

ASSESSMENT OF THE FISHERY FOR MACRO-INVERTEBRATE GLEANING IN LAGONOY GULF: ALBAY SIDE

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Introduction

Lagonoy Gulf is a rich fishing ground in the east coast of Bicol bordered by the of provinces of Albay, Catanduanes and Camarines Sur covering 165 barangays with approximately 221.08 km of coastline with some 7500 fishers depending on multi-species fisheries for their livelihood and employment. Just like in any other fishing ground the Gulf's critical habitats have been reported to suffer heavy exploitation at an alarming rate due to anthropogenic activities. Thus, poverty and food security is one of the major concerns that cannot be ignored in coastal areas who depend on these resources for livelihood (Barut *et al.*, 2001 and Pelea, *et al.*, 2004, unpublished FRMP Report).

On the other hand, gleaning has been a traditional practice in many countries of the world, yet very little work has been done about the fishery for macro-invertebrates gleaning (Campus, *et al.*, 2005). Details or statistics of its contribution to livelihood and to total fishery are not known. The fact is most of the exploited species are sedentary or slow moving making it highly vulnerable to over-harvesting. A typical example is the overfishing giant clams (*Tridacna gigas*, *T. derasa*, and *Hippopus porcellanus*) in mid-1980's (Juinio *et al.*, 1989) and sea urchin fishery in Bolinao, Pangasinan (Talaue-McManus and Kesner, 1995). Having known of its importance and aware of the imminent danger of eventual depletion and extinction, the need for a responsive course of action becomes extremely urgent. On this basis, the aim of the present work is to come up with a better understanding of the status of gleaning and its implications to food security, livelihood and its contribution to the total fisheries.

Materials and Methods

The study made use of descriptive research to assess that status and implications of the fishery of macro-invertebrates gleaning in Lagonoy Gulf. Rapid Resource Assessment (RRA) techniques with field survey questionnaire as the main data collection tool. This was supplemented by biological datasets (i.e. biomass, catch volume density, size composition, etc.) from actual gleaning. KI interview and FGD was used to validate other relevant information.

Results and Discussion

Gleaners Profile

A total of 288 gleaners were identified in the three sampling sites; Natunawan cove (43%) , Sogod (40%) and Sagurong (17%). Majority (58%) of the gleaners are females and about 39.33 % of gleaners are children. Gleaning was undertaken in shallower reef flats, mud flats, sandy to rocky areas, sea grass including mangrove areas, hence their familiarity with the immediate coastal habitat. Similar observation was noted in Fiji where women have a wealth of knowledge on the marine environment (Vunisea, 1997). They use simple tools (i.e. stakes, rods, old bolo) use of senses and skilful utilization of fisheries knowledge.

Gleaning frequency reveals 6 to 10 days per month in Sagurong and Sogod while 16 to 20 days per months in Natunawan Cove. Apparently because of is the proximity to gleaning sites and timing for the lowest low tide where extensive gleaning areas are exposed. The target species are mostly invertebrates and the harvest either sold for cash or consumed by the family. Because invertebrates are lower down the food chain, they also serve as potential food of larger pelagic and demersal fish species; hence, the practice in turn may affect the more economically important species by “ecosystem over fishing” (Vina Ram-Bidesi (1997).

On the contrary, because this activities are simple and do not involve use of sophisticated equipment and technology, their impact is minimal. It can also be sustainable in the sense that the locations fished vary, target species vary and are usually seasonal, giving certain species time to regenerate.

Estimated Production Data

Harvest Volume and Rate

The harvest volume was estimated from the weight of the harvest in kilograms per gleaner and the harvest rate from the weight of the harvest per gleaner over time. The estimated harvest volume was based on a maximum of four (4) hours gleaning time which correspond to the duration of the low tide.

In merely seven (7) months the total harvest is 2,647.84 kilos. On the average, the harvest volume per gleaner based on 4 hours gleaning time was estimated at 9.28 kilos for Natunawan; 6.12 kilos for Sagurong and 1.73 kilos for Sogod. Observation also showed that invertebrate’s population and biodiversity varies with habitat with mud flats

having the highest yield (1,578.84 kilos) followed by the sea grass and reef flats (984.48 kilos) and lowest in rocky bottom (84.52 kilos). Finding also reveals a general declining trend in the gleaner's harvest over time. Drastic decline was attributed to the changing climatic pattern in the area resulting to heavy rainfall and flash floods.

Species Composition

In Natunawan a total of nine (9) species were collected, six (6) species belong to Mollusca, one to Echinodermata, another to Crustacea and the last to Brachiopoda. In Sagurong, five species were collected all belong to the phylum Mollusca. *Scapharca inequivalves*, *Paphia amabilis*, and *Pinna sp.* are common in mud flats and sea grass beds. Table 1 presents the species caught and percentage species Composition by sampling sites

Table 2. Scientific Names, English Name and Common Names of the Species Caught and Percentage Species Composition by Sampling Sites

Scientific name ¹	English name	Common name	Species Composition					
			Sogod		Natunawan		Sagurong	
			F	%	F	%	F	%
<i>Scapharca inequivalves</i>	Inequivalve ark	Kud-kud			0.76	6.95	1.69	15.78
<i>Codakia tigerina</i>	Tiger clam	Libud-libud					1.44	13.45
<i>Strombus spp.</i>	Conch	Liswik					1.27	11.86
<i>Paphia amabilis</i>	Lovely venus	Punaw/Halaan	0.69	27.60	0.63	5.76	1.12	10.46
<i>Pinna muricata</i>	Pen Shell	Sarad			0.22	2.01	0.82	7.66
<i>Gafrarium pectinatum</i>	Venus shell	Burugat			0.24	2.19		
<i>Crassostrea cuculata</i>	Oyster	Sisi			2.00	18.28		
<i>Mytilus edulis</i>	Blue Mussel	Tahong			0.59	5.39		
<i>For Identification</i>	For ID	Bugtay	0.56	22.40				
<i>For Identification</i>	For ID	Budbud	0.75	30.00				
<i>Telescopium telescopium</i>	Pond snail	Bagungon			0.52	4.75		
<i>Turbo reevei</i>	Turban shell	Buhuan	0.50	20.00				
<i>Polinices spp.</i>	Moon shell	Burubitoon			0.58	5.30	0.02	0.19
<i>Lingula unguis</i>	Lamp shell	Ugpan			1.06	9.69		
<i>Lambis lambis</i>	Common spider conch	Sahang					1.90	17.74
<i>Conus spp.</i>	Cone Shell	Tabo					0.36	3.36
<i>Trachycardium muricatum</i>	American yellow cockle	Karang karangan					0.12	1.12
<i>Ocypode cerathophthalma</i>	Crab	Bungkang			1.00	9.14	0.12	1.12
<i>Holothuria spp.</i>	Sea cucumber	Ik-Ik			1.08	9.87		
<i>Peneaus spp.</i>	Shrimp	Buyod			0.25	2.29		
<i>Scylla serrata</i>	Mud Crab	Hanitanit			1.00	9.14	1.00	9.34
<i>Portunos pelagicus</i>	Blue Crab	Kasag			1.00	9.14	0.85	7.94
<i>Anomalocardia squamosa</i>	Squamosse venus	Kagot			0.01	0.09		
Total			2.50	100	10.94	100	10.71	100

¹ Based on Guide to Philippine Flora and Fauna, Volume VI: Gastropods and Pelecypods by Rolando Garcia; Annelids by Filipinas S. Palpal-latoc, Natural Resources Management Center, Ministry of Natural Resources and University of the Philippines, Copyright 1986.

Density and Biomass

In Natunawan, six species were collected with a biomass of 2.46 g/m² and the density was 5.91 individual/m² indicating that the weight of the harvested species is smaller but with denser population in the areas.

Twenty two (22) species of macro-invertebrates were encountered in the San Miguel Island. Biomass is also highest in this area with 42.44 g/m² and the density was 0.42 individual/m², which implies that while the biomass of the species caught is high, while the species density is also low.

Contribution to Livelihood

Majority (68.38%) considers their harvest as source of additional income and the remaining 36.62% use it as an additional source of food. In the study of Quarto (2007), gleaning for shellfish during low tide represents food security not only for the family beneficiaries but for other residents as well.

Considering the monetary benefits from gleaning, with an average harvest of 5.71 kilos per gleaner, an estimated harvest of 1,027.8 kilos can be realized assuming a 15 days gleaning trip per months for 12 months a year. On an annual basis, the 288 gleaners can harvest about 296,006.4 kilos or 296 tons of macro-invertebrates per year valued at PhP 5,920,128.00 (128,063.68 US\$) at a selling price of PhP 20.00 per kilos (based on 1 US\$ = PhP 46.228) This translates roughly to an annual income of PhP 20,556 (444.66 US\$) per gleaner.

In area where gleaning is considered as additional income, gleaner can earn PhP1,713 (37.055 US\$) per month. On the other hand, in areas where most of the harvest is consumed, it means savings which can be used for other economic needs.

Given these benefits, gleaners are apprehensive of the decreasing harvest and the increasing gleaner's population as this in the future may in one way or another affect the sustainability of gleaning resources.

Conclusion and Recommendation

Gleaning is a subsistence fishing activity with economic and ecological significance. From economic standpoint, it directly and indirectly contributes to the total fisheries. At least 296 tons of macro-invertebrates valued PhP 5,920,128.00 (128,063.68 US\$) at a selling price of PhP 20.00 per kilo (based on 1 US\$ = PhP 46.228) is contributed by

gleaning. At the household level, they are either in the form of additional income or food source estimated roughly at PhP 20,556 (444.66 US\$) per gleaner annually.

From the ecological perspectives, since gleaning activities involve the use simple tools the impact of their fishing activities is likewise minimal. In addition, because the area fished and target species vary, it provides opportunities to some species time to regenerate. However, since most invertebrates are lower down the food chain and are potentially consumed by the larger pelagic and demersal fish species, the practice may in turn have an impact on economically important species by “ecosystem over fishing”. In-depth studies along this line should be explored.

The need for biodiversity conservation and management studies and the aspects associated with health and safety hazards is likewise recommended as input for planning and management to sustain the resource on a long-term basis.

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