

DULONG DEMYSTIFIED

Among rural families and fisherfolk who have harvested it for many years, it is eaten with rice, steamed in banana leaves (called *sinaing* or *pinais*), or fermented into a year-long staple, a salty fish paste called *bagoong*. For urban dwellers, it is bottled in oil and eaten as a gourmet treat.

Neither consumer nor most *dulong* fishers, however, is fully aware of the big story behind this diminutive fish, and its impact on local fisheries, the marine ecosystem, and potential food security for fishing communities throughout the Philippine archipelago.

Dulong fishing boats ply the nearby coastlines of the islands, and are easily recognizable by the fine-mesh nets they carry (with a mesh size of less than 3 cm), used in the two most common types of *dulong* fishing gear: (a) boat-based scoop net using halogen lamps to attract *dulong* shoals, locally called *pasigabo* in Calatagan, Batangas, and (b) the *pukot* or modified beach seine, where the net is dropped offshore by a fishing boat and pulled in from the beach by a group of locals in a *bayanihan* manner.

Boat-based scoop net fishing utilizes a crew of four to seven men and catches larger volumes of *dulong* and is ideal for coastal areas with coral reefs or rocky substrates, while the *pukot* works best off sandy-bottom beaches. *Dulong* fishing takes place literally a stone's throw away, only some 500 meters from shore.

A generator powers the halogen lights used to attract the shoals of fish, because *dulong* fishing is done mainly in the dark, from 6 to 9 in the evening or 3 to 6 in the early morning. *Dulong* can be caught year-round, but are most abundant between November and March.



CI Philippines/P. Premme

In recent years, the magnitude, scale, and species composition of *dulong* fisheries in the Philippines have become a cause of concern for scientists and conservation groups, and have drawn attention to the possible negative impacts of continuous and unabated fishing.



CI Philippines/P. Premme

A WIDESPREAD COASTAL RESOURCE

The extent of *dulong* fishing throughout the Philippines remains undetermined, but a study by the Coral Triangle Support Partnership (CTSP), through Conservation International (CI)-Philippines, conducted in December 2010, has zoomed in on the rich Verde Island Passage (VIP) corridor, between the provinces of Batangas and Mindoro.

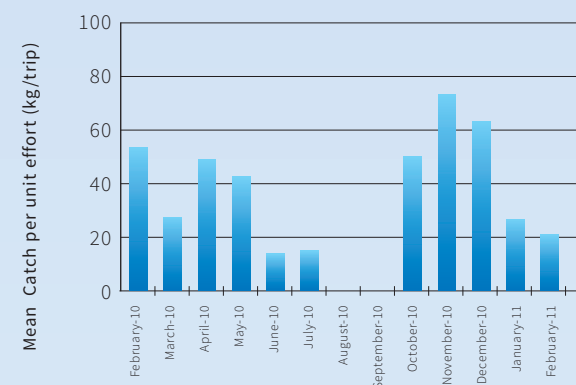
Municipalities along the corridor were visited in December 2010, covering the entire coastline of Batangas from San Juan to Calatagan, where fishermen were interviewed and the estimated number of *dulong* fishing boats recorded. Some of their findings:

- *dulong* is caught all over Batangas Province and Occidental and Oriental Mindoro, except where Marine Protected Areas (MPAs) and private industries were present
- 191 *pasigabo* and 158 *pukot* were recorded in 12 coastal municipalities of Batangas, with a large concentration of *dulong* fisheries in the Batangas Bay area—Mabini, Lobo, and San Juan; and in Calatagan.
- With each *pasigabo* catching an average of three metric tons of *dulong* per year, the annual total production of 191 *pasigabo* could reach a whopping 573 metric tons.
- Some 400 families in the area benefited directly from the fisheries.
- Lipa, Batangas is the main market for *dulong*.

San Juan, Batangas: A microcosm of *dulong* fisheries

From February 2010 to February 2011, a *dulong* fishing family in San Juan, Batangas monitored the catch of 20 *dulong* vessels in the same trade. Fishers were asked to fill out a form to record their catch. Total earnings were recorded, and samples from each catch preserved for a scientific study of taxonomic composition.

The numbers were formidable: in 2010, the 20 fishing boats in one barangay in San Juan, Batangas caught some 60 metric tons of *dulong*, valued at PhP 4 million (about US\$100,000)—with an average income per trip of PhP 2,800 (US\$70), or an average daily catch of 50 kg.



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Little Big Fish

A Study of *Dulong* Fisheries in the Philippines

The extent, species composition, market structure, and relevant legislation of a significant local fishery, as seen in the municipality of San Juan, Batangas



Engraulis japonicus

Herklotsichthys quadrimaculatus

centimeters

Dulong is a term used in the Philippines to refer to a variety of small, often immature fishes in both marine and fresh water systems, caught using a fine-mesh scoop net. It is an important protein source in coastal communities, as well as a delicacy that has been on the Filipino table for generations.

WHAT'S THE CATCH?

Because *dulong* is caught year-round in coastal waters, the likelihood of juvenile fish being caught—and the adult population consequently being depleted—is alarmingly high.

A total of 35 bottled samples were collected from *dulong* catches from Brgy. Laiya-Aplaya, San Juan, Batangas between April and June 2010 and between November 2010 and February 2011. Specimens were systematically sorted and identified based on form, measurements, pigmentation, and other external characteristics.

The samples revealed the presence of 11 fish families, 64.5% of which were *Clupeidae* (sardines), mainly of the genus *Herklotsichthys*; 34.1% of which were *Engraulidae* (anchovies), at least four different species; and the remaining 1.4% comprised of various species—all samples predominantly measuring 15–25 mm long. The size of the smallest maturing species reported in the area is 40–60 mm.



CI Philippines/P. Premne



CI Philippines/P. Premne

97.5% of the catch in the San Juan *dulong* fishery are larvae or immature fish.

What happens when fish are continually caught while they are still young and immature?

- They disappear before they get the chance to reproduce.
- The abundance of the adult stock may be affected.
- Since other pelagic fish may also spawn during the same season, fish larvae of species other than sardines and anchovies are also being caught as bycatch.
- Because larger fish and organisms feed on the larvae, catching large amounts reduces the food source—and the chances of survival—of many other species.

WHO'S MAKING THE MONEY?

A study of the *dulong* fisheries market chain was made in March–July 2011 to determine the magnitude, values, and prices of *dulong* in the network, as well as the people involved in it. Surveys were conducted among those involved in *dulong* harvesting and processing. A focus group discussion (FGD) was conducted with selected fishermen from Barangay Laiya-Aplaya, one of two villages in the municipality of San Juan where *dulong* fishing takes place. Interviews were made with people in both Batangas and Manila.

The chain of people involved in the trade is a long one. After the fisherfolk, there are the brokers who own the boat and supervise the crew used for fishing. Commissioners function in much the same way, but instead of operating their own boats, they finance the fishing activities of fishermen and share in profits. Both sell to the resellers and traders at the dock, who in turn bring the fish to markets, as well as to *manglalako* who peddle the fish to different barangays. At the market, the catch is also bought by dealers who sell them to the individual market sellers or vendors in the San Juan and Lipa markets, who then sell *dulong* to the final consumers, the residents of San Juan and Lipa.

Based on the information gathered, major players from Laiya included seven brokers, five commissioners, nine buyers, and more than 20 estimated *manglalakos*. A total of 14 fishers from the barangay catch *dulong*, and have done so for between one and 15 years, with the younger fishermen inheriting the trade from their fathers and grandfathers.

An alternative livelihood in Laiya is *pangulong* (ring net) fishing, or working on large commercial fishing boats with a crew of 50–60 men, who divide half of the catch as their wage. Locals also make money from boat rentals to tourists in San Juan. Both alternatives have

been threatened in recent years, however, as *pangulong* fishing has had smaller yields, and resorts have purchased their own boats for the use of guests. Thus, fishers take advantage of *dulong* to augment incomes.

Each fishermen can catch as much as 20 kg a day, or as little as 5 kg; one kilo consumed by the fisherman's household and the rest sold to *dulong* buyers. Catch is also measured in terms of *banyera* or basins (about 50 kg per *banyera*), or *timba* or pails (about 25 kg per *timba*). A good day's catch for a fishing boat and its crew would be between seven and 10 *banyera*. A fisherman can earn from P25 to P80 per kilo (from about 65 cents to US\$2), depending on the quality of the *dulong*.

Total daily net income from *dulong* fishing in San Juan for the season studied amounted to between PhP 350,554 and PhP 622,452 (US\$8,760–US\$15,560). The total annual value of *dulong* fisheries: between PhP 28,463,181 and PhP 51,290,564 (US\$712,000–US\$1,282,000). Expenses for *dulong* fishing, usually shouldered by boat owners, include payments for labor (crew) and equipment needed for fishing, such as ice, plastic, bulbs for halogen lights, and fuel for boats.

Based on divided net income, however, it was determined that among all the players in the supply chain, the brokers made the most money, pocketing as much as PhP 40,372 (US\$ 1,000) a day. Market sellers earned a measly PhP 259 (US\$6.50). Most significantly, a fisherman could take home as little as PhP 125 (US\$3.13) on a bad day for five kilos of low-quality *dulong*.



CI Philippines/R. Geromimo

WHAT DOES THE LAW SAY?

The legality of *dulong* fishing is an amorphous issue, complicated by overlapping or unclear guidelines. The use of fine meshed nets and catching

The current law has its precedents; Republic Act (RA) 4003, issued in 1932, declared it unlawful to catch fry, fish eggs, or small fish less than 3 cm long. Fisheries Administrative Order (FAO) 167, issued in 1989, specified a closed season for catching sardines, herrings, and mackerel in the Visayan Sea.

The more recent Fisheries Code of 1998 (Republic Act or RA 8550) and its Implementing Rules and Regulations (IRR) Department Administrative Order (DAO) 3 of the Department of Agriculture (DA) make no reference to *dulong* fishing, but carries a definition for two critical terms:

- Fish fingerlings - a stage in the life cycle of the fish when it measures about 6 to 13 cm, depending on the species
- Fish fry - a stage at which a fish has just been hatched, usually with sizes from 1 to 2.5 cm

Section 89.1 of RA 8550 specifies that is unlawful to fish using nets with a finer mesh than specified by the

However, no rules and regulations have been issued defining which species are “by their nature small but already mature” and thus exempted from the ruling.

DA, except for certain species which “by their nature are small but already mature, to be identified in the implementing rules and regulations by the Department.”

Meanwhile, a juvenile fish is defined in FAO 237 as “small sized and sexually immature fish (or within maturity stages I & II or GSI < 4).”

To complicate matters further, fish fry, which are indistinguishable from juvenile fish, can still be legally caught in municipal waters by “marginal fishermen,” according to the Local Government Code of 1991 (RA 7960).

Regulations in two municipalities in the Verde Island Passage, Lobo and Calatagan, also prohibit the catching of juvenile fish; Lobo goes as far as defining specific species, and months of the year when *dulong* cannot be harvested. However, enforcement of these policies has been difficult given that most of the neighboring municipalities do not restrict catching of *dulong*.

Clearly, the lack of coordination among different legislations contributes to the inadequate management of this fishery.

Section 89.2 of RA 8550 clearly prohibits the catching of juvenile fish, and provides for their identification, but does not contain guidelines for such identification, making it difficult to regulate *dulong* fishing.

Fish fry like *dulong*, found all over Philippine waters and feeding millions of Filipinos, is an important element in a massive, dynamic web of life in which people, resources, species, and the environment are, and always will be, inextricably linked. *Dulong* is not a separate species but form an important part of the sardine and anchovy fisheries. In an era where most of fish populations are rapidly dwindling, fishes are worth far more as adults than as babies.

WHAT CAN BE DONE?

Monitoring of *dulong* fisheries should continue and expand to other municipalities of the Verde Island Passage, and include small-scale and commercial fisheries that catch the adult fish *dulong*. Such monitoring should eventually become an inexpensive, community-based effort and linked clearly to decision options that respond actively to the status of the fish stocks.

Existing laws should be expanded to specify which fish are considered juveniles, which are considered small but already mature, and how species that can be caught should be accessed by both municipal and commercial fishers.

Value chain studies should be made in other areas within the VIP where *dulong* is caught, to inform future market policies.

Taxonomic studies should expand to areas west of San Juan, Batangas, and cover larger, older sardines and anchovies caught by other kinds of gear.

Dulong fisheries should be managed as part of a broader effort to sustain production of small pelagic fisheries because of the species composition of this group.

MANAGING A FISHERY, MANAGING THE OCEAN

Understanding how to better manage *dulong* fisheries in terms of species, market factors, and national and local governance is part of the Ecosystem Approach to Fisheries Management (EAFM), one of the goals of the Regional Plan of Action (RPOA) of the Coral Triangle Initiative (CTI).

The United States government has provided funding for a study for the implementation of this plan through the Coral Triangle Support Partnership (CTSP), in which NGOs and various international partners are working together to protect the Coral Triangle, the planet's epicenter of marine diversity that encompasses the territorial waters of six nations—the Solomon Islands, Papua New Guinea, Indonesia, Timor-Leste, Malaysia, and the Philippines.

The RPOA's other goals are designating and managing priority seascapes, establishing and managing Marine Protected Areas, putting climate change adaptation measures in place, and improving the status of threatened species.

