

# Catch Per Unit Effort (CPUE) of Bivalves in Northwestern Bohol, Philippines

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**Abstract**— Catch Per Unit Effort (CPUE) is a measure of status of marine resource in a given area. In this study, bivalve fishery information was gathered using the self-structured questionnaire. There were 61 respondents who were the registered fishermen of Calape, Tubigon and Clarin. Among the three towns it was Clarin where highest mean CPUE was observed with 1.2kg/hr/man. This was followed by Calape with 0.8kg/hr/man and lowest mean CPUE was recorded in Tubigon with 0.6kg/hr/man. High CPUE value means that there are still enough bivalve resources in the area and lowest CPUE means that these resources are endangered. Considering that, the result of this study showed that there is a need to regulate the collection of bivalves with lower wild stocks to avoid loss of these natural resources.

**Keywords**— Collection, Gleaning Mangroves, Seagrass and Wild stocks.

## I. INTRODUCTION

Bivalves community as part of benthic organisms is considered as an efficient tool of marine fishery assessment. They belonged to mollusks phyla which was considered as the most abundant marine organisms (Subba Rao, 1993). Bivalve species can be found all around the globe in variety of environments, from the poles to the tropics. Over such array, environmental conditions vary such as water temperature, dissolved oxygen, salinity and potential hydrogen. These differences influenced growth, reproduction and survival but on the other hand, it limits their distribution.

They are ecologically important since they served as a bio indicator for water pollution. Although, they mostly thrive in clean waters but some species would occur in polluted waters (Medeiros, 1997). They are suspension feeders and these feeding strategies pose different problems with respect to threshold levels of environmental stress (Calebrase et al., 1984). Economically, they are harvested for food and livelihood resource. As a matter of fact, out of total harvested aquatic resources, about 10% of annual food was consumed through bivalve harvesting (Roberts, 1999). They are also very important in shell industry.

In the Philippines, majority of the population live in coastal areas with livelihood mostly involving fishing. Majority of coastal households (53%) are engaged in subsistence fishing particularly gleaning for invertebrates and small fishes. Gleaning is almost a daily activity done during low tide 2-3 hours and is largely confined to sea grass beds, rocky reef flats and occasionally along the edge of mangrove forests. It involves men, women and children with various ages. Most of the gleaners were engaged in this activity for 20-40 years while few have been gleaning for 50 years. Engagement is especially higher (60%–72%) in remote fishing villages and small islands with little access to other income sources (De Guzman et al., 2014).

In this regard bivalves which are one of the highly gleaned marine invertebrates were under shade of endangered species (Shainmugam and Vairamani, 2005). Hence, this study is necessary to know the volume of bivalves caught per gleaning operation in Northwestern,

Bohol to know the sustainability of these marine resource. The bivalves were collected in three towns specifically, Clarin, Tubigon and Calape comprising the Northwestern part of the province. These towns constitute 90% of bivalve fishing industry in Bohol because these are coastal municipalities. This study is vital to know the present condition of bivalves in the area.

## II. OBJECTIVES OF THE STUDY

This study generally aimed to determine the catch per unit effort of bivalves in the area. Specifically, it would compare the catch per unit effort of bivalve species caught in each town namely: Clarin, Tubigon and Calape. Species of bivalves will also be noted as well as the income per unit effort.

## III. MATERIALS AND METHODS

The information on bivalve catch in Northwestern Bohol Philippines was done by interview using the self-structured survey questionnaire in (Appendix A). The respondents of the study were the registered fishermen/gleaners in three towns. A total of 61 individuals were the respondents of the study. There were 21 respondents in Clarin, 20 in Tubigon and 20 in Calape respectively. Aside from face-to face interview, an actual field survey was also conducted. Randomly selected fishermen were selected to glean in the sampling area and they were timed from the start and end of gleaning activity.

## IV. DATA ANALYSIS

The Catch Per Unit Effort (CPUE) was determined using the daily total catch data as total weight in kilograms and daily fishing time spend for each collector. CPUE was computed using the formula of Bantoto and Ilano (2012):

$$\text{CPUE} = \frac{\text{Total weight of catch (kg)}}{\text{Total fishing time/hr/collector(man)}}$$

Income Per Unit Effort (IPUE) was calculated using the formula:

IPUE= CPUE (kg/hr-man)x buying price (Php/kg)

**V. RESULTS AND DISCUSSIONS**

There were six local names they used to know about bivalves (Table 1) such as “balisaha”, “amahong”, “tagnipis”, “punaw”, “sinao”, “silhi”, “imbao”, “wasay” and most common local term was “litob”. Each local term denoted different species such as for balisaha (*A.squamosa*), amahong (*M.philippinarum*), punaw (*Kataleysia recens* and *K.hiantina*), imbao (*A.corrugata*), wasay (*Pinna bicolor*, *P.muricata*, *Atrina vexillum* and *A.lamellata*). It was also noted that for some species of bivalves there were different local terms in each town just like in the case of *T.belcheri*, *Circe scripta*, *T.virgata*, *T.linguafelis* and *T. staurella* which in Clarin they were named as *tagnipis*, for Tubigon was *sinao* while in Calape it was *sihi*. However, for species not mentioned they termed it as *litob*.

The collection of these bivalves was done in the morning from 5am to 11 am by handpicking. Usually done, during low tide when water was clear and siphon of bivalve were easily seen for faster collection. Among the three towns it was in Calape and Clarin where high volume of catch was

observed. Although, the collection time is higher in Tubigon it appeared to have the lowest catch. This low value of .6 kg/hr-man Catch Per Unit Effort (CPUE) observed in Tubigon showed that there were decreasing number of wild stocks. This low CPUE value according to Luchavez and Abrenica (1997) means that there were relatively low wild stocks of bivalve in the area. Yet, there were other factors that affect its abundance which could be by environmental factors like physic-chemical parameters and habitat loss. Meanwhile, highest CPUE value was observed in Clarin with 1.2kg/hr-man which also showed more wild livestock of bivalves. This was followed by Tubigon with .6kg/hr CPUE value. The harvested bivalves were used both for consumption and sold in local markets. Frequent gleaners in Clarin have the highest Income Per Unit effort (IPUE) of 60 pesos per hour. This was followed by Tubigon (45 Php/hr-man) and Calape had the lowest IPUE of 40 pesos per hour. The number of hours of collection was highest in Tubigon and the price value of bivalves which inferred that collection of these economically important bivalves was their means of livelihood and they were dependent on them compared to that of Clarin and Calape.

Table 1. Information on the Bivalve CPUE in Bohol N= (61).

| Information                  | Collecting Sites  |   |   |
|------------------------------|---|---|---|
|                              | Clarin  | Tubigon   | Calape  |
| 1. Local Name                | Tagnipis- <i>C.scripta</i> , <i>T.linguafelis</i> , <i>T.staurella</i><br>Punaw- <i>K. recens</i> , <i>K.hiantina</i> ,<br>Litob- <i>A.granosa</i> , <i>S.cornea</i> ,<br><i>S.indica</i> , <i>G.tumidum</i><br>Balisaha- <i>A.squamosa</i><br>Amahong- <i>M.philippinarum</i><br>Imbao- <i>A.corrugata</i> | Sinao- <i>C. scripta</i> , <i>T.belcheri</i><br><br>Punaw- <i>K. recens</i> , <i>K.hiantina</i><br>Litob- <i>A.granosa</i> , <i>S.indica</i><br>Imbao- <i>A.corrugata</i> | Sihi- <i>C.scripta</i> , <i>T.belcheri</i><br><br>Punaw- <i>K. recens</i><br>Litob- <i>A.granosa</i> , <i>S.indica</i><br><i>S.cornea</i> , <i>G. tumidum</i><br>Wasay- <i>P.bicolor</i> , <i>P.muricata</i><br><i>A.vexillum</i> , <i>A.lamellata</i><br>Imbao- <i>A.corrugata</i> |
| 2. Collecting Site           | Brgy. Poblacion   | Brgy. Macaas  | Brgy. San Isidro  |
| 3. Method use                | handpicking/mata  | handpicking/mata  | handpicking/mata  |
| 4. Collecting hours          | 5am -8am  | 5am-11am  | 5am-8am   |
| 5. No. of hrs per collection | 3hrs  | 6hrs  | 3hrs  |
| 6. Frequency of collection   | 2-7x a week   | 3-7x a week   | 2-7x a week   |
| 7. Total kg/collector        | 1-10kg  | 4-6kg   | 2-10kg  |
| 8. Economic Importance       | consumption and sold  | consumption and sold  | consumption and sold  |
| 9. Place to Sell             | neighbor and local market   | local market  | local market  |
| 10. Price/kg                 | Php30-50kg  | Php 60-75kg   | Php40-50kg  |
| 11. Income/trip              | 30-100Php   | 240-360Php  | 80-500Php   |
| 12. Number of Collectors     | 1-6   | 3-5   | 5-10  |
| CPUE(kg/hr-man)              | 1.2   | .6  | .8  |
| IPUE(Php/hr-man)             | 60  | 45  | 40  |

**VI. CONCLUSION**

Catch per unit effort value of bivalves in Northwestern Bohol, Philippines is low considering the number of hours spent in the collection. This low yield will cascade on the low economic status of fishermen in the area. Thus, it is important that there should be law regulating the collection

of these commercially important bivalves for its sustainability.

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### Appendix A SURVEY QUESTIONNAIRE

Name:\_\_\_\_\_

Date:\_\_\_\_\_

Age:\_\_\_\_\_

1. How many times do you gleaned in a week?  
A)1 B)2 C) 3 D) everyday
2. What time of the day do you prefer to glean?  
A) 5am-6am B)7am-8am C)3pm-5pm
3. How many kilos of bivalves to you get every time in an hour of gleaning?\_\_\_\_\_
4. How much do you earn per kilo? \_\_\_\_\_
5. How many kinds of bivalves were you able to collect?\_\_\_\_\_
6. What are the local names of bivalves captured?\_\_\_\_\_
7. How many are you when you do gleaning activity?\_\_\_\_\_
8. What gleaning gear do you use?\_\_\_\_\_

Thank You!

The researchers