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ON CORAL REEFS, FISHERIES AND FOOD SECURITY
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Small Fish, Big Impact

Dulong Fisheries of San Juan, Batangas, Philippines

A Synthesis Report

September 2013

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Small Fish, Big Impact: Dulong Fisheries of San Juan, Batangas: A Synthesis Report

Edited and Compiled by:
Rollan C. Geronimo, Conservation International, Quezon City, Philippines

Section Authors:
Wilfredo L. Campos, University of the Philippines Visayas, Iloilo City, Philippines
Fenelyn M. Nabuab, University of the Philippines Visayas, Iloilo City, Philippines
Mary Ann Cielo L. Malingin, University of the Philippines Visayas, Iloilo City, Philippines
Rina Maria P. Rosales, REECS, Inc.
Jon Josef Manlunas, REECS, Inc.
Mario E. Maderazo, _____

Copyediting by Alya Honasan
Design by Felix Mago Miguel

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For more information on the Coral Triangle Initiative, please contact:
Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security Interim-Regional Secretariat
Ministry of Marine Affairs and Fisheries of the Republic of Indonesia
Mina Bahari Building II, 17th Floor
Jalan Medan Merdeka Timur No. 16
Jakarta Pusat 10110, Indonesia
www.coraltriangleinitiative.org

National CTI Coordination Committee – Secretariat (Philippines)
Protected Areas and Wildlife Bureau
Department of Environment and Natural Resources
Ninoy Aquino Parks and Wildlife Center
Telefax Number: (+632) 925-8948; 924-6031 loc. 207

Bureau of Fisheries and Aquatic Resources
Department of Agriculture
DA Compound, Q.C. Circle, Quezon City
Telephone Number: (+632) 929-4894; 929-8183

website: www.cti.pawb.gov.ph

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By Rollan C. Geronimo

Contributed section reports by

Wilfredo L. Campos
Fenelyn M. Nabuab
Mary Ann Cielo L. Malingin
Rina Maria P. Rosales
Jon Josef Manlunas
Mario E. Maderazo

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CI Philippines/R. Geronimo

Executive Summary

Together with the local government of San Juan, Batangas in the Verde Island Passage marine corridor, the Coral Triangle Support Partnership (CTSP), through Conservation International (CI)–Philippines, contributed to the Coral Triangle Initiative by conducting studies to inform possible management actions on catching small fry fishes collectively known as *dulong*. *Dulong* is a term commonly used in the Philippines to describe a set of small fishes caught using fine-meshed nets (i.e., with mesh size of less than 3 cm). Initial studies conducted by the FishBase Information Network, Inc., and supported by CI–Philippines, have identified *dulong* catches from San Juan, Batangas as post-larval to early juvenile stages of sardines and anchovies. There are similar fisheries in other countries, and *dulong* is probably synonymous with "whitebait" in many other places, referring to immature fry of fish such as sardines and anchovies. It serves as a local delicacy with high consumer demand.

The catching of juvenile and post-larval fishes is regulated, if not prohibited outright, in many parts of the world because of its potential impact on the replenishment of fish populations. Concerns on the viability of *dulong* fishing, and its probable contribution to overfishing and declining fish catches in the Verde Island Passage, have surface in various fisheries studies and planning workshops. In the Philippines, the Fisheries Code (Republic Act 8550) explicitly prohibits the use of fine-mesh nets or nets with mesh sizes less than 3 centimeters. However, an exception is made in the same law that "the prohibition on the use of fine-mesh nets shall not apply to

the gathering of fry, glass eels, elvers, *tabios*, and *alamang*, and such species which by their nature are small but already mature, to be identified in the implementing rules and regulations by the Department."

Aside from this exception, the Bureau of Agricultural Statistics actually reports a *dulong* fish group in their fisheries production monitoring, with an English common name of "starry goby" or *Asterropteryx atripes*, a freshwater goby that matures at a very small size. The confusion on the law and the lack of information on the nature of *dulong* fisheries in the marine environment are some reasons why *dulong* fishing remains widespread and openly practiced.

In response to critical knowledge gaps on *dulong* fisheries in the Verde Island Passage, CI-Philippines commissioned several studies on (1) the general extent and production information of *dulong* fishing in the Verde Island Passage; (2) taxonomic identification of the composition of *dulong* catches in San Juan, Batangas; (3) the market structure of *dulong* fisheries; and (4) local and national policies relating to *dulong* fisheries.

Dulong fishing is a significant industry in the Verde Island Passage. Total annual production is estimated to be at least 573 metric tons (mt) for Batangas province alone, with a total value of Php 38 million. By comparison, the 2010 total landed catch by municipal and commercial fishers in Batangas for anchovies, Indian mackerel, Indian sardines, and round herring were 210 mt, 1,171 mt, 2,673 mt, and 135mt, respectively.

Based on samples of *dulong* catches from San Juan, Batangas, *dulong* is composed primarily of post-larval to juvenile stages of fish species under the families Clupeidae (64%) and Engraulidae (34%). Fry of various species of demersal and pelagic fishes are also caught, comprising 2% of most catches. Half of the *dulong* catch in San Juan, Batangas is composed of the species *Herklotsichthys quadrimaculatus* or bluestripe herring. This species is not commonly caught and reported in Batangas, based on information from the Bureau of Agriculture Statistics. It is possible that *H. quadrimaculatus* might be mixed with small pelagic catches of artisanal fishers. It is reported to be less resilient to fishing impacts compared to others species in the family Clupeidae. The genus Stolephorus dominates the engraulid composition of *dulong* catches. Post-larval and juvenile fish of other families (e.g., reef associates) were also mixed with the *dulong*, but in small numbers compared to the clupeids and engraulids. Still, given the limited fecundity of these fish families and the volume of catch, the absolute numbers being caught could seriously impact their adult sub-populations later on.

The market chain for *dulong* is relatively short. Demand for the fish is high, as evident from interviews with vendors who attest that *dulong* always sells out before noon. Middlemen profit the most from catching *dulong*, although daily shares of fishers during peak season are well above the average daily fishing income of most fishers. At least 300 fishing households depend on this fishery in 10 coastal municipalities of Batangas province. Many of these fishers report that they learned the trade from their fathers and grandfathers.

While the Philippine Fisheries Code or RA 8550 prohibits the use of fine-mesh nets and the catching of fry and fingerlings of fishes, except for those that mature at a small size, the Local Government Code gives local governments authority to provide permits to municipal and small-scale fishers to gather fry and fingerlings. However, a meeting with the director of the Department of Agriculture–Bureau of Fisheries and Aquatic Resources (DA-BFAR) settled the issue, when he stated that *dulong* fisheries are fully prohibited under RA 8550 and any form of management (e.g., seasonal closures, catch restrictions, etc.) that allows the catching of *dulong* would contradict national law. Strictly speaking, the *dulong* fishery is banned in the Philippines, but the director of DA-BFAR himself acknowledges the complexity of the issue. He recommends starting with intensive advocacy campaigns aimed at correcting misinformation—mainly, that *dulong* are mature small fishes. It is hoped that such corrections will underscore what steps must be taken towards more sustainable management of the country's *dulong* fisheries, for the ultimate benefit of human communities.

The information gathered from the studies reveals that *dulong* fisheries benefit many fishing households, and strict implementation of the ban on the use of fine-mesh nets would require initially correcting common knowledge of local fishers on the nature of this group of fishes. Making fisherfolk accept that the main catch of *dulong* fishing is actually the newly-hatched sardines and anchovies, which they also rely on, is an important step towards successful implementation of the law. In addition, a policy on identifying species of fishes exempted from the ban on the use of fine-mesh nets is highly recommended to be consistent with the Fisheries Code, which states that identification of exempted species would have to be carried out as part of the Implementing Rules and Regulations.

(c) Philippines/P. Prenne

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List of Acronyms and Abbreviations

CT	Coral Triangle
CTI	Coral Triangle Initiative
CTSP	Coral Triangle Support Partnership
DA-BFAR	Department of Agriculture–Bureau of Fisheries and Aquatic Resources
EAFM	Ecosystem Approach to Fisheries Management
FIN	FishBase Information and Research Group, Inc.
FGD	Focused Group Discussion
Lm	Length at maturity
VIP	Verde Island Passage

Background

The Coral Triangle (CT) of the Solomon Islands, Papua New Guinea, Indonesia, Timor-Leste, Malaysia, and the Philippines (the CT6) is the epicenter of marine diversity on the planet, with over 500 species of reef building corals and 3,000 species of fish. It produces biological resources that sustain the lives of more than 120 million people in the region, and benefit millions more worldwide. Yet, the marine and coastal natural resources of the CT, and the many goods and services it provides, are at immediate risk from a range of factors, including over-fishing and unsustainable fishing methods, land-based sources of pollution, and climate change. These factors adversely impact food security, employment opportunities, and standards of living for people who depend on fish and other marine resources for their livelihoods.

The six CT countries have since held a series of Country Coordinating Committee (CCC) meetings to establish the scope and priorities of this monumental effort. The five conservation goals laid out in the Coral Triangle Initiative (CTI) Regional Plan of Action (RPOA) and the related National Plans of Action (NPOA), which present clear goals, targets, and prioritized activities necessary to achieve local, national, and regional outcomes within 10-15 years, are as follows:

1. Priority seascapes designated and effectively managed
2. Ecosystem approach to fisheries management (EAFM) and other marine resources fully applied

3. Marine Protected Areas (MPAs) established and effectively managed
4. Climate change adaptation measures achieved
5. Threatened species status improving

In support of the implementation of the CTI RPOA and the NPOAs, the US government provided technical and financial assistance through well-coordinated efforts by the United States Agency for International Development (USAID), the National Atmospheric and Oceanic Administration (NOAA), the Department of State (DOS), and other agencies, amounting to over US$40 million, to support implementation of the CTI. The main conduit for this aid is the Coral Triangle Support Partnership (CTSP), a five-year project executed by a consortium of non-government organizations (NGOs) led by the World Wide Fund for Nature (WWF), in partnership with The Nature Conservancy (TNC) and Conservation International (CI). The consortium NGOs maintain a strong presence in the CT countries (except Timor-Leste, which WWF supports through the CTSP Regional Project Office in Jakarta), and the CT6 have the opportunity to take advantage of the consortium's international reach to leverage additional assistance. Finally, consortium members have invested millions of dollars in the CT, with plans to scale up significantly over the next 10 years.

CTSP is working with CT countries to develop and fully apply the Ecosystem Approach to Fisheries Management (EAFM), which is Goal No. 2 of the RPOA. To do this, CTSP is assisting local governments in the Philippines in managing fisheries, applying the concepts and principles of EAFM.

Together with the local government of San Juan, Batangas in the Verde Island Passage (VIP) marine corridor, CTSP, through Conservation International-Philippines, is promoting EAFM by conducting studies to inform possible policies and management options related to catching small fry fish, collectively called *dulong*.

Conservation International-Philippines contracted a not-for-profit scientific research group, the FishBase Information Network (FIN) and WorldFish Center to conduct a study on the composition of dulong fish catches by fishers in San Juan, Batangas. They were able to identify the composition and life-history stages of dulong catches from December 2008 to January 2009. Samples collected from the market and fish landings revealed a preponderance of catch in the post-larval to juvenile stages for Engraulidae (anchovies) and Clupeidae (sardines), with a mean size range of less than 20 mm. This is contrary to the common notion that dulong is composed only of one species, and is a small but already mature fish. FishBase (www.fishbase.org), an online comprehensive database of fish species in the world, lists only one species with a local common name of dulong: *Gobiopterus lacustris*, a demersal freshwater species found only in Luzon, Philippines (e.g., Laguna de Bay). G. *lacustris* reaches a maximum size of around 2.4 cm and could very well meet the exception in the banning of fine-mesh nets as stated in Section 89 of RA 8550: "That the prohibition on the use of fine-mesh net shall not apply to the gathering of fry, glass eels, elvers, tabios, and alamang and such species which by their nature are small but already mature..." Assuming that the results of the FIN/WorldFish study are representative of the catches in a year, the dulong fishery of San Juan, Batangas might pose a serious threat, lead to overfishing of these important semi-pelagic stocks, and result in subsequent reductions in stocks of their predators (e.g., Carangidae or jacks and scads).

Although the FIN/WorldFish report provided important information on management and prevention of growth overfishing in the dulong fishery, it was limited to only two months of monitoring. FIN/WorldFish recommended conducting longer term (i.e., for at least one year) monitoring of dulong catches to establish the seasonality of the fishery and better support policy formulation. An overall assessment of dulong and associated small pelagic fisheries in San Juan will also help create more socially acceptable and progressive policies.

The use of fine-mesh nets in capturing fish known as dulong might also result in unnecessary overfishing of non-target species. It is important to establish whether the dulong fishery is catching reef-associated species, which are much less resilient than small pelagics. Capturing larvae or the juveniles of these less resilient species, even if they contribute only a small proportion to the overall catch, might have significant repercussions on the stability of their populations.

Given the extent of fisheries and high extraction rates for dulong, there is growing concern over impacts on other fish and fisheries. In order to provide decision-makers with enough information to chart an ecologically sound yet socioculturally sensitive plan of action, CI-P/CTSP commissioned several scientific studies to fill in the information gap. The studies have been compiled in this report, and are divided into the following sections:

Section 1: General extent and production statistics from mapping surveys and fish catch monitoring data
Section 2: Taxonomic identification of *dulong* composition
Section 3: Market study on *dulong* fisheries
Section 4: Review of local and national policies relating to *dulong* fisheries
Section 5: Synthesis of findings and recommendations

The minutes of the meeting with the Department of Agriculture–Bureau of Fisheries and Aquatic Resources (DA-BFAR) Director, Atty. Asis G. Perez and staff have also been included as an annex to this report for reference. It reflects the position of DA-BFAR on the issue of dulong fisheries and the interpretation of Republic Act 8550 with regards to this fishery, based on the results presented by CI-Philippines.

SECTION 1

Bounty of the Sea

Extent of '*Dulong*' Fisheries in the Verde Island Passage and Catch Monitoring Results

By Rollan C. Geronimo

CI Philippines/R. Geronimo

Figure 1-1. Map of the Verde Island Passage

Introduction

Dulong is a collective term commonly used in the Philippines to describe a set of small fishes caught in the marine and freshwater environments using fine-mesh nets (i.e., with mesh size of less than 3 cm). It is common knowledge that *dulong* fishing is extensive around the Philippines, but there is very limited information on the nature of this fishery (e.g., species composition, status of stocks, socioeconomic contributions and dependencies, etc.) or details of its extent and magnitude (Hermes 2004).

Most fishers perceive that *dulong* are mature but very small fish, distinct from their other catches. Initial studies on this fish group conducted by FIN and WorldFish (FIN/WorldFish 2009) revealed that these fishes are actually post-larvae or juveniles of other fishes. High extraction rates on this stage of fish growth can significantly affect the population of the species and reduce adult catches (Hermes 2004). Larvae and juveniles of other fishes (e.g., coral reef fishes) might also be caught in the fine-mesh nets.

A major concern raised by those opposing the fishery is its magnitude and scale. Some of the locals from Barangay Laiya-Aplaya in San Juan, Batangas note that during peak season, up to 1,000 kg of *dulong* are bought by middlemen each night, an entire jeepney load. Locals also mention that apart from San Juan, *dulong* fishers also abound in Mabini and Calatagan, in the same province.

CTSP supported field activities that mapped out the extent of this fishery in the Verde Island Passage (VIP). Catch monitoring was also established in San Juan, Batangas for *dulong* fishers to estimate production statistics.

Methods

Mapping extent of *dulong* fishing in the VIP

The extent of *dulong* fishing in the VIP was established through a series of field visits to coastal municipalities of Batangas and Oriental Mindoro (Figure 1-1). The entire coastline of Batangas province from San Juan to Calatagan was traversed by walking along the beach or driving along the coastal roads. Fishers along the way were interviewed, and *dulong* fishing boats docked along the beach were counted to get an estimate of their number. *Dulong* fishing boats are easy to spot, as they have on-board portable generators and one or two big halogen lamps (see photo on cover page of this section, page 18). They are also docked along the shore during daytime, since *dulong* fishing takes place either at dusk or dawn

.

Figure 1-2. Location of ***dulong*** fishing grounds Along Batangas Province (red line), based on key informant interviews (NOTE: Tingloy was not surveyed).

Fish catch monitoring of *dulong* in San Juan, Batangas

A fisher-based fish catch monitoring system was established to determine the exploitation rates and estimate the benefits to fishers of the *dulong* fishery. A *dulong* fishing family was requested to help monitor the catches of selected *dulong* fishing vessels for one year, from February 2010 to February 2011. A trip-catch form was provided (see annex) and filled for each fishing vessel every week. A total of 20 *dulong* fishing boats were monitored. The contracted enumerator was also asked to collect samples of *dulong* preserved in 10% formalin in 100 ml bottles whenever there were *dulong* catches. These were used for the taxonomic identification of *dulong* composition (see Section 2).

Results and Discussion

Extent of *dulong* fishing in the VIP

Dulong is caught along almost the entire coastline of Batangas province, from San Juan to Calatagan (Figure 1-2).[1] The only areas where *dulong* fishing is absent are those fronting Marine Protected Areas (e.g., the west coast of Mabini peninsula) and along the inner and east coast of Batangas Bay, where industries implement strict no-entry zones in front of their facilities.

In Oriental Mindoro, *dulong* is caught along Puerto Galera in the north and Pinamalayan and Gloria to the east of Mindoro Island (Figure 1-3). In Occidental Mindoro, the municipalities of Looc in Lubang Island and Abra de Ilog are major *dulong* fishing areas.

[1] *Dulong* fishing occurs very near the shore. Interviewed fishers note that their fishing grounds are often no more than one kilometer from shore.

Fishing gear used for catching *dulong*

Two types of fishing gear are used to catch *dulong*: (1) boat-based scoop net (locally called *pasigabo* in Calatagan, Batangas) using lights to attract fry shoals, and (2) the *pukot* or modified beach seine, where a pouch made of a fine-mesh net is put out to sea by a small boat, and the ends pulled in from the beach (Figure 1-4).

The boat-based scoop net is the main fishing method. It uses two generator-powered halogen lights to attract the fry. Once the shoal of *dulong* is concentrated in the light beam, a V-type fine-mesh scoop net is used to haul the shoal from the water. Total crew of the boat-based scoop net can range from four to seven people. Four municipalities have this type of fishing gear: Batangas City, Mabini, Lobo, and San Juan. The boat-based scoop net is called *pasigabo* in Calatagan, Batangas. This type of fishing gear is predominant in areas with rocky substrates or coral reefs. Given its mobility, the *pasigabo* is able to explore long stretches of the coastline to track shoals of *dulong*.

The *pukot* or modified beach seine is used in the municipalities with soft-bottom or sandy substrates, such as those in the inner portions of Balayan Bay (i.e., municipalities of Balayan, Calaca, and Lemery). The *pukot* in these areas have been modified by replacing the pouch of the beach seine with fine-mesh nets. These are opportunistic fishers, and only target *dulong* shoals that appear in front of their houses or barangay. Once a shoal of *dulong* is observed sparkling in the water at night, the fishers encircle the shoal with their beach seine using the fine-mesh pouch, and haul the catch to shore by pulling the net. By volume, the boat-based scoop nets catch a lot

Figure 1-3. Main *Dulong* Fishing areas according to key informant interviews and number of *dulong* fishing boats observed for Batangas province.

more *dulong* than the *pukot*, but the *pukot* tends to have more bycatch (e.g., juveniles of other demersal fishes).

A total of 169 boat-based scoop nets and 158 *pukot* or *bayakos* were noted from 11 coastal municipalities in Batangas province, based on interviews of local government personnel, fishers, and other key informants, and also from coastal walks where docked boats were counted (Annex 1). *Dulong* fishing is more common and is of comparably larger scale in the Batangas Bay area, while *don pilas* (herring) fishing is more common in Balayan Bay. In addition to the boat-based scoop nets or *pasigabo* listed in Annex 1, 22 *pasigabo* in seven barangays in their municipality were identified during a community consultation workshop with *dulong* fishers of Calatagan, Batangas, bringing the total of such boats in Batangas province to 191.

Seasonality and status of *dulong* fishing

There appears to be no huge difference in seasonality of *dulong* catches across municipalities. Most fishers interviewed still regard the months between November and February as peak season for *dulong* fishing, similar to the results from focus group discussions (FGDs) conducted in San Juan, Batangas last June 2010.

Dulong fishing is partially and vaguely illegal in San Juan, Batangas compared to the other coastal municipalities of Batangas province where this fishery operates openly and freely. Fishers of San Juan mention that there is a silent agreement between the *dulong* fishers of San Juan and the local chief executive before that they can catch *dulong* but not *tamak* – another group of small, immature fishes but differentiated from *dulong* by its dark grey color. Fishers believe that the *tamak* are small fishes that can still grow while the *dulong* are naturally small or tiny fishes.

The impact of *dulong* fishing on adult fishes is difficult to quantify. However, fishers around the coastal areas of Batangas attest to the adverse impacts of the fishery and positive benefits when it is curtailed. Surprisingly, many fishers cited the recent disappearance of *don pilas* (herring) and attribute this to catching of *dulong*, pollution, and the intensified commercial fishing. This scarcity had been noted for periods ranging from eight months to five years in some barangays. Residents in Brgy. San Diego in Lian, Batangas, on the other hand, attest to the benefits of not catching fry fishes. Mr. Nicolas Kaisip of Lian, Batangas narrated how the barangay's decision to close the areas nearshore which prevented the use of *pukot* or *bayakos* has resulted in an increase in their fish catches. These fishers can be tapped during information, education, and communication (IEC) caravans to tell other people about their experiences and testaments.

Dulong fishing grounds in San Juan, Batangas

Dulong in the municipality of San Juan, Batangas is primarily concentrated in two coastal barangays: Barangay Laiya-Aplaya and Barangay Hugom. Their fishing grounds change, depending on the monsoon. During the southwest monsoon, they fish mostly along the coastal waters of the adjacent municipality, Lobo, particularly in front of Barangay Biga and Balibago (Lobo, Batangas) (Figure 1-5). During the northeast monsoon, when *dulong* is said to peak in abundance, most

A

B

Photos by CI Philippines/R. Geronimo

Figure 1-4. Two types of fishing boats and gears used for catching *dulong*: (A) boat-based with portable generator and two sets of halogen lights. A fine-mesh scoop net (inset) is used to haul In *dulong* shoals caught by the light. (B) These modified beach seines are also used for catching *dulong*. Their pouches have been replaced by fine-mesh nets.

of the San Juan fishers shift to the Coloconto Bay along Barangays Imelda, Bataan, Nagsaulay, and Subukin (San Juan, Batangas).

Dulong production and catch statistics in San Juan, Batangas

From February 2010 to February 2011, a total of 60,597 kg of *dulong* were caught by the 20 fishing boats being monitored by our local enumerator. The peak production period occurred from October 2010 to February 2011 (Figure 1-6a). Between February 2010 and September 2010, fishers reported minimum catches. Most of the time, fishers went home empty-handed during these months.

The overall average catch per fishing trip was 43 kg, which peaked in November 2010 at 73kg/trip (Figure 1-6b). The maximum amount of *dulong* caught in a single trip was recorded at 440 kg last November 12, 2010. Total fishing time for this catch from dock to dock was only three hours.

Although total volume of *dulong* catches was low from February 2010 to July 2010, mean catch per trip was still relatively high. Unfortunately, days when fishers returned with no catch were not recorded by the enumerator. The pattern of catch per trip (Figure 1-6b) and catch per unit effort (Figure 1-6c) would most likely resemble the trend for total catches (Figure 1-6a).

The 60-metric ton (mt) *dulong* production is valued at Php 4 million (Figure 1-6d). Prices for *dulong* ranged from P45/kg to as much as P140/kg. For comparison, retail prices for anchovies and Indian mackerel in 2010 were at P74.21/kg and P104.70/kg, respectively (BFAR 2010). Fishers say that the price of *dulong* decreases as the average size of *dulong* individuals increases, or as other fishes get mixed with *dulong*, as indicated by the color of the catch (i.e., whiter catches command higher prices). Average income per trip was at P2,815.42.

Conclusions and Recommendations

Dulong fishing is widespread in the Verde Island Passage. No less than 400 fishing households benefit greatly from this fishery in 11 coastal municipalities surveyed in Batangas province alone. Major fishing areas for *dulong* in the VIP can be found in the municipalities of Calatagan, Mabini, Lobo, and San Juan in Batangas; Looc and Abra de Ilog in Occidental Mindoro; and Puerto Galera, Gloria, and Pinamalayan in Oriental Mindoro.

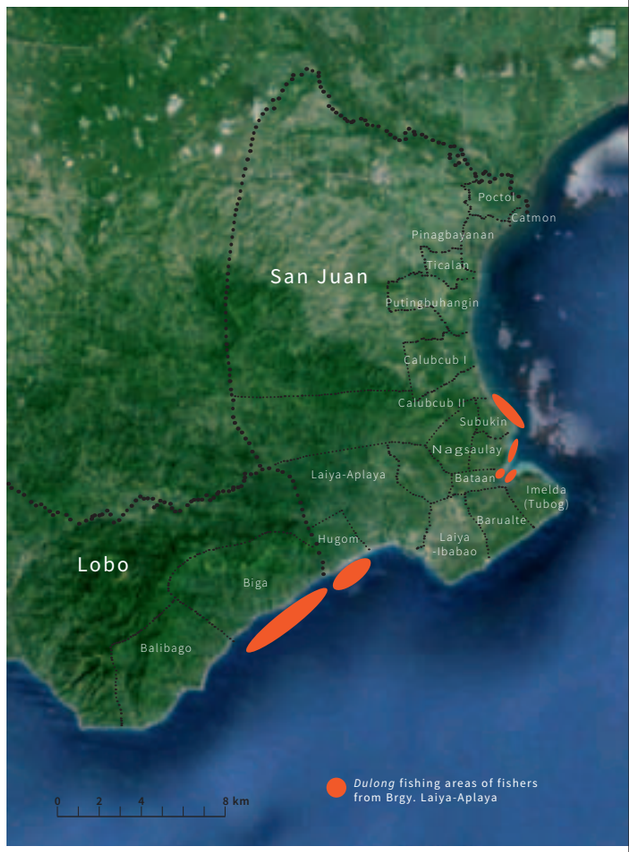


Figure 1-5. *Dulong* fishing grounds in San Juan, Batangas

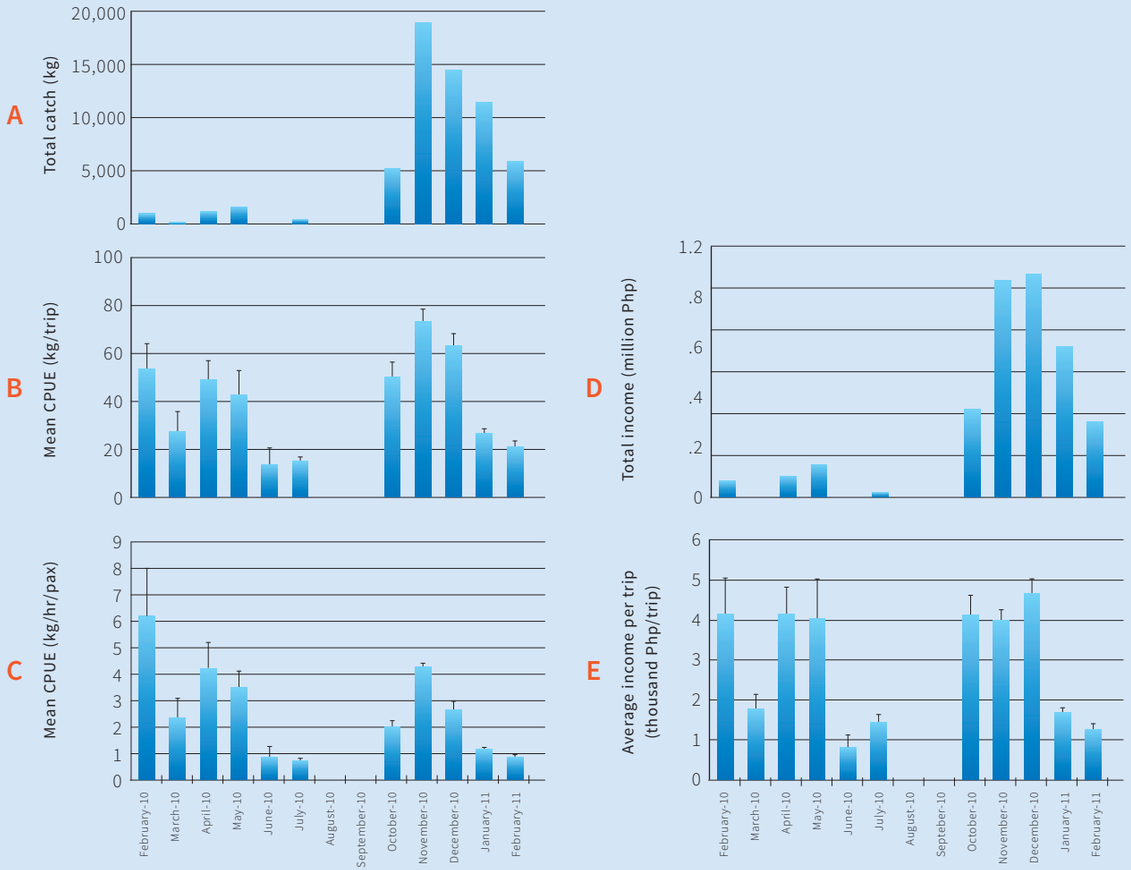


Figure 1-6. Monthly catch and Income trends from the monitoring of 20 fishing boats in Brgy. Laiya-Aplaya, San Juan, Batangas. (A) aggregated catch, (b) catch per trip, (C) Catch per hour per fisher, (D) Total income (in million pesos), and (E) Average income per fishing trip (in thousand pesos). Data from February 2010 to February 2011. Whiskers refer to Standard errors.

Production from the fishery is substantial. A year of monitoring of 20 fishing boats in San Juan, Batangas alone in 2010 revealed a total catch of at least 60 mt, valued at a little over Php 4 million, with an average income per trip of Php 2,800. Assuming that each boat-based scoop net could catch an average of 3 mt per year, the annual total production of 191 boat-based scoop net in 12 municipalities of Batangas City could easily reach 573 mt! In comparison, the 2010 total landed catch by municipal and commercial fishers in Batangas for anchovies, Indian mackerel, Indian sardines, and round herring were 210 mt, 1,171 mt, 2,673 mt, and 135 mt, respectively.

Monitoring of fish catches is a crucial part of fisheries management. Continuous and regular monitoring of fish catches and other parameters provide important information on stock dynamics of the resource. The results also help in information, education, and communication campaigns, especially if the monitoring was done with adequate participation of the community and local fishers. Some recommendations to improve the monitoring are:

- to continue the existing *dulong* fisheries monitoring in San Juan, Batangas, and to replicate this in other identified major *dulong* fishing municipalities;
- to expand the coverage of the monitoring to include other small-scale subsistence fishers, particularly those who catch adult *dulong*, to be able to evaluate the potential impact of *dulong* fishing on other fisheries;
- to ensure that zero-catches (i.e., trips which returned without any catch) are recorded to properly average the data; and,
- to adopt a community-based daily monitoring that captures non-fishing days and reasons for not going out, as this provides important information on supplemental livelihoods engaged in by fishers. It will also help calculate losses for fishers, which will help to properly contextualize the production data.

SECTION 2

CI Philippines/R. Geronimo

What's in a Species?

The Taxonomic Composition of '*Dulong*' Fish Catches from San Juan, Batangas

By Wilfredo L. Campos
Fenelyn M. Nabuab
Mary Ann Cielo L. Malingin

OceanBio Lab, Division of Biological Sciences,
College of Arts and Sciences, University of the Philippines
Visayas, Miag-ao, Iloilo

Figure 2-1. Map of Verde Island Passage showing location where samples for this study were collected

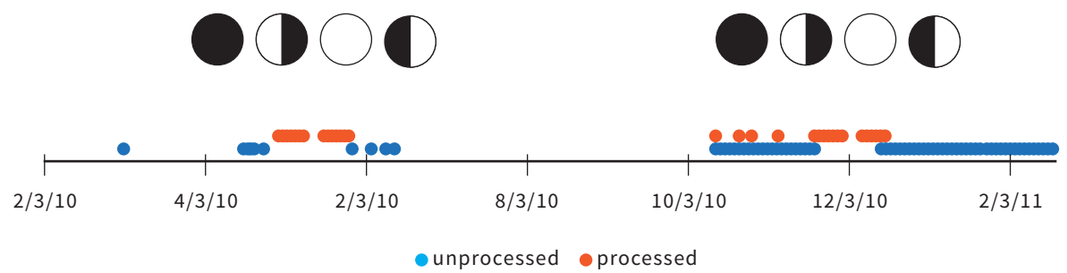
Introduction

Dulong are small fishes that are caught using fine-mesh nets in fresh and marine waters. They are believed to be comprised of a single species that attains maturity (adulthood) at a small size. However, because this resource is targeted year-round in coastal waters, which in south Luzon extend at least from the southern coast of Batangas to Tayabas Bay, it is likely that *dulong* are comprised not only of several species, but also of early juvenile fish. If so, continuous heavy exploitation could eventually lead to the depletion of adults in the stock. Thus, an in-depth analysis of the taxonomic composition of the *dulong* is essential to ensure sustainability of this resource.

Materials and Methods

Samples from daily scoop net catches of *dulong* were collected from Brgy Laiya-Aplaya, San Juan, Batangas (Fig. 2-1) covering the periods of mid-April to June 2010 and November 2010 to February 2011. A total of 154 samples were collected. Samples were first categorized by season and lunar periodicity. Samples dated May 2010 and October–December 2010, covering complete lunar cycles, were selected, since larval abundance during these months is typically high. Figure 2-2 shows the dates when samples were collected (blue dots), and the dates when specific samples were analyzed for this study (red dots). A total of 35 samples were processed for this study.

Figure 2-2. Chart showing months when samples were collected (blue dots). The red dots indicate which samples were processed and analyzed. Samples covering complete lunar cycles were processed to cover months when larvae are typically abundant.



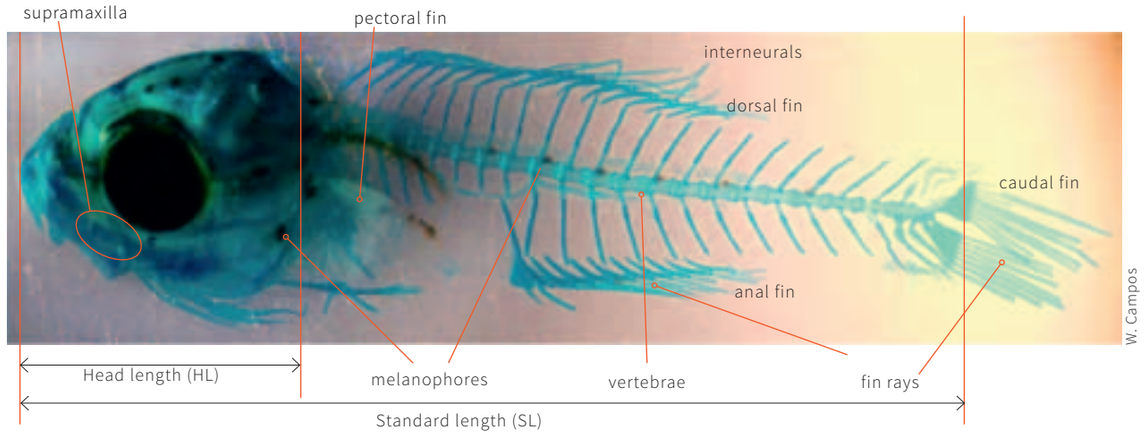


Figure 2-3. Typical measurements and morphological features used in identifying fish larvae. This specimen underwent staining and clearing, as described in the text.

Specimens were then sorted out and identified based on morphometrics, meristics, pigmentation, and other external morphological characters, as described in Leis et al. (2000), Okiyama (1993), and Food and Agricultural Organization (FAO) (1998) (Fig. 2-3). These were observed and examined under a binocular dissecting microscope equipped with an ocular micrometer to facilitate detailed measurements. Standard lengths of specimens were measured, and representatives of the various larval forms identified were photographed. Subsampling of abundantly represented larval forms (more than 100 specimens) was done on a few occasions, but in most cases, the entire sample was processed.

For further verification, representative specimens were treated using the clearing and double staining process described by Potthoff (1984) and Helland (2009), with improvised modifications based on the availability of chemicals. The procedure is as follows: Specimens fixed with absolute ethanol were first washed in several changes of distilled water for two to three days. These were then placed directly into an acidified Alcian Blue solution to stain the cartilage for one day, or until the flesh digested the blue color. Specimens were then immersed for two to three hours each (or until the specimen sank) in a series of ethanol solutions (95%, 75%, 40%, and 15%) and finally in distilled water. For clearing, specimens were placed in an enzyme solution (or liquid detergent with enzyme solution when chemicals required for this step were not available) that was changed every two to three days, until bones and cartilage were clearly visible. When vertebrae were clearly observed, larvae were placed in 1% KOH solution with Alizarin Red for 24 hours, or until the bones were distinctly red. Stained specimens were then bathed in a mixture of 0.5% KOH and glycerine with the proportions 3:1, 1:1, and 1:3 in series, then in pure glycerine for final preservation with a few crystals of Thymol added to inhibit microbial growth. Bleaching was not done to retain the pigments of the larvae.

Results and Discussion

A total of 3747 specimens were analyzed. From these, 11 fish families were identified with as many as 26 different "forms" determined (Table 2-1). Of these, *Clupeidae* (sardines) made up 64.5% of all specimens and *Engraulidae* (anchovies) comprised 34.1%. The remaining 1.4% was comprised of larvae of demersal/reef-associated (*Gerreidae, Gobiidae, Mullidae, Pomacentridae, Phosichthyidae, and Schindleriidae*) and epipelagic (*Atherinidae and Scombridae*) fish and juveniles of deepwater (*Myctophidae*) fish. Catches in both seasons were dominated by clupeids and engraulids (Fig. 2-4), with the latter's abundance increasing by about 30% towards November-December. Diversity is lower, however, in the later months of the year, with more families recorded from catches during the summer.

Based on this overall composition, all clupeid and engraulid species that have been recorded in the vicinity of Verde Island Passage from various sources, including Herre (1930), FAO (1998), and Fishbase (Froese and Pauly, 2009), were listed down, and their respective lengths (size at first maturity, or most common size in typical catches if "length at maturity" or L_m is unavailable) tabulated. A comparison between these reported sizes, assumed to be the sizes of mature

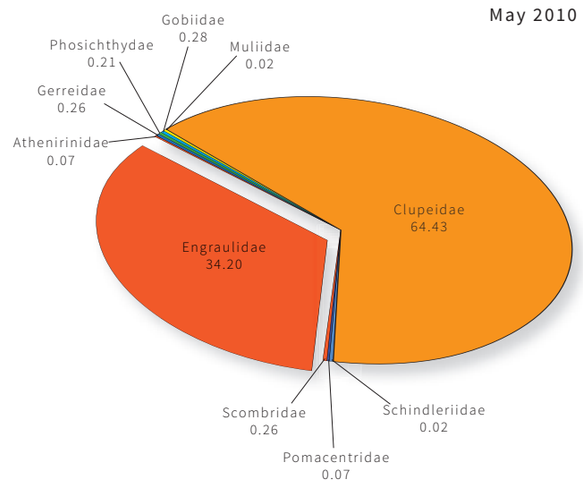
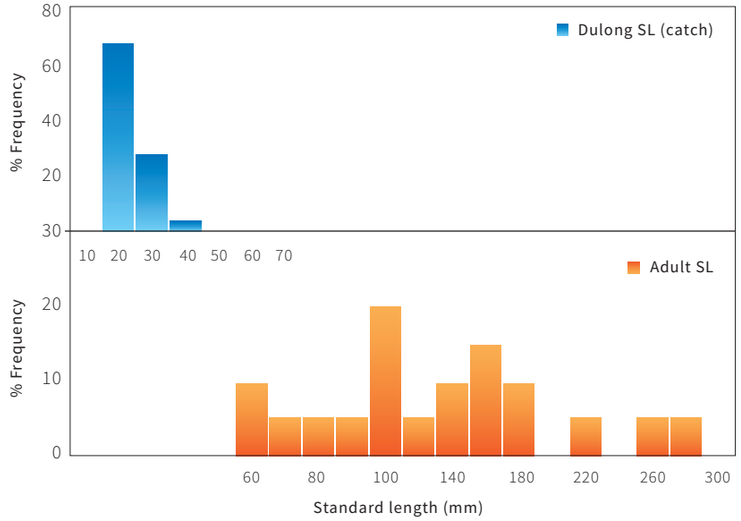


Figure 2-4. Seasonal composition of catches from the *dulong* fishery in San juan, Batangas

Table 2-1. Taxonomic composition of catches from the ***dulong*** fishery in San Juan, Batangas. Only the percentage of composition (%) of the most common families, *Clupeidae* and *Engraulidae*, are shown, but the number of specimens recorded (N) is presented for each of the 26 "forms."

Taxon	N	%		%
Clupeidae (2417 = 64.5%)				
Amblygaster/Sardinella sp.	12	0.5		0.5
Herklotsichthys sp.	43	1.8	H. quadrimaculatus	1.8
Clupeid sp.1	1425	59.0	mostly Herklosichthys	85.0
Clupeid sp.2	569	23.5		
Clupeid sp.4	36	1.5		
Clupeid sp.3	24	1.0		
Clupeid bigL	154	6.4	Amblygaster Sardinella Herklotsichthys	12.7
Clupeid bigD	111	4.6		
Clupeid gas bladder	43	1.8		
Engraulidae (1276 = 34.1%)				
Stolephorus sp.	145	11.4		11.4
Engraulis japonicus	56	4.4		4.4
Encrasicholina sp.	15	1.2		1.2
Engraulinae	7	0.5	Stol/Engr/Encra	0.5
Thryssa sp.	20	1.6		1.6
Engraulid sp.1	856	67.1	Stol/Engr/Encra/Thry	81.0
Engraulid sp.2	163	12.8		
Engraulid sp.3	14	1.1		
Others (54 = 1.4%)				
Atherinidae				
Atherinomorus duodecimalis	18			
Myctophidae				
Benthosema fibulatum	10			
Gerreidae	10			
Gobiidae	6			
Phosichthyidae	4			
Mullidae	2			
Scombridae	2			
Pomacentridae	1			
Schindleriidae	1			
Sum	3747			

Figure 2-5. Comparison of specimen sizes from *dulong* fishery catches and sizes of mature individuals of locally-occurring species reported in the literature



fish, and the size distribution of catches from the *dulong* fishery, is shown in Fig. 2-5. Clearly, the bulk of catches in the local *dulong* fishery are 15-25 mm Standard Length (SL), or barely one inch long. In contrast, the size of the smallest maturing species (Engraulids: *Stolephorus* and *Encrasicholina*) reported in the area is around 40-60 mm SL. This rather large difference emphasizes that what are actually caught by the fishery are larvae and very early stage juveniles of various species. Based solely on the number of specimens analyzed and the smallest size of locally-occurring species reported in the literature (L_m=4.0cm, *Encrasicholina devisi*, Fishbase), 97.5% of the catches in the *dulong* fishery are immature.

Clupeiedae

At least three species of clupeids were identified. These include *Herklotsichthys quadrimaculatus* (Fig. 2-6a) and larval forms that would most likely be members of *Sardinella* and *Amblygaster*. The distinction between *Herklotsichthys* on the one hand, and *Sardinella* and *Amblygaster* on the other, lies in the shape of the supramaxilla bone of the upper jaw (Fig. 2-6b). Several larval forms, Clupeid sp1 to 4 (Table 2-1), are most likely members of the genus *Herklotsichthys*, but are too young and undeveloped for species to be determined (Fig. 2-7). Other species of this genus that occur in local waters include *H. dispilonotus* (max 8.5 cm SL) and *H. punctatus* (max 8.5-9.5 cm SL) (FishBase, 2011). As

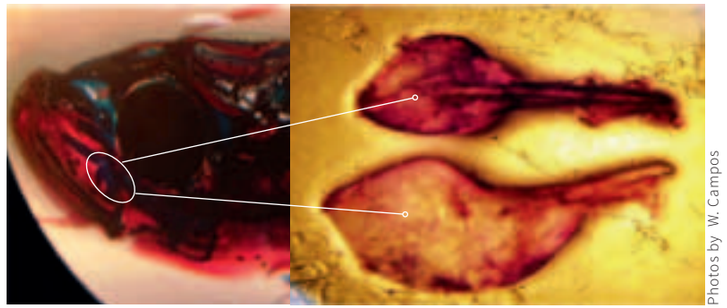


Figure 2-6. (a) Specimens of *H. quadrimaculatus* from the *dulong* fishery of San Juan, Batangas. A picture of a typical adult (L_m 7-10 cm SL; max 25 cm SL; FishBase, 2011) is shown for comparison; (b) Diagnostic characters of genus *Herklotsichthys*

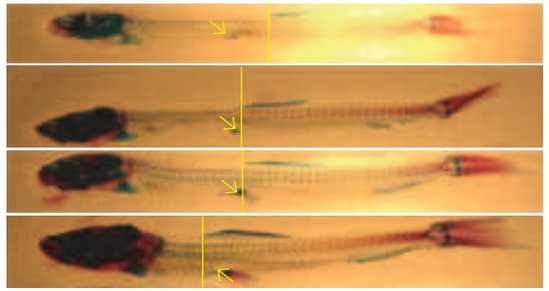


Figure 2-8. Fin migration with development in *Herklotsichthys* sp. The sizes of the specimens from the top are 17, 18, 19, and 20 mm SL respectively. Yellow lines indicate the position of the origin of the dorsal fin, while the yellow arrows indicate the position of the pelvic fin.

Figure 2-7. Clupeid larval forms that are most likely *Herklotsichthys*

with most fish larvae in general, their development from hatching to late stage larvae is accompanied by changing morphological features, such that features that may be characteristic of early stages may no longer be present for later stages. Hence, identification should always be based on developmental stage. Clupeids are a typical example. Figure 2-8 shows how the relative positions of the dorsal and pelvic fins change with age. In young specimens the dorsal fin starts posterior to the placement of the pelvic fin. This relative location reverses in later stage larvae, such that the origin of the dorsal fin is now anterior to the placement of the pelvic fins.

Engraulidae

At least four species of engraulids were identified from the samples. Among these was *Engraulis Japonicus*, locally known as *bolinao* (Fig. 2-9). Its characteristic features are shown in Figure 2-10. Among all identified engraulids, this species is the only one that does not possess ventral scutes anterior or posterior to the pelvic fin.

The most common engraulid identified was *Stolepherus* (Table 2-1). While several species have been reported in this part of the country, these can only be differentiated when specimens are in the juvenile stage. Figure 2-11 shows a typical *Stolephorus* larvae caught by the fishery and three possible species of adults that these larvae may belong to. Other species in the same genera have been reported in the Philippines, and these include *S. ronquilloi* (max 5.3 cm SL), *S. tri* (max 9.5 cm SL), *S. indicus* (max 15.5 cm SL), and *S. commersonnii* (max 10 cm SL) (FishBase, 2011). *Stolephorus* can be distinguished from other engraulid genera by the features shown in Fig. 12. Most of the specimens examined were still too young to determine which genus they belong to (Table 2-1).

Close to 2% of the identified engraulids belonged to the genus *Thryssa*. These are easy to mix up with other engraulids with broad mid-lateral stripes, such as *Encrasicholina* (see below) or even with the silversides (*Atherinidae*, shown below), which are very common in shallow coastal waters. There are several species of *Thryssa* that have been reported in southern Luzon, and these include *T. baelama* (Fig. 2-13), *T. encrasicholoides* (max 10.7 cm SL), *T. hamiltonii* (max 27 cm SL), *T. mystax* (L_m 13 cm SL; max 15.5 cm SL) and *T. setirostris* (max 18 cm SL) (FishBase, 2011). The diagnostic morphological characteristics of *Thryssa* are shown Fig. 2-14. Ventral scutes as well as teeth are not sufficiently developed to allow identification of most engraulid larvae according to genera, much less species (Table 2-1).

The last among the identified engraulids is the genus *Encrasicholina*. As mentioned above, these also possess a wide mid-lateral stripe like *Thryssa* and silversides, although they only possess pre-pelvic and no post-pelvic ventral scutes. This genus represents less than 2% of the identified engraulids, but most (81%) engraulid larvae in the samples were unidentifiable by genera (Table 2-1). There are four species of *Encrasicholina* reported in southern Luzon, including the rare Philippine anchovy, *E. oligobranchus* (max 6.2 cm SL) (FishBase, 2011). The other species are shown in Fig. 2-15 below. The characteristic features used to identify the genus are shown in Fig. 2-16.

Engraulis japonicus

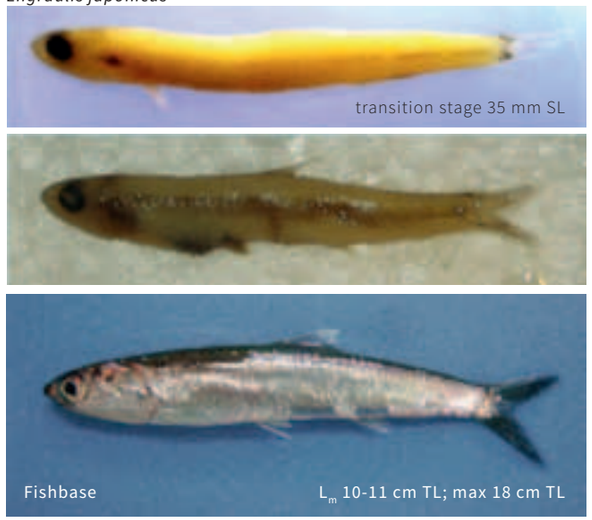


Figure 2-9. Specimens of *Engraulis japonicus* from the dulong fishery of San Juan, Batangas. A picture of a typical adult (fishbase) is shown for comparison.

Engraulis japonicus

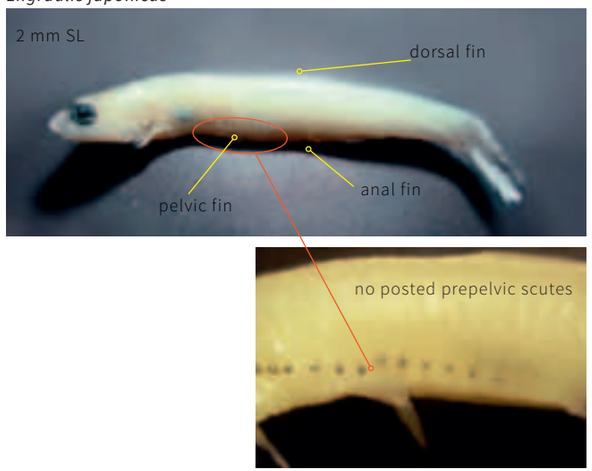


Figure 2-10. Diagnostic features of *Engraulis japonicus* recorded in catches of the *dulong* fishery in San Juan, Batangas

Stolephorus sp.

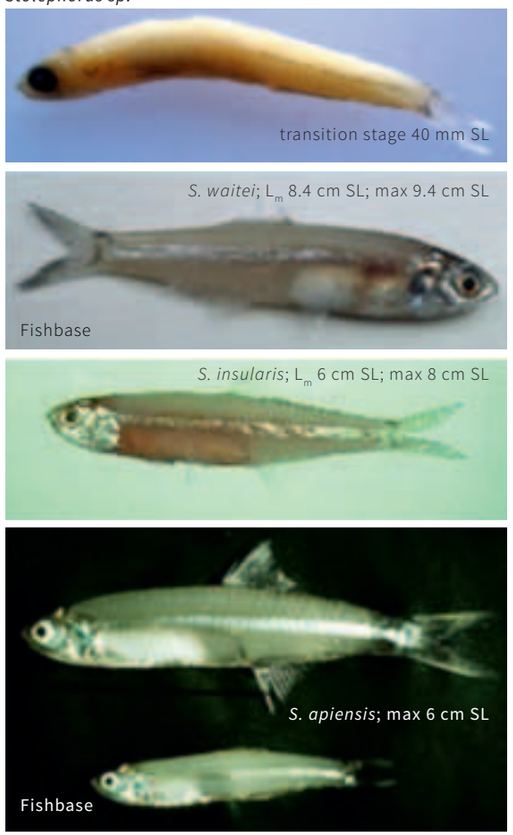


Figure 2-11. Possible adult species of *Stolephorus* larvae recorded from catches of the *dulong* fishery in San Juan, Batangas.

Stolephorus sp.

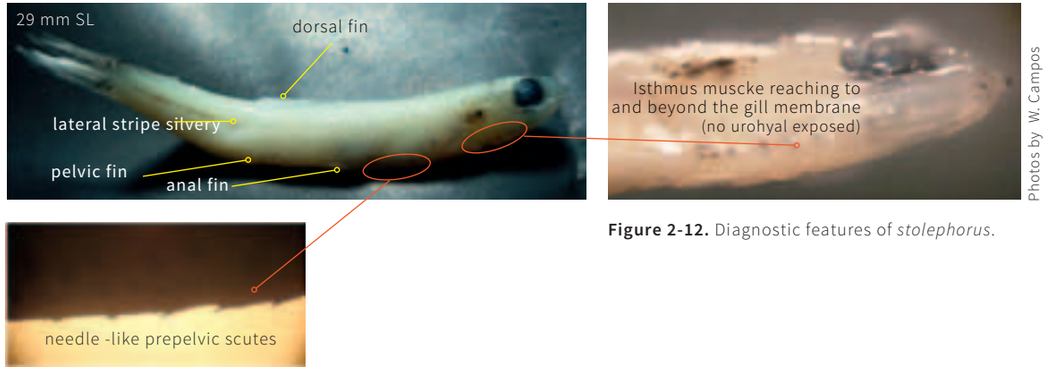


Figure 2-12. Diagnostic features of *stolephorus*.

Thryssa sp.

Figure 2-14. Diagnostic features of *thryssa*. Note the small black arrows pointing to the rather small pre-and post-pelvic scutes.

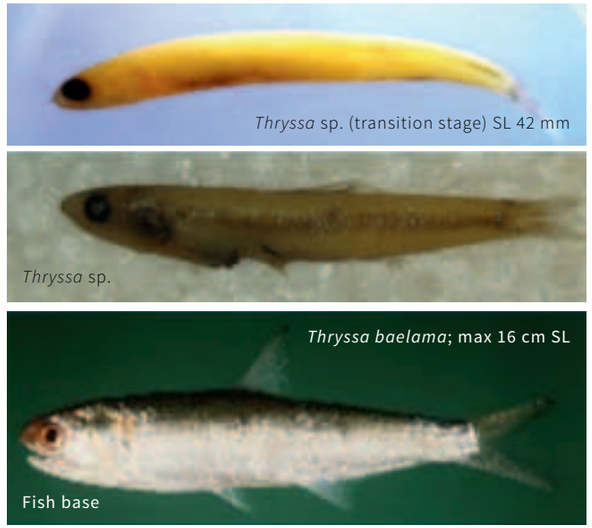


Figure 2-13. Possible adult species of *Thryssa* larvae and juveniles recorded in catches of the *dulong* fishery in San Juan, Batangas.

Figure 2-15. The possible adult species of *Encrasicholina* larvae and juveniles recorded in catches of the *dulong* fishery in San Juan, Batangas

The remaining identified specimens comprise 1.4% of the total number of individuals analyzed. Figure 2-17 shows photos of larvae of *Scombridae*, *Schindleriidae*, and *Phosichthyidae*. Juvenile lanternfish (*Myctophidae*), Benthosema fibulatum, were also recorded in the catches. *Myctophids* inhabit depths below the photic zone (100-150 m deep) but swim towards the surface at night to feed on various zooplankton. Similarly, lightfishes (*Phosichthyidae*) are meso/bathypelagic as adults, although larvae are known to occur closer to the surface (FAO, 1998). It is likely that these fish are capable of extensive vertical migration to feed on zooplankton,

Enchrasicholina sp.

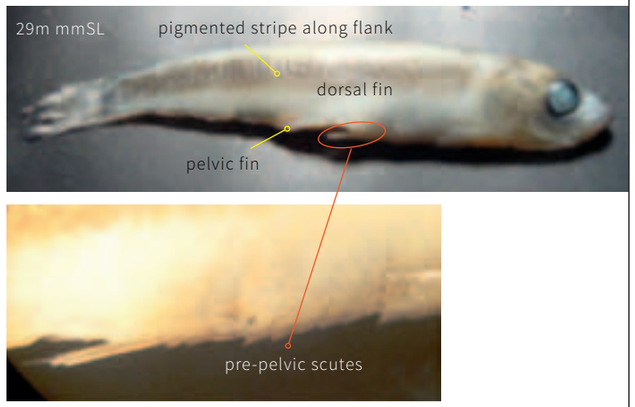
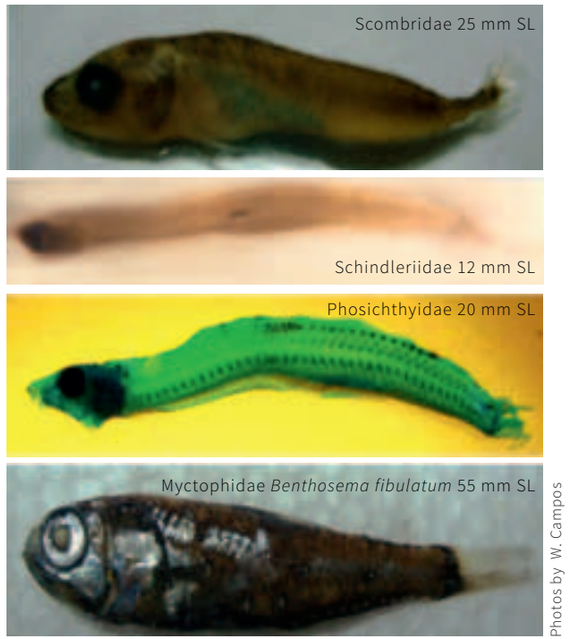


Figure 2-16. The diagnostic characteristics of *Encrasicholina*



Photos by W. Campos

Figure 2-17. Photos of other identified specimens from catches of the *dulong* fishery in San Juan, Batangas

especially at night. *Scombridae* include mackerel and roundscads, both of which are commonly caught in waters of the Verde Island Passage. The *Schindleriidae* are pelagic fish occurring offshore, but are also commonly found near coral reefs. They are slender gobioid fish that retain their larval appearance (long and often transparent bodies) even as adults. Their maximum recorded size is 22 mm. These fish have been recorded only in the Indo-Pacific, and only two species are known to date: *Schindleria pietschmanni* and *S. praematura* (FAO, 1998).

Conclusions

Almost all the fish caught by the *dulong* fishery in San Juan, Batangas are early to late-stage larvae. Some adult individuals might be caught, but these would be rare and would not include members of the clupeids or engraulids, which comprised 64.5% and 34.1% respectively of all specimens analyzed. While more information might be gained had the rest of the remaining 80% of the samples been analyzed, it is unlikely that the above conclusion would change, since seasonal differences in the catch composition were minimal. It is important to note that at least three species of clupeids and four species of engraulids are represented in the catches. The most common clupeid genus from the analysis is *Herklotsichthys*, while the most common engraulid genus is *Stolephorus*. It is not known whether the larger sardines caught by purse seines and other fishing gear off southern Batangas belong to the same genus, but other sardine stocks elsewhere in the country (e.g., Visayan Sea, Dipolog Strait, and Moro Gulf) are

Photos by W. Campos

Figure 2-18 shows specimens of the remaining families identified from the samples. All specimens in this case had already undergone clearing and double staining. Though rather rare in the sampled catches, these families are common in shallow coastal areas and include many reef-associated member species.

comprised of other genera. The apparent preponderance of *Herklotsichthys* in the sampled catches may be due to limitations in the identification of larvae, or even the single location where samples were collected. An extended study should include other major *dulong* fishery areas further west of San Juan, Batangas. Additionally, the taxonomic identification of larger (older) sardines and anchovies caught by purse seines and other gear types should be checked to find out if those being caught in the *dulong* fishery are the same species. This would have important management implications.

It is likewise important to note that larvae of bottom-associated and pelagic fish are more abundant during the summer, since this suggests that by-catch of non-clupeid/engraulid species in the fishery would also be highest during this season. While even very small proportions can translate to large numbers of individuals because of the size of the larvae and the large volume of total landings, determining the impact of *dulong* fishery on recruitment to the "older" part of the stocks will require more extensive collection of samples.

Recommendations

The harvesting of fry for purposes other than fish farming is grounded on the idea that natural mortality rates before settlement, or prior to the onset of juvenile fish behavior, are so high that catching them in moderate amounts will have little, if any, additional impact on subsequent recruitment to the stock. This particular phase in the life cycle of many coastal species is believed to constitute a bottleneck, which only a relatively small portion of potential recruits is able to survive. Hence, since a large portion will die through natural causes and can no longer contribute to the stock or be "recruited," catching this large portion (instead of allowing them to die naturally) should not affect recruitment. However, while natural larval mortality rates are truly high for most species, much of this mortality is caused by predation by other organisms larger, more developed, and hence more adept at survival than the larvae themselves. Catching large amounts therefore reduces the food source of many other species. Furthermore, excessive catches could lead to a reduction in stock abundance, although proving or quantifying this is not simple and straightforward.

To review and improve current policies regarding the *dulong* fishery (and perhaps other fry fisheries as well), the following are necessary:

(1) treat the *dulong* fishery as an integral part of small pelagic fisheries because their catches consist primarily of clupeids and anchovies;
(2) determine the species composition of the small pelagic fisheries as well as the spatio-temporal distribution of catch and effort; and
(3) examine the population biology of local stocks of small pelagic resources.

Other important information outside of the fisheries biology of the stock includes the flow of goods, post-harvest operations, value chain, livelihood opportunities, and other aspects relating to activities downstream of fishing.

CI Philippines/P. Premme

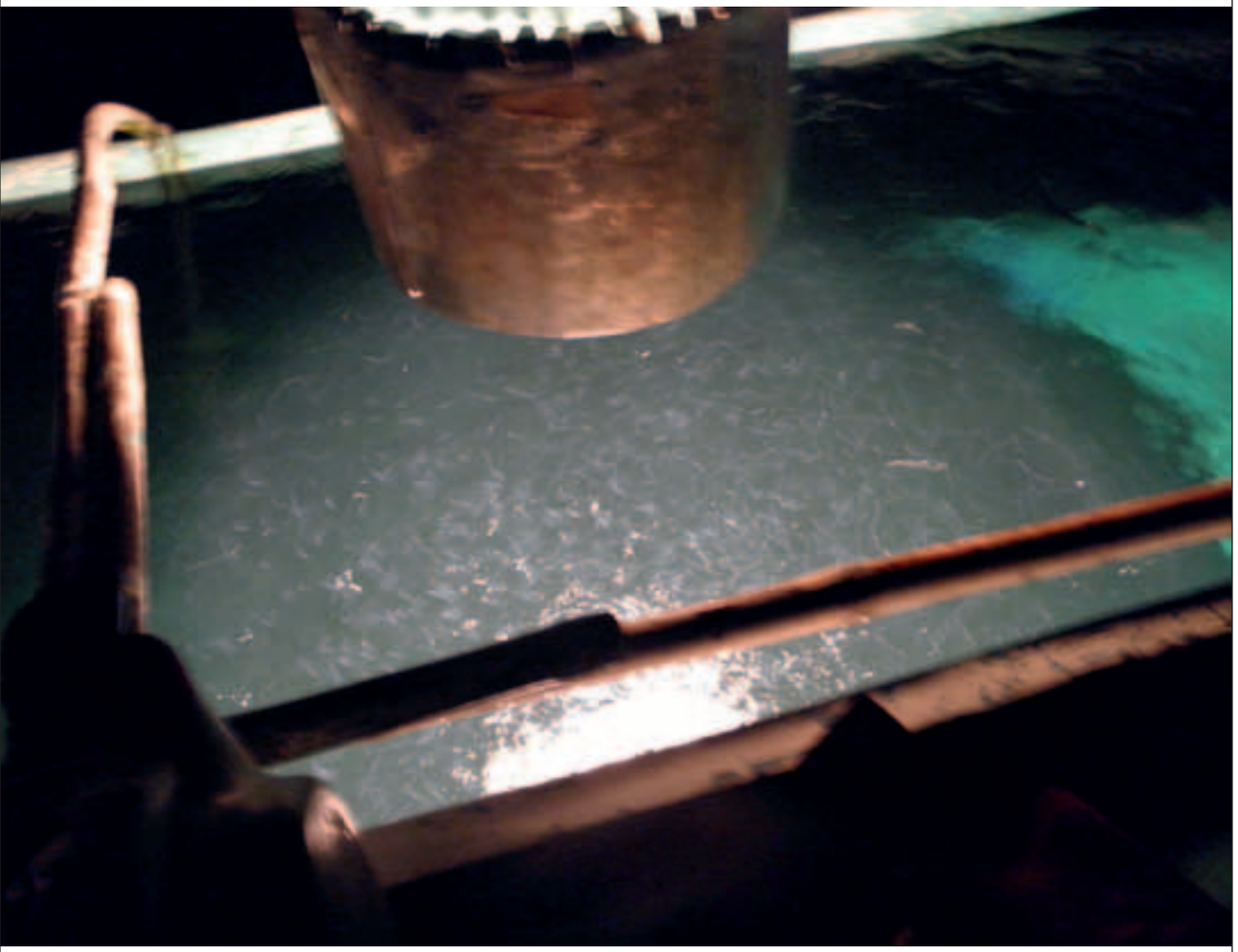
SECTION 3

CI Philippines/P. Premme

Living on Little Fish

A Market Study of 'Dulong' Fisheries in San Juan, Batangas

By Rina Maria P. Rosales
Jon Josef Manlunas



CI Philippines/P. Premme

Introduction

One of the main issues confronting the management of fisheries in the Verde Island Passage is the large volume of *dulong* fisheries being harvested in some of its waters, such as in the municipal waters of San Juan, Batangas. Conservation International-Philippines (CI), through its Coral Triangle Support Partnership (CTSP) Program, is attempting to obtain a clearer understanding of the market for the *dulong* fishery that starts in San Juan, Batangas. A study of the market chain, along with the major market participants and the seasonality of harvest and processing, was conducted in March–July, 2011. To the extent possible, the study determined the relative magnitude, values, and prices of *dulong* along the market chain. The results of this study could help inform the socioeconomics of the *dulong* fishery which will be integrated with ongoing biological and policy work by other CTSP consultants to contribute to the holistic management of this fishery.

Data Gathering Methods

Purposive surveys were conducted among the various market participants in *dulong* harvesting and processing. For harvesting, a focus group discussion (FGD) was conducted with a selected group of fishers pre-identified by CI-Philippines as actively participating in *dulong* harvesting. For purposes of this study, fishers coming from Barangay Laiya-Aplaya were tapped for the FGD. Barangay Laiya-Aplaya has been identified as one of two villages in the municipality of San Juan where *dulong* fishing takes place. The recent survey of *dulong* fish catch conducted by CI-Philippines likewise fed into the overall results of the study.

For the various processing activities, market participants in Batangas and Manila were interviewed. The interviewees were identified from the survey process itself, i.e. *dulong* harvesters identified the buyers of their catch, who in turn identified the buyers of the semi-processed *dulong*, and so on, until the end consumer was reached.

The survey questions are attached as Annex 2.

Survey Results

Aside from the fishers who directly harvest *dulong* from the wild, other players in the *dulong* chain are the following:

1. Brokers – have their own boat and crew that directly sell to "resellers"/traders at the dock, and/or sell to dealers at the market.
2. Commissioners –have the same function as the broker, but do not have their own boat and crew. However, they are the ones who finance the fisherfolk, and profit is shared after the sale.
3. Laiya sellers/resellers/traders ("*mamimili*") – buy fish from the brokers and commissioners and resell to dealers in markets.
4. Dealers – buy and sell fish from resellers in bulk and sell them to the market resellers. At the markets, they are also called commissioners. We just use "dealers" to distinguish them from the commissioners who fund fisherfolk.
5. San Juan/Lipa Market sellers –buy fish from the dealers and sell to end buyers/consumers.
6. *Manglalako* – buy from brokers and/or commissioners and sell to the different barangays/*sitios* in San Juan and Lipa.

There are two sets of players in the *dulong* market. At Laiya, there are the fisherfolk, brokers, commissions, and resellers/traders. At the markets, we have the second set of players. There they have dealers, who sometimes just share profits with market resellers instead of selling *dulong* to them. The market resellers/traders are the ones who sell to the end buyers or other traders who sell in the different barangays.

Based on the information shared, there are more than 41 major players from Laiya, excluding the fisherfolk. This is partly composed of seven brokers, five commissioners, and nine buyers. Of the seven brokers, three directly sell to market dealers. Then there are the more than 20 estimated *manglalakos*, who buy from the brokers and commissions and sell to San Juan barangays.

Of all the respondents surveyed, not one has any information about any entity that buys *dulong* in bulk and processes them. Responses often refer to the cooking of *dulong* for household consumption. Buyers in the markets are usually the local residents. Bulk buyers in the markets are usually the *manglalakos* who cater to different barangays in San Juan and Lipa.

Following is a flowchart that illustrates the various stages of *dulong* harvesting and processing for *dulong* coming from San Juan fishers:

Stage 1: Dulong harvesters

A focus group discussion (FGD) was conducted with selected fishers in San Juan, Batangas on March 21, 2011. Participants included the following:

Edwin Valdez, 44
Rogelio Javier
Melvin Javier, 25
Joseph Mendoza, 32
Marlon Calleya, 22

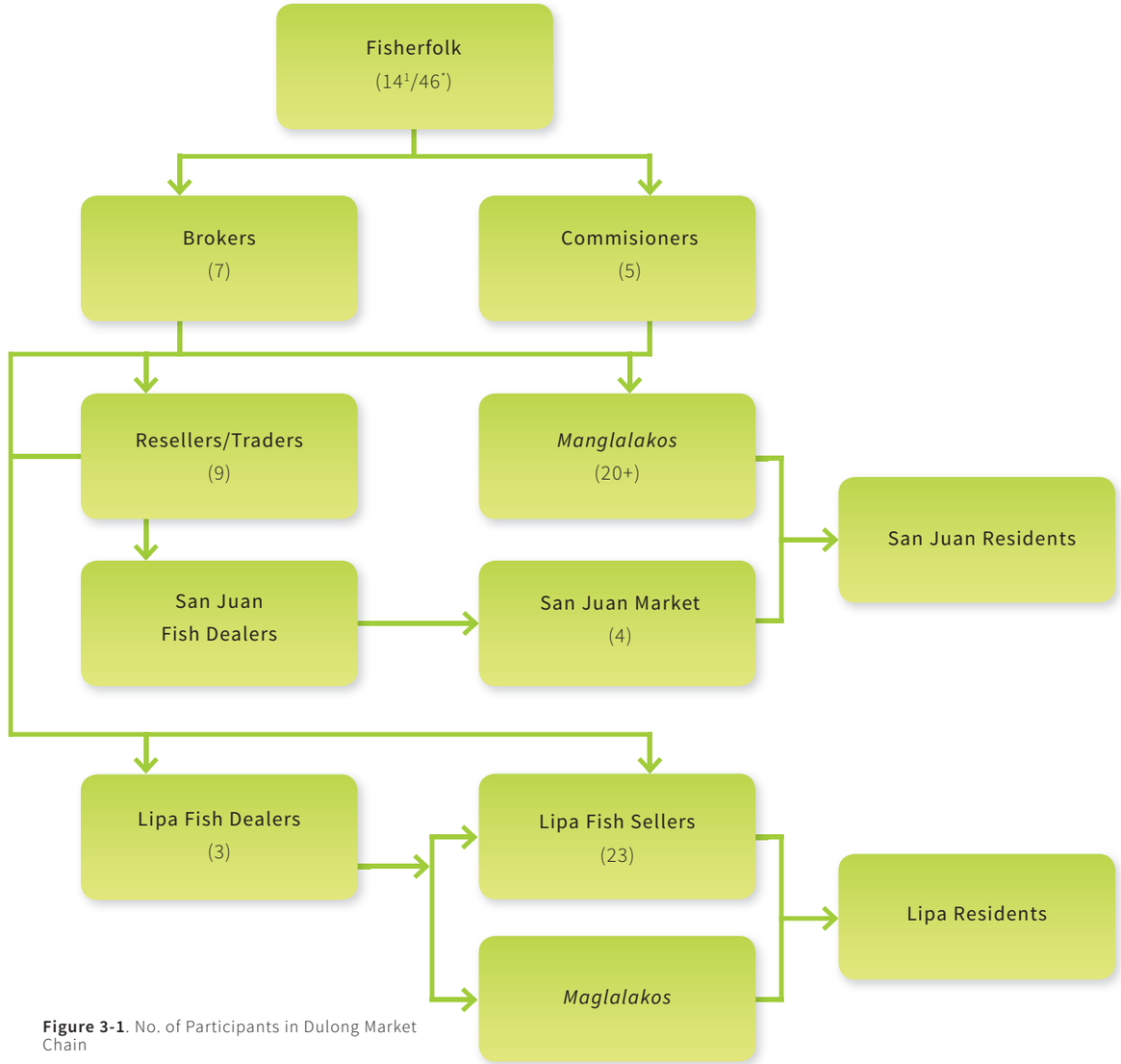


Figure 3-1. No. of Participants in Dulong Market Chain

Numbers in parenthesis are the estimated number of participants.

1 From Laiya Aplaya, based on FGD (no. of boats)

2 From San Juan. Based on CI fisherfolk survey (no. of boats)

Table 3-1 Demographic Profile of FGD Participants, San Juan, Batangas, March 2011

Name	Barangay	Age	Fishing grounds	No. of years in *dulong* Fishing	Other sources of livelihood
Edwin Valdez	Laiya Playa	44	Brgy Bataan, San Juan	15	*Pangulong/taksay*
Rogelio Javier				7	Rents out boats to tourists
Melvin Javier		25		4*	
Josep Mendoza		32		5	
Marlon Calleya		22		1	

Respondents estimated that a total of 14 fishers from their barangay are involved in *dulong* fishing. Fishers' years of experience in *dulong* harvesting ranged from one year to 15 years. The younger fishers come from families of *dulong* harvesters, and hence have learned their practices from older generations. Women used to participate in *dulong* fishing, but when motorized *bancas* had to be used because of more distant fishing grounds and larger waves in recent years, participation has been limited to the men. Paddle *bancas* are no longer used for *dulong* fishing in Bgy. Laiya-Aplaya, San Juan.

Aside from *dulong* fishing, other sources of livelihood include participating in *pangulong* fishing. Income from *pangulong* fishing is divided between the owner of the fishing boat, who gets 50% of the catch, and all the others who joined the trip, who divide the remaining 50%. One trip usually involves 50–60 persons. In 2010, however, *pangulong* fishing operated at a loss, as there was hardly any catch throughout the year. A third source of income is from boat rentals to tourists in San Juan. Boat owners follow a queue for the service of tourists. However, there are 40 boat owners in the queue, and resorts have now started to purchase their own *bancas* for use of their guests. This activity is not bringing in the expected income to *dulong* fishers; hence, they need to continue their *dulong* fishing to augment their incomes.

Harvesting of *dulong* is usually done between the months of November and January. However, for the year 2011, harvesting went on until the summer months of March and April. Harvesting starts at around 6 pm and ends at 10 pm. Boat owners are usually assisted either by family members or hired labor in catching *dulong*. A typical *dulong* fishing trip would include seven to eight people in a boat. Hired labor is paid with a share in fish catch.

Catch volume and measurement vary during harvesting season. During peak season, fishers catch as much as 20 kg each per day, with one kilo consumed by the household and the rest sold to *dulong* buyers. Lowest catch recorded is around 5 kg per fisher per day. Sometimes, catch is measured in terms of *banyera* or basins, and at other times, in terms of *timba* or pail. A good catch would land an entire fishing boat's crew around seven to 10 *banyeras*, or 20 pails in one day. From

Table 3-2. Volume of *Dulong* Caught and Sold, San Juan Batangas, March 2011

Catch/Trip	Kilos Consumed	Kilos Sold
7-10 *banyera*	1 *banyera*	9 *banyera*
20 kg if peak	1 kg	19 kg
5 kg if lean	1 kg	4 kg
20 *timba*	1 *timba* equally shared	19 *timba*

this data, it can be surmised that one *banyera* would be equivalent to two pails, or 50 kilos of fish.

Farm gate prices of *dulong* range from a low of Php 25 per kilo when the catch is composed of what they term as *dulis* or a lower class of *dulong*, to Php 80 a kilo of *puti* or higher quality *dulong*. Most fishers sell to fish brokers, some of whom are also residents of San Juan municipality. Brokers in turn sell to market vendors, who sell *dulong* for Php 120 a kg in the wet market. The Lipa Public Market in the neighboring City of Lipa is one of the main trading centers where *dulong* is brought from San Juan. At the Lipa Public Market, *dulong* is sourced not just from San Juan but also from other municipalities in Batangas, and is sold and bought in large volumes.

If *dulong* is sold by fishers for less than Php 100 per kg, some buyers (roughly estimated at around 10 people in the village) process the harvest into a viand called either *sinaing* or *pinais*, a local delicacy eaten with rice and sold to consumers at Php 6 per piece (see photograph on the title cover of this section). One kilo would usually yield 20 pieces. Hence, if a kilo of raw *dulong* is sold at less than Php 100, it would increase in value to Php 120. However, this does not really produce profits for such processors, as costs of producing *sinaing* or *pinais* are estimated at Php 50-Php60 per kilo of *dulong*. If the farm gate price is Php 100 or more, fish catch is sold directly by the brokers to Lipa public market vendors.

Fish catch has been observed to decrease throughout the years. This is attributed mainly to more fishers catching *dulong* in deeper waters. Hence, the large "fries" or fingerlings do not get to reach shallow waters anymore.

Some municipalities in Batangas have banned *dulong* fishing. The Municipality of Lobo previously enforced a total ban on *dulong* fishing but was forced to recall his order when fishers protested of the low catches and when the alternative livelihoods the government provided (e.g., swine raising) did not work out. Even the Mayor of San Juan enforced some regulations on *dulong* fishing. When *dulong* fishers go through areas where *dulong* fishing is banned, including areas where Marine Protected Areas (MPAs) have been established, they get shot at by Bantay Dagat members. But some *dulong* fishers complain that some Bantay Dagat

members connive with fishers in neighboring villages and municipalities, and local residents of Barangay Bataan are prohibited from fishing *dulong* but those coming from other towns are allowed. Sometimes they get caught and are fined Php 2,500 per fisher. Some FGD participants expressed their willingness to stop *dulong* fishing if alternative livelihoods are provided to them and their families. Some even expressed their willingness to guard their fishing grounds if they are paid accordingly, although they admit that there are hardly any more fishing violations being committed within the waters of San Juan. In the end, they acknowledged the fact that there are too many *dulong* fishers, and rising energy prices have increased their input costs. Both of these factors have probably contributed to the decline in catch through the years.

When asked if they were willing to participate in the proposed livelihood dispersal project of the LGU to entice them to stop *dulong* fishing, some of them complained that the program will not work because of the lack of space for raising animals in their backyards. When asked about their thoughts on a possible closed season for *dulong* fishing, most of the respondents did not favor this regulation, since *dulong* fishing is already seasonal in nature. They will, however, welcome livelihood assistance that is directly linked with *dulong* fishing. One type of assistance they suggested was training to process *dulong* into higher value products, such as bottled *dulong* in olive oil. Linking them with guaranteed markets would further ensure that they can augment their livelihoods if they are required to decrease their *dulong* fishing.

Stage 2: Brokers and commissioners

According to brokers, *dulong* season is from September to December. On average, they can get as much as 20 chests of *dulong* per day, with each chest weighing around 50 kg. Brokers and commissioners usually sell to the resellers and *manglalakos*. However, some of them also sell *dulong* to the dealers in Lipa, where they are sold at Php 3,000–Php 5,000 per chest, equivalent to PhpP 60–Php 100 per kg.

They transport *dulong* via hired jeepney, often sharing the cost by traveling to Lipa Market as a group. Each jeep costs Php 2,000. A jeep has a capacity of 10 chests. When sharing a jeep, they pay Php 200 per chest. Other cost items are ice (Php 100/day), plastic (Php50/day), and labor (Php 100–150/day/laborer).

Since brokers have their own boats, the crew costs them Php 2,000 per day (at Php 500/crew member). On top of that they have to pay for gasoline (Php 3,000 per trip per night), light bulbs (Php 1,800 per week, at Php 450/bulb), and oil (Php 130 per trip). When *dulong* is abundant, fishers can go on two to three trips per night, adding to the gasoline costs.

Meanwhile, commissioners get around 30–40 chests of *dulong* per day, since this particular commissioner funds six separate fishing crews. They are then sold for Php 3,000–Php 6,000 per chest.

Commissioners pay for the transportation cost plus and shoulder all expenses of the fishing crew (excluding crew labor costs). On average, each boat needs 30 liters of gasoline per day, amounting to Php 1,590 per boat per night, assuming gas price is Php 53 per liter. They also pay for boat repairs, which are rare, and the costs of which vary depending on the nature of the repair. On average, boat maintenance costs them Php 10,000 per season. They also pay for the *dulong* nets at Php 2,500 per boat per season. Other costs are the usual—light bulbs (Php 1,350 a week, at Php 450 per bulb), ice (Php 50 per chest), plastic (Php 10 per chest), salt, laborers/helpers (Php 300 per day, at Php 150 per laborer), and transportation (Php 200 per chest).

The typical profit sharing scheme between a fishing crew and a commissioner is as follows:

Gross revenue

(Less: Total expenses of commissioner)

Gross profit

(Less: 10% of gross profit): Share of commissioner

Gross profit of boat owner

Less: 1/3 of gross profit of boat owner: Labor cost of boat owner

Net profit of boat owner*

*According the president of the fisherfolk association, net income of a boat owner per season is around Php100,000.

Stage 3: *Dulong* resellers and traders

There are a total of nine resellers/traders (*mamimili*) from Laiya who directly sell to fish dealers (also called commissioners) and market sellers (also called *mamimili*) at Lipa Market. When *dulong* is in season, they only buy and sell *dulong*. During off -season, they buy and sell other fish species available.

According to the resellers, the peak season for *dulong* is December and May of each year. During these months, *dulong* is traded daily (seven times a week). Resellers from Laiya normally buy and sell between one and five coolers per day, each equivalent to 50 kg. A cooler of *dulong* is priced at around Php 3,000–Php 4,000, depending on supply. They are then sold on a per kilo basis ranging from Php 80 to Php 110 per kilo.

The resellers pay the costs that are incurred during the transportation of *dulong* from Laiya to San Juan. Transportation is the highest cost, at Php 2,000 per jeep or Php 200 per cooler, also equal to Php 80 per *timba* (20 kg per *timba*). Each reseller hires a helper at the dock at Php 150 per day and hires another helper at Lipa to unload the coolers at Php 20 per cooler. Other costs include plastic at Php 20 per cooler, ice at Php 75 per cooler, salt at Php 60 per cooler, and lastly, food, which costs them Php 100 per day.

On a bad day during the peak season, the resellers from Laiya bring around 10 coolers to Lipa Market. On a good day, however, they can bring up to 50 coolers of *dulong*. Normally, when resellers have six or more coolers of *dulong*, they sell to fish dealers at Lipa Market. When they have less, they sell directly to the market sellers at Lipa Market. There are three fish dealers at Lipa Market that buy and sell *dulong*; however, only two of them, Ka Luding and Ka Arturo, deal with *dulong* from Liaya.

The resellers say that the net profit per day is erratic. Normally it is between Php 500 and Php 1,000 per day. This could go as high as Php 4,000 per day, or as low as a net loss of Php 3,000 per day.

Table 3-3. *Dulong* Harvest Information, in Kilograms

Player	Ave. Frequency		Ave. Units Harvest/Day in Kg		Ave. Units Consumed/ Day	Ave. Units Sold/Day	N
	No. of Mos/Yr	No. of Days/Wk	Min	Max			
San Juan							
Harvesters[1]	3	7	20	-	1.00	19	46
Brokers1	3	7	1,000	-	0.00	1,000	7
Commissioners[1]	3	7	1,500	-	0.00	1,500	5
Reseller/trader[1]	2	7	200	-	-	200	9
Fish dealer	2	7	50	-	0.00	50	1
Market seller	2	5	17	-	0.25	16	3
Lipa							
Fish dealer	2	7	1,033	1,233	0.00	1,033	3
Market seller	2	7	32	66	0.00	32	13

[1] Based on FGD

Table 3-4. Average Costs and Revenues per player per day, in Php

Player	Number	Revenue		*Dulong* Cost		Other Cost		Net Income	
		min	max	min	max	min	max	min	max
San Juan									
Harvesters for brokers[1]	35	500	-	-	-	-	-	500	-
Harvesters for boat owners[1]	25	894	1,922	-	-	-	-	894	1,922
Boat owners[1]	5	18,772	40,372	-	-	6,257	13,457	12,514	26,914
Small boat owners	34	1,140	2,280	-	-	-	-	1,140	2,280
Brokers[1]	7	30,000	50,000	-	-	6,526	6,526	23,474	43,474
Commissioners[1]	5	24,000	48,000	18,772	40,372	3,143	3,143	2,086	4,486
Reseller/trader[1]	9	16,000	22,000	12,000	16,000	2,050	-	1,950	3,950
Fish dealer	2	4,583	-	4,167	-	-	-	417	417
Market seller	4	1,625	1,755	1,367	-	-	-	259	-
Lipa									
Fish dealer	3	25,000	65,000	82,667	143,333	-	-	1,000	-
Market seller	23	3,269	3,588	2,738	7,143	-	-	531	-

[1] Based on FGD
Assumptions:
1 boat per commissioner
1 boat per broker
5 crew members per boat

Revenues and Costs

Table 3-3 and Table 3-4 show a summary of the survey conducted at San Juan and Lipa. Notice that no other costs appear for fish dealers and market sellers in the table. This is because costs related to *dulong*, such as harvesting and transportation costs, are shouldered by the brokers, commissioners, and resellers/traders from Laiya, not by the sellers in the market. The actual costs appear in the FGD results, in which participants were resellers/traders and a commissioner from Laiya. The only cost that they pay is the buying price of the *dulong* itself.

The cost computation in Table 3-4 was done by assuming that each broker and commissioner brings only four coolers of dulong to Lipa, the same quantity as the resellers, while the rest are sold at the docks. In addition, it is assumed that there is only one boat per broker and one boat per commissioner. This is not necessarily the case, as brokers and commissioners can have more than one boat. Lastly, as per FGD with dulong fisherfolk, it is assumed that there are five crew members per boat. For the computation details, please refer to Annex 4.Harvesters are further categorized into three: the harvesters for brokers, harvesters for boat owners, and the boat owners. Boat owners are further classified into two: the boat owners under the commissioners, and the small boat owners. Harvesters for brokers refer to the labor hired by the brokers for each trip, while harvesters for boat owners refer to the crew of the boat owner under the commissioners. Small boat owners refer to the small boats that can carry only one passenger, usually the owner. Boat owners under the commissioners have larger boats that can carry five crew members. Revenues of commissioners, boat owners, and commissioner labor were computed using the profit sharing scheme described earlier. Revenue for harvesters hired by brokers is based on the reported costs of the brokers.

Total revenues in Figure 3-2 were computed using the average costs and revenues from Table 3-4 and the estimated number of players per stage. Note that boat owners and brokers have the largest incomes. The computations above are based on the assumption of five crew members per boat.

Based on the average and total net income figures for each group, the brokers and boat owners benefit more individually and as a group. Those with the smallest share in the total value chain on an individual basis are the San Juan market sellers, and the San Juan fish dealers and market sellers as a whole. Total net income from *dulong* fishing in San Juan amounts to between Php 350,554 and Php 622,452 on a daily basis.

Aside from the reported revenues and costs, another factor affecting the total net incomes is the estimated number of players. It is assumed that brokers and commissioners have one boat each, while each boat has five crew members, based on the interviews conducted. Total revenues, costs, and net incomes per year were computed by multiplying the per day estimates with the reported frequency of harvest per year.[3] The distribution of total net incomes across the whole value chain is illustrated Figure in 3-3.

[3] Frequency of harvest is seven times a week for the entire season, based on personal interview with Ms. Eva Javier, one of the brokers in Laiya.

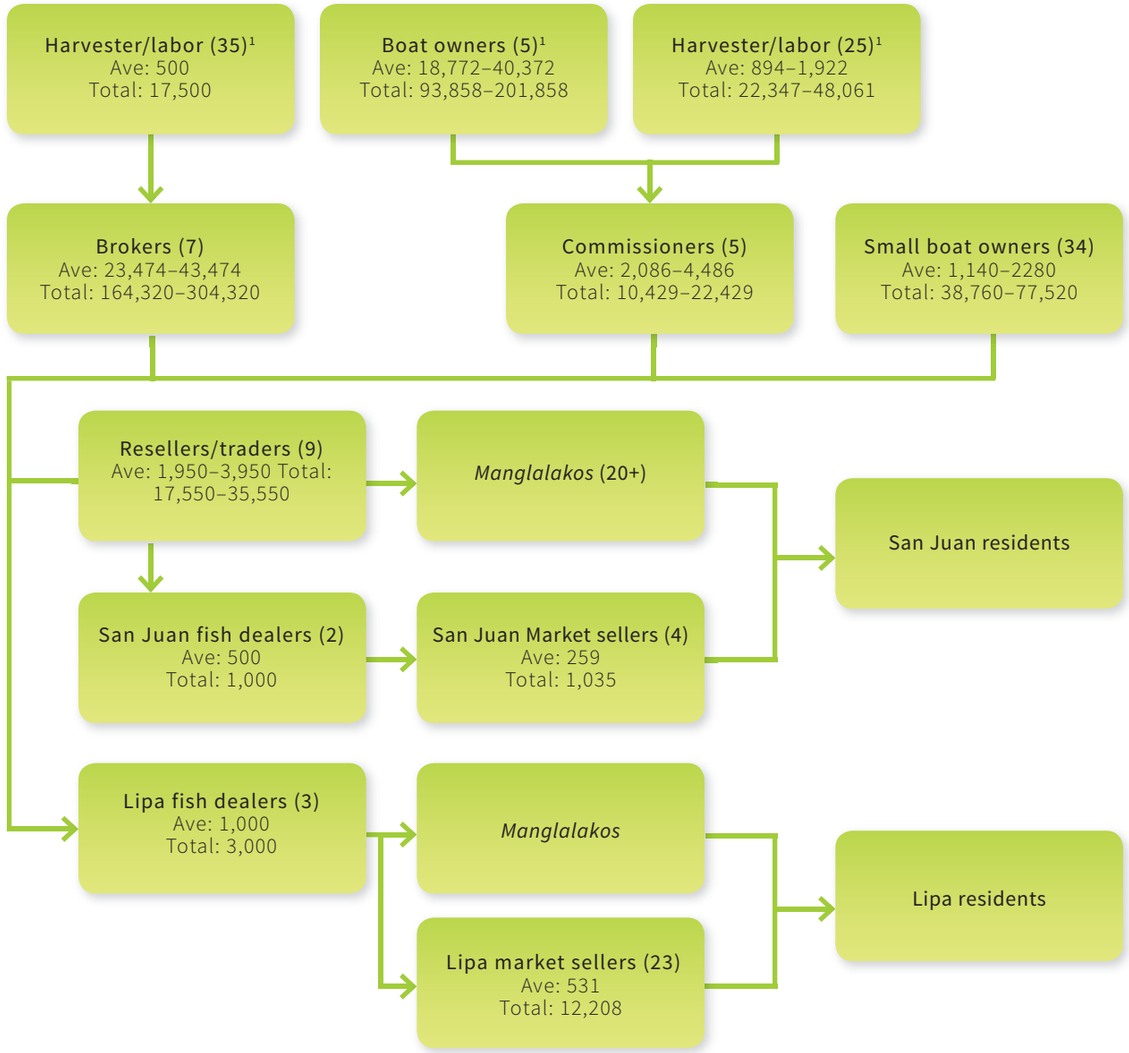


Figure 3-2. Average and total net incomes for all players per day

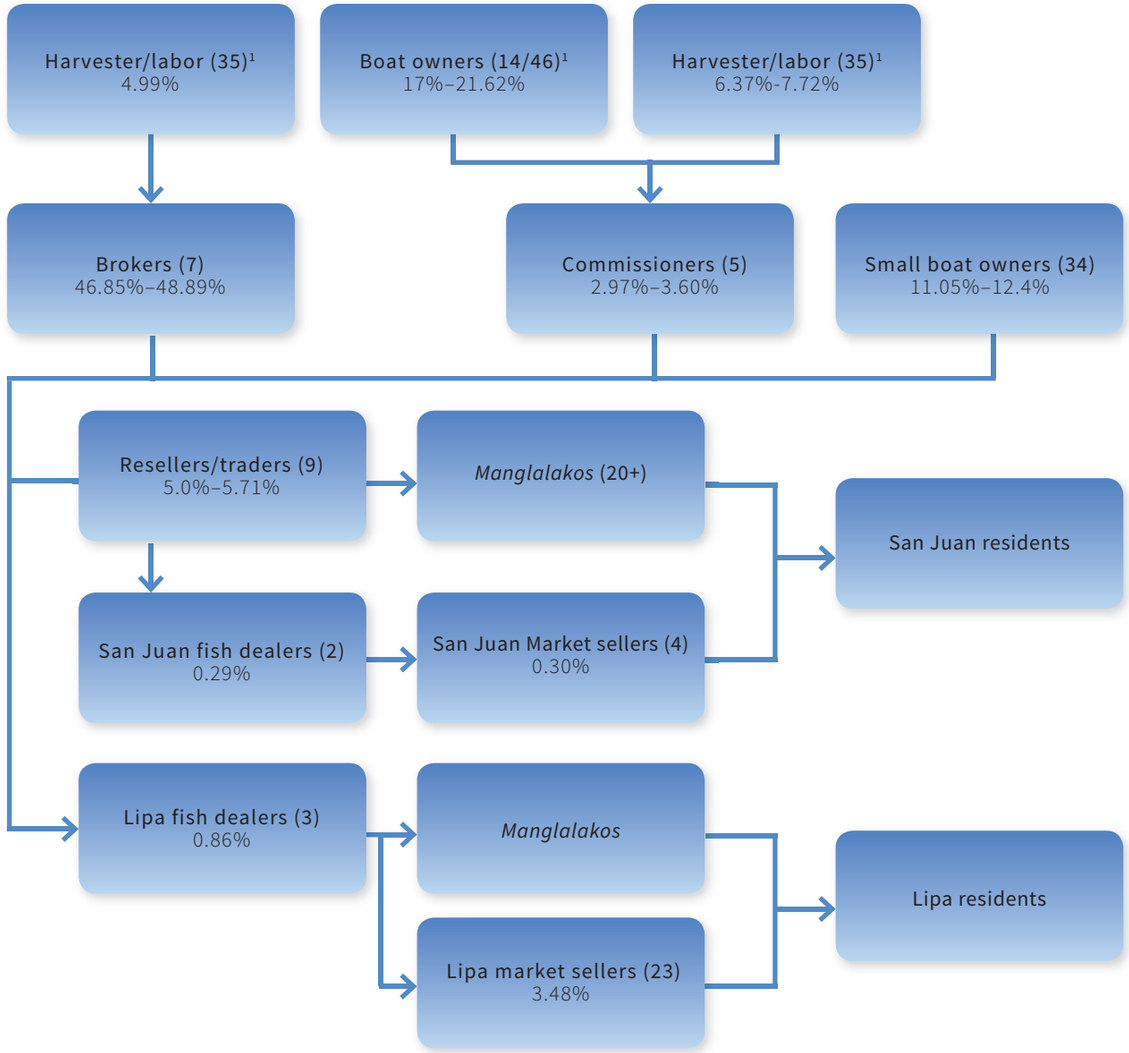


Figure 3-3. Percentage Distribution of Net Incomes

[1] Based on the assumption of five crew members per boat.

Table 3-5. Total Revenues, Costs, and Net Incomes per Day[2]

Player	Number	Revenue		Dulong Cost		Other Cost		Net Income	
		min	max	min	max	min	max	min	max
San Juan		662,133	1,122,459	215,658	345,858	111,129	128,679	335,346	622,452
Harvesters for brokers[1]	35	17,500						17,500	
Harvesters for boat owners[1]	25	22,347	48,061					22,347	48,061
Boat owners[1]	5	93,858	201,858			31,286	67,286	62,572	134,572
Small boat owners	34	38,760	77,520					38,760	77,520
Brokers[1]	7	210,000	350,000			45,680	45,680	164,320	304,320
Commissioners[1]	5	120,000	240,000	93,858	201,858	15,713	15,713	10,429	22,429
Reseller/trader[1]	9	144,000	198,000	108,000	144,000	18,450		17,550	35,550
Fish dealer	2	9,167		8,333				833	
Market seller	4	6,502	7,020	5,467				1,035	
Lipa		150,192	277,513	310,985	594,286	0	0	15,208	
Fish dealer	3	75,000	195,000	248,000	430,000			3,000	
Market seller	23	75,192	82,513	62,985	164,286			12,208	
Total		812,326	1,399,972	526,642	940,144	111,129	128,679	350,554	622,452

Assumptions:
1 boat per commissioner
1 boat per broker
5 crew members per boat

Dulong sold in San Juan market have two sources: Laiya and Dalahikan, Quezon. *Dulong* from Dalahikan land in Sitio Balakbakan, which are then transported to San Juan Market. *Dulong* sold in Lipa Market come from various municipalities inside and outside Batangas. Aside from Laiya, some come from Lobo, Lemery, and Calatagan, while others come from Cavite and Malabon.

[2] Refer to Annex 4 for the computation details.

Table 3-6. Total Revenues, Costs and Net Incomes per Year

Player	Days per season	Revenue		Dulong Cost		Other Cost		Net Income	
		min	max	min	max	min	max	min	max
San Juan		51,061,795	88,452,417	14,631,971	25,020,060	8,818,273	10,809,073	27,611,550	51,290,564
Harvesters for brokers[1]	84	1,470,000						1,470,000	
Harvesters for boat owners[1]	84	1,877,157	4,037,157					1,877,157	4,037,157
Boat owners[1]	84	7,884,060	16,956,060			2,628,020	5,652,020	5,256,040	11,304,040
Small boat owners	84	3,255,840	6,511,680					3,255,840	6,511,680
Brokers[1]	84	17,640,000	29,400,000			3,837,120	3,837,120	13,802,880	25,562,880
Commissioners[1]	84	10,080,000	20,160,000	7,884,060	16,956,060	1,319,933	1,319,933	876,007	1,884,007
Reseller/trader[1]	56	8,064,000	11,088,000	6,048,000	8,064,000	1,033,200		982,800	1,990,800
Fish dealer	56	513,333		466,667				46,667	
Market seller	43	277,404	299,520	233,244				44,160	
Lipa		8,410,769	15,540,700	17,415,138	33,280,000	0	0	851,631	0
Fish dealer	56	4,200,000	10,920,000	13,888,000	24,080,000			168,000	
Market seller	56	4,210,769	4,620,700	3,527,138	9,200,000			683,631	
Total		59,472,564	103,993,117	32,047,110	58,300,060	8,818,273	10,809,073	28,463,181	51,290,564

Assumptions:
1 boat per commissioner
1 boat per broker
5 crew members per boat

Dulong Products Sold in Manila

Based on the FGDs and survey conducted, *dulong* from San Juan are bought, sold, and consumed in San Juan and Lipa. There was not a case in which a player mentioned any buyer who processes *dulong* and sells to markets outside Batangas. We attempted to interview the sellers in the weekend markets in Metro Manila to find out where the *dulong* they process and sell are from. In particular, the markets we visited were the Centris Walk, Salcedo Market, and Legaspi Market.

Figure 3-5 illustrates the flow of *dulong* from the sources to the end buyers based on the interviews. Some processors get their *dulong* from suppliers who have contacts from different provinces. According to *dulong* suppliers we were able to talk to, they get their stock from Ilocos Norte, Cavite, Batangas, and Malabon. Unfortunately, they did not know the specific

Figure 3-4. *Dulong* sources outside San Juan

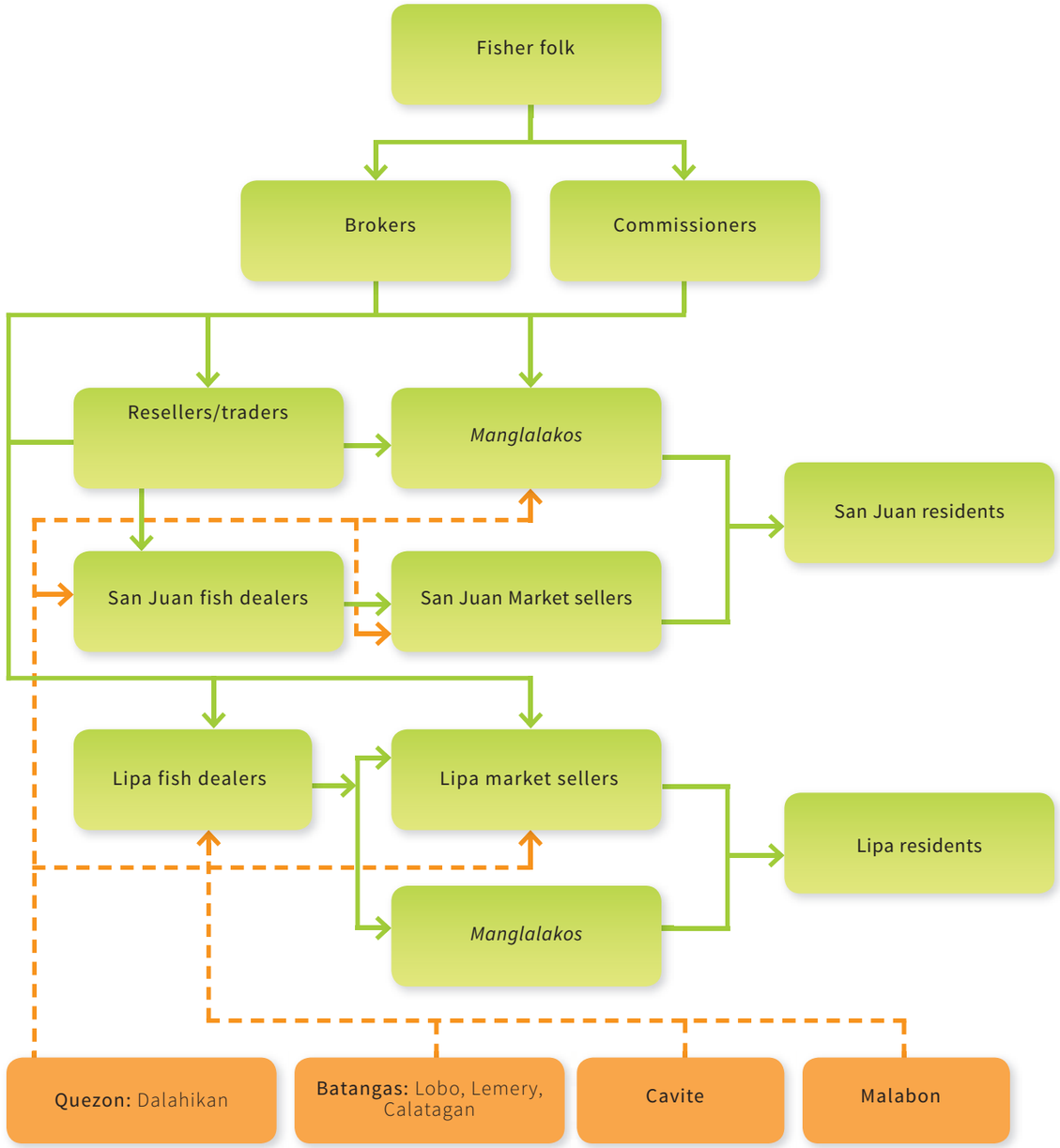
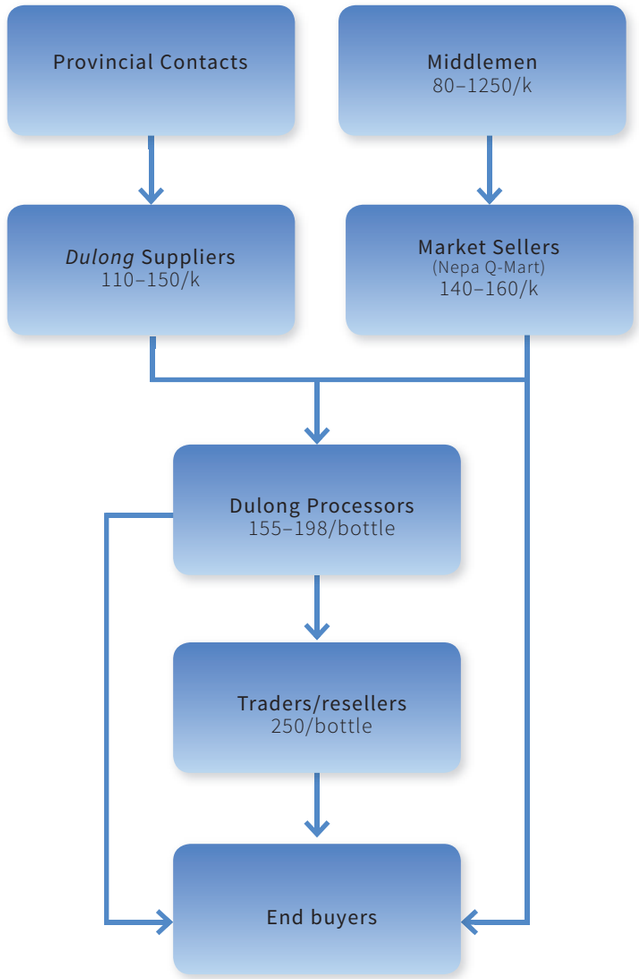


Figure 3-5. *Dulong* flow in Manila



municipality in Batangas the *dulong* is from, since middlemen just deliver them to their stalls.

One processor mentioned that they get their *dulong* from a seller in Nepa Q Mart in Cubao, Quezon City. According to the market sellers in Nepa Q Mart, they get their *dulong* from Cardona, Lucena, Bulacan, Malabon, Bataan, Navotas, and Laguna. Note that they say that *dulong* from Laguna are delivered on a daily basis, except when the weather is really bad. *Dulong* from Laguna is the *tabang* type that comes from rivers.

From Figure 3-5, it is seen that end buyers buy both processed and fresh *dulong*. According to the market sellers in Nepa Q Mart, *dulong* are always sold out. All that goes into the market are sold on the same day. When asked why, they said that it is cheap and easy to cook.

The *dulong* products being sold in the weekend markets are *dulong* in olive oil and *dulong* in corn oil. Both processors and resellers have stalls in the markets. According to the sellers, there is a high demand for these products. One processor mentioned that on a regular month, processed *dulong* accounts for between 15% and 20% of total sales, but come December, it is 30%-40% of total sales.

Conclusion

Total income for all players in San Juan amounts to between Php 350,554 and Php 622,452 per day. This represents the total value of *dulong* fisheries in San Juan. On a yearly basis, assuming the least and maximum number of months of *dulong* harvesting, the total annual value of *dulong* fisheries is between Php 28,463,181 and Php 51,290,564.

Dulong products being sold in Manila do not come from San Juan, Batangas. Rather, they are sourced from elsewhere. Furthermore, there are other areas within the Verde Island Passage that harvest *dulong*, such as in Mabini and Lobo. In order to come up with a sound policy for *dulong* fisheries on a corridor-wide scale, it might be useful to conduct value chain studies later on, specifically in other areas within the VIP that harvest *dulong*.

CI Philippines/P. Premme

SECTION 4

CI Philippines/P. Premme

Fishing for Policies

Dulong in Local and National Legislation

By Mario E. Maderazo

Republic of the Philippines
Congress of the Philippines
Metro Manila

Tenth Congress

Republic Act No. 8550 February 25, 1998

AN ACT PROVIDING FOR THE DEVELOPMENT OF, MANAGEMENT AND CONSERVATION OF THE FISHERIES AND AQUTIC RESOURCES, INTEGRATING ALL LAWS PERTINENT THERETO, AND FOR OTHER PURPOSES

Be it enacted by the Senate and House of Representatives of the Philippines assembled:

Section 89. ***Use of Fine Mesh Net.*** – It shall be to engage in fishing using nets with mesh smaller than which may be fixed by the Department: Provided, that the prohibition on the use of fine mesh net shall not apply to the gathering og fry, glass eels, elvers, tabios, and alamang and such species which by their nature are small but already mature to be identified in the implementing rules and regulations by the Department.

Violation of the above shall subject the offender to a fine from Two thousand pesos (P2,000.00) to Twenty thousand pesos (P20,000) or imprisonment from six (6) months to two (2) years or both such fine and imprisonment at the discretion of the court: Provided, that if the offense is committed by a commercial fishing vessel, the boat captain and the master fisherman shall also be subject to the penalties provided herein: Provided, further, that the owner/operator of the commercial fishing vessel also violates this provision shall be subjected to the same penalties provided herein: Provided, finally, that the Department is hereby empowered to imnpose upon the offender an adminstrative fine and/or cancel his permit or license or both.

Introduction

One of the main issues with *dulong* fishing is its legality. In order to provide sound policy advise to CTSP and CI on legally-acceptable management options for the fishery, a review of existing legislations and policies that could apply to the *dulong* fishery has been completed that discusses answers to the following questions:

(1) Is there any existing policy on *dulong* fisheries?

(2) How is juvenile fish different from fry and fingerlings?

(3) Is there a distinction made by law between *dulong*, juvenile fish, fry, and fingerlings?

(4) Is there a window for policy development?

National Law

Dulong, as it is culturally and generally referred to in the Philippines, are small variety of fishes caught using fine-mesh scoop nets. The Fisheries Code of 1998 (Republic Act or RA 8550) and its Implementing Rules and Regulations (IRR) (Department Administrative Order or DAO 3) provide the following related terms which may be associated with *dulong* on account of its size :

Fish fingerlings - a stage in the life cycle of the fish when it measures about 6-13 cm, depending on the species. (DAO 3, IRR of 8550)

Fish fry - a stage at which a fish has just been hatched, usually with sizes from 1 to 2.5 cm (DAO 3, IRR of 8550)

Juvenile fish – small sized and sexually immature fish (or within maturity stages I & II or GSI < 4) (Fisheries Administrative Order or FAO 237)

The above definition of terms provides specific measurement of the "smallness" of a fish, based on the stage of its life cycle. It will be noted that under existing law, there is a difference in the treatment of fingerling and fry on one hand, and juvenile fish on the other.

SEC. 89. Use of Fine-Mesh Net. - It shall be unlawful to engage in fishing using nets with mesh smaller than that with which may be fixed by the Department: Provided, that the prohibition on the use of fine-mesh net shall not apply to the gathering of fry, glass eels, elvers, *tabios*, and *alamang* and such species which by their nature are small but already mature, to be identified in the implementing rules and regulations by the Department.

Violation of the above shall subject the offender to a fine from two thousand pesos (P2,000) to twenty thousand pesos (P20.00) or imprisonment from six (6) months to two (2) years or both such fine and imprisonment at the discretion of the court: Provided, that if the offense

is committed by a commercial fishing vessel, the boat captain and the master fisherman shall also be subject to the penalties herein: Provided, further, that the owner/operator of the commercial fishing vessel who violates this provision shall be subjected to the same penalties provided herein: Provided, finally, that the Department is hereby empowered to impose upon the offender an administrative fine and/or cancel his permit or license or both.

The Department, through BFAR, shall:

Rule 89.1 Regulation of Mesh Sizes. – Issue the appropriate FAO, within one (1) year from the effectivity of this IRR, on the allowable mesh size for different gears, which may serve as guidelines for LGUs in the implementation of this prohibition in municipal waters;

Rule 89.2 Determination of Juvenile Fishes. – Issue the appropriate FAO on fishes considered in juvenile stage, and penalizing possession thereof. (underscoring supplied)

Under Sec. 89 of RA 8550, fishing of fish species that are small by nature is allowed, but only with the use of fine-mesh nets. By implication, catching fishes which do not belong to said species with the use of fine-mesh net is prohibited.

The mesh size of a fine-mesh net is "less than three centimeters (3 cm) measured between two opposite knots of a full mesh when stretched.[4]"

Section 89.2 of DAO 3, which is supposed to operationalize the policy statement of prohibiting the catching of juvenile fishes under RA 8550, falls short of such objective by merely providing that the Department of Agriculture (DA), through the Bureau of Fisheries and Aquatic Resources (BFAR), shall later on issue the appropriate administrative order penalizing possession of fishes which are still in the juvenile stage. However, such provision is a window for developing a clear-cut policy on *dulong* fishing.

Local Legislation

A reference to the Local Government Code of 1991 (RA 7960) shows that fry fishing is allowed.

(2) Grant the privilege to gather, take, or catch *bangus* fry, prawn fry, or *kawag-kawag* or fry of other species and fish from the municipal waters by nets, traps ,or other fishing gears to marginal fishermen free of any rental, fee, charge or any other imposition whatsoever. [Section 149, (b) , (1)]

Local legislation in two municipalities within the Verde island Passage (VIP) Corridor indicate also the norm of prohibiting the catching or fishing juvenile fishes, as seen in the following Table 4-1

Past Legislation

The ban on catching juvenile fishes has been institutionalized by the government in the past. Notable are the following legislation:

Ra 4003 - an act to amend and compile the laws relating to fish and other aquatic resources of the philippine islands, and for other purposes.[5]

Sec. 13. Protection of Fry or Fish Eggs. — Except for scientific or educational purposes or for propagation, it shall be unlawful to take or catch fry or fish eggs and the small fish, not more than three centimeters long, known as *siliniasi*, in the territorial waters of the Philippines. Towards this end, the Secretary of Agriculture and Commerce shall be authorized to provide by regulations such restrictions as may be deemed necessary to be imposed on the use of any fish net or fishing device, for the protection of fry or fish eggs: Provided, however, that the Secretary of Agriculture and Commerce shall permit the taking of the young of certain species of fishes known as *ipon*, and other species under such restrictions as may be deemed necessary.

Fisheries and Administrative Order (FAO) 167 Series of 1989

Subject: Establishing a closed season for the conservation of sardines and herrings and mackerels in the Visayan Sea.

Sardines and herrings shall include the following species of fish belonging to the family *Clupeidae* and known under the following scientific and local names: *Sardinella fimbriata*, fimbriated sardines, *tunsoy, laolao, tabagak, tamban, Iiryan;* Sardine/*la perferata*, deep-bodied herrings, *halobaybay, tamban, lapad, tamban lison, lapa;* sardine/*la longiceps*, Indian sardines, *tamban tunsoy, haul-haul; Dusumieria acuta*, round dwarf herring, *tulis, balantiyong, and hilos-hilos.*

Mackerels shall mean species of fish belonging to the family *Scombridae* and known under the following scientific and local name *Rastrelliger brachysoma*, short-bodied mackerels, *hasa-hasa*, and *Rastrelliger chrysozonus*, striped mackerels, *alumahan* and *bulao*.

Fry of young sardines and mackerels shall refer to the fry or young of the species mentioned in Section 1 a) and 1 (b) above, and known under the local names of *lupoy, silinyasi, linatsay* or *manansi*.

Table 4-1. Local Legislation of two municipalities within the Verde Island Passage

Municipality	Ordinance No./Title	Policy
Lobo	2006-06	Prohibits fishing during spawning of pelagic and demersal of species of fish, including the catching, buying and selling of ***bangus*** fry, ***sabalis***, and ***tamak*** species at any time of the year Prohibits the catching of ***dulong*** during the months of March, April, May, and June for Brgys Banalo to Malabrigo
Calatagan	Fisheries Code of Calatagan	Prohibits catching/fishing of juvenile fishes and other species

Summary of Findings

1. There are existing laws and policies that prohibit catching of juvenile fishes. Even past laws have institutionalized such policies. The Fisheries Code of 1998, however, does not specifically refer to *dulong* fishing, but it is clear on the prohibition of fishing for juvenile fish species.
2. The IRR of RA 8550, particularly Sec. 89.2,

[4] Sec. 3 par. 21, RA 8550

[5] Act No. 4003 issued on 5 December 1932

offers a window to develop a policy on *dulong* fishing, since the rules specifically identify the prohibition of catching fish in the juvenile stage. The identification of the fishes which are in juvenile stage through the issuance of an appropriate administrative order is also a mandate of the said provision.

3. Although existing law defines fry, fingerlings, and juvenile fishes, the absence of provision clearly identifying which fishes are considered in their juvenile stage makes it impossible to regulate if not prohibit *dulong* fishing. Definition alone is not helpful, since there is a provision under the Local Government Code where fishing of fingerlings and fry are allowed, and these are hardly distinguishable from juvenile fish. Defining which fish "are by nature small but are already mature" under Section 89 of RA 8550 would also be helpful to rationalize the distinction between fry, fingerlings, and juvenile fish.
4. The existence of site-specific ordinances within the VIP is a fertile ground to develop the policy on *dulong* fishing, since its implementation can draw from practices and experiences on the ground, which could later inform the policy to be developed.

Recommendations

The policy proposal for *dulong* fisheries could be in the form of an administrative order that will define and operationalize the following provisions of RA 8550:

(1) identification of fish which are in the juvenile stage;
(2) identification of fish which are by nature small but are already mature; and
(3) identification of the conditions and manner by which access (regulation or prohibition) to such fish species could be allowed for fishers, whether municipal or commercial.

CI Philippines/P. Premme

SECTION 5

CI Philippines/R. Geronimo

The Big Picture

Synthesis of Findings and Recommendations

By Rollan C. Geronimo

CI Philippines/P. Premme

This section summarizes the main conclusions from the different studies commissioned by CI through the CTSP for improved understanding of *dulong* fisheries in the Verde Island Passage. The main conclusions and recommendations can be found in Table 5-1.

Dulong fishing is a significant industry in the Verde Island Passage. Total annual production is estimated to be at least 573 metric tons (mt) for Batangas province alone, with a total value of Php 38 million. By comparison, the 2010 total landed catch by municipal and commercial fishers in Batangas for anchovies, Indian mackerel, Indian sardines, and round herring were 210 mt, 1,171 mt, 2,673mt, and 135 mt, respectively.

Based on samples of *dulong* catches from San Juan, Batangas, *dulong* is composed primarily of post-larval to juvenile stages of fish species under the families *Clupeidae* (64%) and Engraulidae (34%).[6] Half of the *dulong* catch in San Juan, Batangas is composed of species *Herklotsichthys quadrimaculatus* or Bluestripe herring. This species is not commonly caught and reported in Batangas, based on information from the Bureau of Agriculture Statistics. It is possible that *H. quadrimaculatus* might be mixed with small pelagic catches of artisanal fishers. It is reported to be less resilient to fishing impacts compared to others species in the family *Clupeidae*. The genus *Stolephorus* dominates the engraulid composition of *dulong* catches. Post-larvae and juvenile stages of other fish families (e.g., reef associates) were also mixed with the *dulong*, but their amount is small compared to the clupeids and engraulids. Still, given the limited fecundity of these fish families and the volume of catch, the absolute numbers of these families could seriously impact their adult sub-populations later on.

The market chain for *dulong* is relatively short. Demand for the fish is high, as evident from interviews with vendors who attest that *dulong* always sells out before noon. Middlemen profit the most from catching *dulong*, although daily shares of fishers during peak season are well above the average daily fishing income of most fishers. At least 300 fishing households depend

[6] Although the samples for the taxonomic identification work were collected from catches of *dulong* fishers in San Juan, Batangas, the fishing grounds represented by the samples include the coastal waters of the adjacent municipality, Lobo, and San Juan itself.

on this fishery in 10 coastal municipalities of Batangas province. Many of these fishers report that they learned the trade from their fathers and grandfathers.

While the Philippine Fisheries Code or RA 8550 prohibits the use of fine-mesh nets and the catching of fry and fingerlings of fishes, except for those that mature at a small size, the Local Government Code gives local governments authority to provide permits to municipal and small-scale fishers to gather fry and fingerlings. However, a meeting with the director of DA-BFAR settled the issue, when he stated that the *dulong* fisheries are fully prohibited under RA 8550 and any form of management (e.g., seasonal closures, catch restrictions, etc.) that allows the catching of *dulong* would contradict the national law. Strictly speaking, the *dulong* fishery is banned in the Philippines, but the director of DA-BFAR himself acknowledges the complexity of the issue. He recommends starting with intensive advocacy campaigns aimed at correcting misinformation—mainly, that the *dulong* are mature small fishes. It is hoped that such corrections will underscore what steps must be taken towards more sustainable management of the country's *dulong* fisheries, for the ultimate benefit of human communities.

Study		Main Conclusions	Main Recommendations
Extent and catch monitoring *Rollan Geronimo*		• Dulong fishing occurs in most coastal communities in Batangas province and selected municipalities in Oriental Mindoro and Occidental Mindoro. • At least 170 *pasigabo* (scoop nets with lights) boats and 160 *pukot* (modified beach seines) exist in 10 coastal communities in Batangas. • Annual production of 20 *pasigabo* fishers in San Juan reached 60 metric tons in 2010, valued at Php 4 million. • Extrapolating, annual *dulong* catches for Batangas province in 2010 could have reached 573 metric tons worth Php 38 million.	• Continue catch monitoring of dulong fisheries and expand to other major fishing areas or municipalities in the Verde Island Passage. • Expand coverage of catch monitoring to include small-scale and commercial fisheries that catch the adult fish stages of *dulong*. • Develop a community-based and low cost method for sustaining fish catch monitoring in main *dulong* fishing municipalities.
Taxonomic composition of dulong from San Juan, Batangas *Dr. Wilfredo Campos*		• Almost all fish caught by the *dulong* fishery in San Juan, Batangas are early to late-stage larvae (bulk of cathces between 15 and 25mmin standard length. • 64.5% *Clupeiadae*, 34.1% *Engraulidae*. • 56% of the total catch is *Herklotishthys sp.* • 8% are either from *Amblygaster* or *Sardinella* genus • At least four species of Engraulidae: *Stolephorus sp.*, *Engraulis sp.*, *Thryssa sp.*, and *Encrasicholina sp.* • Other non-clupidae/engraulid species were observed in *dulong* catches during the summer season (e.g. Match to May). • Catching large amounts of *dulong* reduces the food source of other species. Furthermore, excessive catches could lead a reduction in stock abundance, although proving or quantifying this is not simple and straightforward.	• An extended study should include other major dulong fishery areas further west of San Juan, Batangas. Additionally, the taxonomic identification of larger (older) sardines and anchovies caught by purse seines and other gear types should be checked., to find out if what is being caught in *dulong* fishery are the same species. • Treat the *dulong* fishery as an integral part of small pelagic fisheries because their catches consist primarily of clupeids and anchovies. • Determine the species composition of small pelagic fisheries as well as the spatio-temporal distribution of catch and effort. • Examine the population biology of local stocks od small pelagic resources.
Market study of *dulong* fisheries in San Juan, Batangas *Rina Maria P. Rosales*		• Total income for all *dulong* players in San Juan = Php 350,554– Php 622,452 per day • Total annual value of *dulong* fisheries from catches in San Juan=Php 28,463,181–Php 51,290,564	• In order to come up with a sound policy for *dulong* fisheries in a corridor-wide scale, it might be useful to conduct a value chain studies later on, specifically with the VIP than harvest *dulong*.
Dulong in National and local legislation *Atty. Mario Maderazo*		• RA 8550 does not specifically refer to *dulong* fisheries, but it is clear on the prohibition of fishing of juvenile fish species. • Confusing definitions under which *dulong* falls: ▪ Fish fingerlings—stage in life cycle of the fish measuring about 6–13 cm depending on the species (DAO 3, IRR of 8550) ▪ Fish Fry—a stage at whcih a fsh has just been hatched, usually with sizes of 1–1.25 cm (DAO 3, IRR of 850) ▪ Juvenile fish—small sized and sexually immature fish (or within maturity stages I and II or GSI<4 (FAO 237) • If *dulong* is classified as a "juvenile fish," then catching it is prohibited by RA 8550. However catching "fry" is allowed by RA 7160 or the local government Code [Section 149, (b), (1)]. • The IRR Rule 89.2 for RA 8550 states that an FAO should be issued on fishes considered juvenile stage, and penalizing possesion thereof.	• The policy proposal for dulong fisheries could be in a form of an administrative order that will define and operationalize the following provisions of RA 8550 ▪ Identification of fish which are in juvenile stage. ▪ Identification of fish which are by nature small but are already mature. ▪ Identification of conditions and manner by which access (regulation or prohibition) to such fish species could be done by fishers, whether municipal or commercial.

CI Philippines/P. Premme

Annexes

Annex 1

Table A-1. Results of interviews of fishers in coastal barangays in Batangas province (surveys conducted by Rollan Geronimo, CI-CTSP consultant)

Barangay	No. of *Dulong* Fishing Boats	Presence of *Don Pilas* Fishing	Fishing Areas for *Dulong*	Other Notes
Batangas City (*dulong* fishing is open and allowed)				
Brgy. Sta. Rita	None	Yes	n/a	Based on interview with Gerardo Peralta, CRM Officer of the Office of the City Veterinary and Agricultural Services (Batangas City)
Brgy. Sta. Clara	None	Yes	n/a	Interviewed fisher: Rafael Roque and Kgd. Derick Arago Used to catch *dulong*, but were driven away by the large ships. There are don pilas fishers using largarete (drift gill nets) but they say there have been no don pilas for almost one year now.
Brgy. Cuta	None	No information	n/a	Only few fishers, according to G. Peralta
Brgy. Wawa	None	Yes	n/a	Fishers using largarete and bag nets, according to G. Peralta
Brgy. Libjo	None	No information	n/a	From G. Peralta
Brgy. Tabangao Aplaya	None	No information	n/a	"Mixed" fishing gear, according to G. Peralta
Brgy. Pinamucan Ibaba	None	No information	n/a	Primarily hook-and-line, according to G. Peralta
Brgy. Pinamucan	None	No information	n/a	Primarily hook-and-line, according to G. Peralta
Brgy. Simlong	7 boats (pasigabo)		In front Brgy. Ilihan	There are *dulong* fishers in Puerto Galera *Dulong* fishers found also in Brgy. Dela Paz
Brgy. Mabacong	None	None	n/a	Hook-and-line fishers
Brgy. Pagkilatan	No information	No information	n/a	
Brgy. Ilihan	2 boats (pasigabo)	No information	n/a	
Brgy. Dela Paz	9 boats (pasigabo)	No information	Brgy. Ilihan to Brgy. Dela Paz	
Brgy. Dela Paz – Pulot Aplaya	None	No information	n/a	
Brgy. Talahib Pandayan	19 boats (pasigabo)	None	Brgy. Ilihan to Brgy. Banalo (Lobo)	Noted that there are many *dulong* fishers in Brgy. Lagadlarin (Lobo) Fish for *dulong* all year-round Catch *dulong* and tamak Main *dulong* fishing barangay in Batangas City There is a buyer who gathers *dulong* catches and sells them in Calapan.
Verde Island barangays	None	No information	n/a	According to G. Peralta
Lobo (*dulong* fishing is open and allowed)				
Brgy. Banalo	7 boats (pasigabo)	No information	Brgy. Banalo to Brgy. Masaguitsit	Peak season: December-February Currently low catch No catch of don pilas for more than two years
Brgy. Masaguitsit	1 boat sighted	No information	Don pilas fishing ground from Brgy. Talahib to Brgy. Biga (Lobo)	No don pilas catch for the past three years Blame the decline in fish to the NAPOCOR plant
Brgy. Fabrica	n/a	n/a	n/a	No coastline, according to fisher interviewed in Brgy. Banalo
Brgy. Lagadlarin	35 boats (25 sighted) (pasigabo)		Brgy. Dela Paz (Batangas City) to Brgy. Olo-olo	Low catches Peak *dulong* season: December-February
Brgy. Olo-olo	1 boat (pasigabo)	None	Just in front	
Brgy. Sawang	6 boats (3 sighted) (pasigabo)	Yes (*pangulong* gear)	Brgy. Sawang to Brgy. Soloc	Pangulong are large commercial fishing boats with nets that catch sardines.
Brgy. Soloc	3 boats (pasigabo)	None	In front	
Brgy. Malabrigo	5 boats (pasigabo)	Yes (*pangulong* gear)	Brgy. Soloc to Brgy. Balibago	
Brgy. Balibago	6 boats (pasigabo)	No information	In front	
Brgy. Biga	No information	No information	No information	This was identified as an area frequented by *dulong* fishers from San Juan, but it was difficult to access the barangay.
San Juan (*dulong* fishers sometimes apprehended, but no clear ordinance)				
Brgy. Hugom	30 boats (pasigabo)		Brgy. Biga (Lobo), Brgy. Imelda, Brgy. Bataan, Brgy. Nagsaulay, Brgy. Subuquin	
Brgy. Laiya-Aplaya	16 boats (pasigabo)			
Mabini (*dulong* fishing is open and allowed)				

Barangay	No. of *Dulong* Fishing Boats	Presence of *Don Pilas* Fishing	Fishing Areas for *Dulong*	Other Notes
Brgy. Gasang	10 boats (9 sighted) (pasigabo)	Yes, but not this year	Brgy. Mainit to Brgy. Talaga Proper	Interviewed the wife of Ka Nestor Austria Don pilas fishers selling their gear due to marked decline in catch Dilis suddenly increased in volume from January to February 2010 Mabini fishers not allowed in Tingloy Don pilas fishers in Brgy. Maniaga, Calamias, and Bulacan
Brgy. Bulacan	None	5 boats; don pilas fishing just in front of the barangay		Five months without don pilas catch already When it peaks, a lot are wasted/spoiled. There are no fish processing techniques employed (e.g., making fish paste or bagoong)
Brgy. San Teodoro	5 boats (sighted 1) (pasigabo); 1 boat is also used as a dive boat		Tingloy municipality Brgy. San Teodoro to Brgy. Gasang	
Brgy. Mainit	7 boats	None	No information	Peak season for *dulong*: November-February February to October: gulyasan or tulingan (skipjack tuna) Beach seine not allowed
Brgy. Calamias	None	Approximately 100 small boats	In front	Don pilas not seen in one to two years already Fishers blame commercial fishing boats from San Juan, Lucena, Mindoro, and Calaca
Taal				
Brgy. Butong	None	Yes but no count	n/a	Tamban fish missing for a few months already During November, top catches include gulyasan, yellowfin tuna, sailfish
Lemery (*dulong* fishing is open and allowed, using beach seines)				
Brgy. Wawa	None	None	n/a	Area referred to as Parola District # 1
Brgy. Maligaya	20 boats (beach seine)	Yes	Brgy. Talisay (Calaca) to Brgy. Balite (San Luis)	*Dulong* catches peak in November-March, but still low catch as of November 2010
Brgy. Anak-Dagat	2 boats (sighted) (beach seine)	Yes; don pilas caught offshore, in the middle of Balayan Bay		Don pilas peak season: November-March Problems in garbage, water quality and NAPOCOR cited as causes of sudden decline in don pilas and tamban catches Very few *dulong* catches this year, according toAlex dela Luna (fisher) Usually, *dulong* peaks December-May
Brgy. Sambal Ibaba & Brgy. Sambal Ilaya	Estimate >50 (beach seine)	Yes (pukot); estimate > 50	In front	
Brgy. Malinis	None	None	n/a	
Brgy. Nonong Casto	4 boats (beach seine)	None	In front	
Brgy. Balanga	None	No information	n/a	
Calaca (*dulong* fishing is open and allowed, using beach seines)				
Brgy. Sinisian	None	No information	n/a	
Brgy. Salong	6 boats (beach seine)	No information	In front	
Brgy. Talisay	16 boats (beach seine)	3 boats; Brgy. Sinisian to Brgy. Cababalang	*Dulong*: Brgy. Talisay to Brgy. Nonong Casto	Don pilas fishers from Calaca not allowed to enter Lemery
Brgy. Camastilisan	7 boats (beach seine)	Approximately 200 boats (largarete or drift gill nets)	In front	
Brgy. Quisumbing	9 boats (beach seine)	70+ boats	In front	Peak of *dulong* season: November-March Interviewed Kgd. Guillermo Hernandez Kgd. Hernandez is requesting assistance from CI to manage their fishery and coastal resources (mobile no. 0939-8295858; address: 195 Brgy. Quizumbing, Calaca, Batangas)
Brgy. San Rafael	None	3 boats	n/a	
Nasugbu (*dulong* fishing is open and allowed, using beach seines)				
Brgy. Bucana	None	None	In front	Seldom catch *dulong* due to large mesh size of beach seine – Jun Ayala (fisher) Fishers in Brgy. Wawa were identified as using illegal fishing gears and large boats
LIAN				

Barangay	No. of *Dulong* Fishing Boats	Presence of *Don Pilas* Fishing	Fishing Areas for *Dulong*	Other Notes
Brgy. San Diego	None	None		There are *dulong* but these are not caught Barangay officials have prohibited fishing using gillnets near shore Most boats use handlines and fish a bit further out to the sea Residents say they still have a lot of fish *Dulong* fishing used to be allowed (1980s) Nicolas Kaisip, a volunteer in the DENR Pawikan Conservation Program, said that the reason they still have lots of fish is because they don't catch the fry and small ones. *Dulong* is eaten by don pilas (herring), salay-salay (trevally), and alumahan (Indian mackerel), which is eaten by tulingan (frigate tuna), and which is in turn eaten by layag-layag (sailfish). There used to be lots of don pilas (herring) in their area, but these disappeared in the 1980s No *dulong* and don pilas (herring) fishers in Lian
Balayan (*dulong* fishing is open and allowed, using beach seines)				
Brgy. Palikpikan	10 boats (beach seine)	Approximately 50 boats (Brgy. Talibayog + Palikpikan + San Piro)	In front	Peak *dulong* season: August-September Five years without don pilas Pangulong are affecting their fish catch
Brgy. San Piro	6 boats (beach seine)	None	In front	No *dulong* recently
Brgy. Navotas	1 boat (beach seine)	None	In front	
Brgy. 10	None	None	n/a	
Brgy. 4	None	None	n/a	
Brgy. 8	9 boats (beach seine)		In front	
Brgy. San Juan	12 boats (beach seine)		In front and in Brgy. Carenahan	*Dulong* peak season:March-April Don pilas usually peaks in December Most of the beach seines are docked in Brgy. Carenahan
Brgy. Carenahan	1 boat (beach seine) owned by resident of Brgy. Carenahan		In front	Other beach seine in Brgy. Carenahan are owned by residents of Brgy. San Juan Don pilas has disappeared for almost eight months already Taksay/basing (bag nets) are catching the don pilas before they come close to shore
Brgy. Gimalas	None	None	n/a	Fishing not allowed

Barangay	No. of *Dulong* Fishing Boats	Presence of *Don Pilas* Fishing	Fishing Areas for *Dulong*	Other Notes
Brgy. Baclaran	5 boats (beach seine)	None	n/a	Based on interview with Bantay Dagat

Annex 2

FISH CATCH MONITORING FORM FOR INDIVIDUALS FISHERS						
Pangalan ng mangingisda:						
Lugar/Barangay				Buwan at Taon:		
Magtala ng hindi bababa sa limang (5) araw na pangingisda sa bawat buwan. Siguraduhin na ilista pa rin kahit walang nahuli sapagpalaot (ilista pa rin kahit '0' ang timbang (kilos)						
	Ilista ang huli kada labas ng pangingisda					
	1	2	3	4	5	
Petsa at oras ng paglabas						
Uri ng pamamlakaya o panghuli						
Bilang ng tao sa bangka						
Lugar ng pinagisdaan						
Kumusta ang panahon: mahangin/ maalon/maayos						
Petsa at oras ng pagbalik						
Mga uri ng isdang nahuli	Timbang	Timbang	Timbang	Timbang	Timbang	Presyo kada kilo
Pangkalahatang huli (Total kilos)						
Bilugan ang bawat petsa na ikaw ay nangisda 1 2 3 45 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31						

Annex 3

MARKET STUDY OF DULONG FISHERIES IN SAN JUAN, BATANGAS
Conservation International-Philippines
Survey Questions
Survey of Dulong Fishers and Processors

QUESTIONS ON HARVESTING ACTIVITY (for *Dulong* Fishers Only):

1. What months do you typically catch *dulong*?_____
2. How often do you catch *dulong*?
_____times/week _____times/month
3. How many hours do you spend catching *dulong* per trip?_____
4. Do you hire other people in harvesting *dulong*? How many, and how much do you pay them?

No. of Hired Laborers	Designation	Working Hours/Trip	Labor Cost/Unit

5. What are your variable costs/trip?

Cost Item	Quantity	Unit Cost

6. What equipment do you use in catching *dulong*?

Equipment	Quantity	Unit Cost	Econ Life

7. How many of you in this barangay/municipality/province are catching and selling *dulong*? _____

8. Production information

a. What is your average catch (kilos) per trip? _____

b. How many kilos do you consume? _____

c.How many kilos do you sell? _____

9. Do you sell the *dulong* catch directly after being caught, or do you process it before being sold?

IF SOLD DIRECTLY AFTER BEING CAUGHT:

10. How much is your selling price per kilo? _____

11. Where do you sell your catch?

a. Direct in wet market

b. Buyer who sells in wet market (no. of buyers)

c. Fish broker, contact details: (no. of brokers)

d. Other (indicate): _____

Buyer Details

Name	Location	Contact details if any

12. If fish broker buys your catch, who does the broker sell to?

_____

13. How does your catch get to the market?

[ ] 1. I take my catch to the market

Mode of Transport	Cost	Location of the market	Length of time to get to market

[ ] 2. Buyer/broker picks up my catch.

2.a. How long is the transaction? _____

[ ] 3. Other/s. Please indicate:_____

Mode of Transport	Cost	Location of the Market

DULONG PROCESSING:

14. What months do you usually process *dulong*?_____

15. How often do you process *dulong*?

_____times/week _____times/month

16. Where do you get/buy the *dulong* that you process?

Name	Location	Municipality

17. How much do you buy the *dulong* per kilo? _____

18. How many kilos do you usually buy? _____

19. What processing activities do you perform? Enumerate each step, how long, how many people involved.

Processing Activity	Duration			Location	No. of People Involved
	Hrs/Day	Times/Wk	No. of Mos.		

20. What are the inputs you use? Cost per input?

Input	Quantity	Unit Cost

What equipment do you use in processing *dulong*?

Equipment	Quantity	Unit Cost	Econ Life

How much do you sell the processed *dulong* for (indicate unit)? _____

How often do you sell processed *dulong*? _____

Where do you sell the processed *dulong*?

Direct in wet market

Buyer who sells in wet market (no. of buyers)

Middleman, contact details: (no. of middlemen)

Other (indicate): _____

Buyer Details

Name	Location	Contact details if any

How does the processed *dulong* get to the market?

[ ] 1. I take the processed *dulong* to the market

Mode of Transport	Cost	Location of the Market	Length of Time to Get to Market

[ ] 2. Buyer/broker picks up the processed *dulong*

2.a. How long is the transaction? _____

[ ] 3. Other/s. Please indicate: _____

Mode of Transport	Cost	Location of the Market

Annex 4

Computation Details

1. The following assumptions were made for the computation of revenues, costs, and net Incomes:
2. One boat per broker
3. One boat per commissioner
4. Five crew members per boat
5. Small boats can only carry one fisher
6. Total number of boats in San Juan is 46 based on the November 2010 Report for the Coral Triangle Support Partnership Project by Rollan C. Geronimo
7. Based on the above assumptions there are 12 boats total for seven brokers and five commissioners. Thus, it is also assumed that there are 34 small boat owners.
8. Harvest is seven days per week for the entire three-month season as per personal interview with Ms. Eva Javier, one of the brokers.
9. Conversion units are as follows:

No.	Units	Kilos
1	*timba*	20
1	*banyera*	50
1	*styro*	50
1	*cooler*	50
1	*kuba*	5

Revenues and Costs

Revenue per player per day is computed based on the reported quantity sold per day and the reported selling prices.

Cost has two categories: *dulong* cost and other costs. Other costs are composed of the fixed costs and variable costs of each player. These costs include hired labor, transportation costs, ice, plastic, food, market labor, gasoline, bulb, oil, repairs, and nets. *Dulong* cost applies only to those players who buy *dulong*: the commissionerss, resellers, fish dealers, and market sellers.

Annex 5

Meeting on the dulong fisheries with DA-BFAR
Minutes of the Meeting
BFAR Office, 3rd Floor, PCA Bldg., Diliman, QC
17 April 2012
2:30 pm – 3:27 pm

Background and meeting objectives:

Dulong is a collective term in the Philippines commonly used to describe a set of small fishes caught in the marine and freshwater environments using fine-mesh nets (i.e., mesh size less than 3 cm). *Dulong* fishing is extensive around the Philippines, but there is very limited information on the actual composition of this catch and its status.

There is current perception among fishers that *dulong* are mature but very small fishes, different from their other catches. If these fishes are actually post-larvae or juveniles of other fishes, high extraction rates can significantly affect the population of the species and reduce adult catches. Larvae and juveniles of other fishes (e.g., coral reef fishes) might also be caught in the fine-mesh nets. Determining the catch composition of *dulong* fishing is a first step towards identifying management options to ensure sustainability of their populations.

The objectives set by CI-Philippines / CTSP for the meeting with DA-BFAR were to:

Present the results of taxonomic identification of *dulong* and the socioeconomic impacts of its fishery

Seek BFAR's guidance on management options for this fishery

Summary of major meeting points and next steps:

According to Dir. Asis G. Perez, the use of fine-mesh nets for catching *dulong* and the character of *dulong* catches as juvenile fishes make this fishery illegal, based on RA 8550 or the Fisheries Code of 1998. As such, no local management policies can be ratified without contradicting the RA 8550 provisions.

The production of the fishery is huge (more than 60 mt/year for 20 fishing boats alone) and is scattered across the country. But the fishery is within municipal waters, and falls under the jurisdiction of local governments, which is outside BFAR's mandate. Despite this limitation, BFAR will support local governments in the implementation of the law in municipal waters.

Given the results presented by CI-Philippines, Dir. Perez believes that there is now enough information to increase advocacy work to stop the catching of these juvenile fishes. The first step in the advocacy work can start with informing the fishers that *dulong* are actually sardines and anchovies in their juvenile stages, an important fish resource. Dir. Perez emphasized that no new policy is needed to regulate the *dulong* fishery.

Dir. Perez also recommended presenting the results to a bigger body (e.g., mayors in the League of Municipalities

of the Philippines or LMP). Values should be extrapolated beyond the 20 fishing boats monitored.

Dir. Perez designated Mr. Jonathan O. Dickson, Chief of the BFAR Capture Fisheries Division, as point person on the issue for DA-BFAR.

Attendance:

1. Dir. Asis Perez
2. Gil Adora
3. Sammy Malvas
4. Sandra Victoria R. Arcamo
5. Nelson A. Lopez
6. Luri L. Labe
7. Pilar F. Fontelar
8. Dennis Tanay
9. Jermaine I. Lacsamana
10. Jonathan O. Dickson
11. Rollan Geronimo
12. Evangeline Miclat
12. Anna Cubos
14. Dir. Romeo Trono

Pre-presentation discussion:

Dir. Romeo Trono of CI-Philippines started the meeting at 2:30 pm with an introduction on the *dulong* study being conducted by CI in the Verde Island Passage. Dir. Trono shared that about 99% of *dulong* caught in San Juan are juveniles from nine commercially important families of fish. He also expressed that he is looking forward to the use of the presented information in BFAR's policies and conservation work.

Dir. Asis Perez commented that he thinks this fishery exists not only in Batangas, but all over the country. He said that they already know that what people are calling *dulong* are not *dulong* per se, but are indeed juveniles, and added that they already have a policy for this and that there are no new policies needed—it's just a matter of implementing those policies.

Endnotes

[1] *Dulong* fishing occurs very near the shore. Interviewed fishers note that their fishing grounds are often no more than one kilometer from shore.

[2] Refer to Annex 4 for the computation details.

[3] Frequency of harvest is seven times a week for the entire season, based on personal interview with Ms. Eva Javier, one of the brokers in Laiya.

[4] Sec. 3 par. 21, RA 8550

[5] Act No. 4003 issued on 5 December 1932

[6] Although the samples for the taxonomic identification work were collected from catches of *dulong* fishers in San Juan, Batangas, the fishing grounds represented by the samples include the coastal waters of the adjacent municipality, Lobo, and San Juan itself.

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Section 4

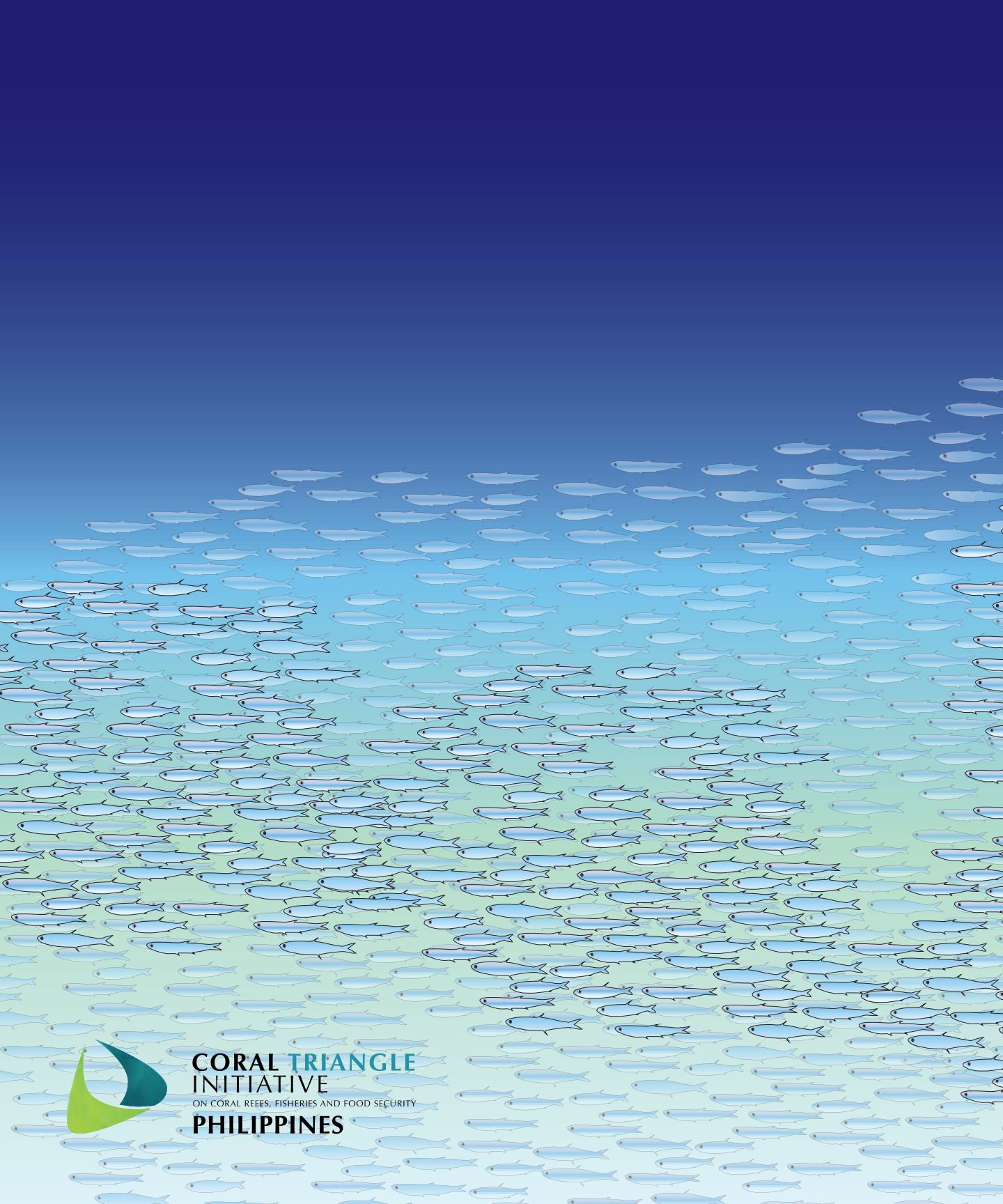
Compilation of the Republic Act No. 8550, its Implementing Rules and Regulations and the corresponding Fisheries Administrative Order, Bureau of Fisheries and Aquatic Resources (BFAR)

Fisheries Code of the Municipality of Calatagan, Batangas.

Fisheries Code of 1998 (Republic Act 8550)

Local Government Code of the Philippines (Republic Act 7160)

Revised Municipal Ordinance No. 2006-06, An Ordinance Regulating Fishing and/or Fisheries in the Municipality of Lobo, Batangas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