

Assumptions:

- ^a Average market price of US\$1.50/kg of reef fish less than production cost of 20 percent (White and Savina 1987; BAS 1993)
- ^b Average market price to fishers of US\$10/kg of live reef fish less production cost of 20 percent (Barber and Pratt 1997)
- ^c Average expenditure of US\$50/day/tourist staying at the site assuming a 60 percent profit margin (Cesar 1996; Vogt 1997)
- ^d Average expenditure of US\$10/day/tourist for purchases at the site assuming a 60 percent profit margin (Vogt 1997; A. White, pers. obs.)
- ^e Physical protection value of US\$5,000 - 25,000/km/year of reef front beach (Cesar 1996)
- ^f Average expenditure of US\$4/day for entrance to marine sanctuary or for a donation to the maintenance of the area or anchor buoys with no costs assumed (Arin 1997)

expenditures. Off-island expenditures are included because of the importance of this revenue in relation to the existence of the coral reef at Olango. If the quality of the coral reef on Olango were to improve, both fisheries and tourism could benefit and provide an increase in future revenues.

The current annual net revenue range of US\$38,300 to 63,400 per km² of coral reef or US\$1.53 million to 2.54 million for the entire 40 km² Olango Island coral reef area is significant and reflects the relatively large expanse of coral reef compared to island land area. It also reflects the large amount spent to stay on Mactan Island while making day visits to Olango. It should also be noted that no "potential" or "indirect" benefits or revenues are included. Such indirect benefits and other revenue streams such as fees, taxes, donations, or simply more SCUBA divers would be possible with more active management and promotion of the area as a quality diving destination with better reefs.

Wetland Areas Other than Coral Reefs (Mangrove and Mudflats)

Olango Island is unusual because in addition to its diverse coral reef habitats, it has productive mangroves and mudflats that attract significant numbers of migratory birds travelling along the East Asia Migratory Flyway twice a year. The economic values and benefits derived from these areas are distinct from those associated with reefs and are dealt with separately.

Table 5.5. Net economic revenues in 1999 (direct) per km² of coral reef and associated habitat in Olango Island and its satellite islets (White *et al.* 2000a).

Resource use	Production range	Annual revenue (US\$) (range)
Sustainable fisheries ^a (local consumption)	4 to 6 tons	4,800 - 7,200
Sustainable fisheries ^b (live fish export)	0.2 to 0.4 ton	1,600 - 3,200
Tourism ^c (on-site residence)	25 to 50 persons	900 - 1800
Tourism ^d (off-site residence and expenditures)	500 to 800 persons	24,000 - 38,400
Tourism ^e (off-site residence - on-site expenditures)	500 to 800 persons	3,000 - 4,800
Seaweed farming ^f (farming revenue from 40 ha)	20 to 40 tons	4,000 - 8,000
Coastal protection ^g	Not available	
Aesthetic/Biodiversity value ^f	Not available	
		38,300 - 63,400
	For entire Olango Island reef area of 40 km ² =	1,532,000 - 2,536,000

Assumptions:

- ^a Average market price of US\$1.5/kg of reef fish less production cost of 20 percent; production range based on the condition of the Olango reef in relation to known fish yields from other reefs (White and Savina 1987; BAS 1993)
- ^b Average market price to fishers of US\$10/kg of live reef fish less production cost of 20 percent (Barber and Pratt 1997)
- ^c Average expenditure of US\$60/day/diving tourist staying at the site assuming a 60 percent profit margin (Nalusuan Island Resort) (Cesar 1996)
- ^d Average expenditure of US\$80/day/diving tourist staying on Mactan Island assuming a 60 percent profit margin including boat rental and gear (Cesar 1996)
- ^e Average expenditure of US\$10/day/diving for souvenirs or food on site assuming a 60 percent profit margin
- ^f Average revenue of US\$250/ton of dried seaweed production assuming 80 percent profit margin
- ^g This is not quantified because only direct net revenues are being considered
- ^h This is not quantified because no net transfers from fees and donations are yet being collected from coral reef use or visitation

In the Philippines, various studies have shown that the direct and measurable sustainable benefits from mangroves come in the form of fish catch and wood harvested. These annual net revenues are slightly more than US\$600 per ha for fairly marginal, not pristine stands of mangroves, from 2 net revenue streams from wood products (US\$90) and fishery products (US\$538) (Schatz 1991; White and Cruz-Trinidad 1998). A summary of mangrove ecosystem value averages from around the world by Costanza *et al.* (1989) is much higher at US\$3,294 per ha per year but will not be used because there is no supporting research for Philippine mangroves other than benefits measured with market values. In addition to the potential revenue derived from the mangroves on Olango is tourism supported by the bird habitat of the associated mangrove mudflats and the protected and unpopulated areas of the OIWS. This is based on the average annual number of visitors and what they spend as shown in Table 5.6. The range of annual net revenues from these wetland resources is also significant and can be factored into management planning for the island.

Table 5.6. Net revenues in 1999 per ha of wetlands (mangrove and other) on Olango Island and its satellite islets (White *et al.* 2000a).

Resource use	Production range	Potential annual revenue (US\$) (range)	
	Per ha	Per ha	Total
Sustainable wood harvest ^a (average from 424 ha of mangroves)	3 to 4 m ³	36 - 48	15,260 - 20,350
Sustainable fisheries ^b (mangrove associated species)	600 to 750 kg	480 - 600	203,500 - 254,400
Tourism ^c (for 920 ha sanctuary) (entry through DENR visitor center)	2.2 to 2.7 persons	13.2 - 16.2	12,144 - 14, 904
Tourism ^d (for 920 ha sanctuary) (entry through Olango Bird and Seascape Tour)	0.4 to 0.5 persons	7.2 - 9.0	6,624 - 8,280
Tourism ^e (for 920 ha sanctuary) (off-island expenditures for bird tour guests)	2.5 to 3 persons	120 -144	110,400 - 132,480
		656.4 - 814.2	
	Mangrove production		218,780 - 274,750
	Tourism to sanctuary		129,168 - 155,664
	Total revenue from wetland area		347,948 - 430,414

Assumptions:

- ^a Average revenue of US\$12/m³ of wood after production costs (Schatz 1991)
- ^b Average market price to fishers of US\$0.80 of mangrove associated fish after production costs (Schatz 1991)
- ^c Average expenditure of US\$10/person including fee, local transport, and food assuming 60 percent profit margin
- ^d Average expenditure of US\$30/person including boat transport and food assuming 60 percent profit margin
- ^e Average expenditure of US\$80/person/day staying on Mactan Island assuming 60 percent profit margin

SUMMARY

In many ways, Olango's economy is largely dependent on the quality of its coastal environment. It is one that can be categorized as "subsistence", an economy that provides only the basic needs of the inhabitants with little surplus for marketing, allowing only for marginal livelihood. Because of this reliance on the coastal resources, the fishers of Olango use diverse fishing gear and methods in catching their target species. Olango residents consider their economic life as average or barely enough to survive or simply contented (able to eat 3 times a day) with what they have. When in need of cash, they can have access to emergency loans usually from neighbors and relatives. Others resort to usury loans commonly referred to as "5/6" (where one borrows say PhP500 and repays PhP600 within 1 month).

For their economy to be sustainable, a basic consideration is that Olango's population growth should be controlled. The continued trend of declining marine and coastal resources is due to both increasing population pressure and a lack of management that endangers

the resource base of the island. There is no other way for the inhabitants but to look for other means of living aside from fishing and its related activities either within or outside Olango. One such alternative island-based source of income is community-based tourism. Tourism has the most potential livelihood option in Olango which at present is limited only to the OIWS. However, this is difficult to implement because Olango's tourism facilities are underdeveloped and there is a lack of trained manpower for the industry.

The islanders have to continue their dependence on outside sources of income such as remittances of their relatives working in "mainland" urban centers (i.e., Cebu or Lapu-Lapu City) or from those who are fishing in areas other than their fishing ground in Olango. And if their development is to be independent and sustainable, they have to develop their own economic base maximizing whatever available resources (natural and human) there are in the island. Among their options, this is the most difficult to do and remains as a challenge for the people of Olango.

