



*Strengthening local capacity
in the economic analysis
of environmental issues*

The Economy and Environment Program for Southeast Asia (EEPSEA) was established in May 1993 to support training and research in environmental and resource economics across its 10 member countries (i.e., Cambodia, China, Indonesia, Lao PDR, Malaysia, Myanmar, Papua New Guinea, the Philippines, Thailand, and Vietnam.) It aims to strengthen local capacity for the economic analysis of environmental issues so that researchers can provide sound advice to policy makers.

EEPSEA Policy Briefs summarize the key results and lessons generated by EEPSEA-supported research projects, as presented in detail in *EEPSEA Research Reports*. *EEPSEA Policy Briefs* and *Research Reports* are available online at www.eepsea.org

Reef Gleaning in the Philippines: Does it Contribute to Poverty Alleviation and Nutrient Security?

Gleaning for edible seafood on shallow reef flats during low tides is an important form of subsistence fisheries in the Philippines. As yields from artisanal, gear-based fisheries continue to decline, coastal residents become increasingly dependent on gathering of invertebrates and seaweed to supplement family incomes and put food on the table. A new EEPSEA study, however, shows that reef gleaning contributes little to household income because of the low prices their catch are sold at and since more than half of the catch is retained for household consumption. Despite this, results suggest that coastal residents do not consume enough seafood to meet their daily protein requirement, probably because many would rather sell their catch in order to buy rice for the household. Still, many gleaners report that what they earn from selling their catch is barely enough to buy a few kilos of rice each day; results indicate that family income falls below the national poverty and subsistence thresholds, evidence that Filipino small-scale fishers remain the poorest of the poor.

On top of this, the study highlights that certain methods of gleaning are destructive and that overharvesting is fast depleting reef flat resources. Hence, the study calls for the formulation and implementation of sound management policies to save what is left of the invertebrate resources in reef flats as well as to sustainably support the food and income needs of marginal fishing communities in the country's coastal areas.



A summary of EEPSEA Research Report No. 2016-SRG1: 'Economics of Reef Gleaning in the Philippines: Impacts on the Coastal Environment, Household Economy and Nutrition' by Asuncion B. De Guzman, Zenaida M. Sumalde, Mariel Denerie B. Colance, Mierra Flor V. Ponce, Gemlyn Mar S. Rance. Comments should be sent to: Asuncion B. De Guzman, Gaia Resource and Environmental Consultancy Services, Purok 6, Poblacion, Naawan, Misamis Oriental, Philippines. Email: sonydeguzman@gmail.com.



Gleaning in Batasan Island, Tubigon, Bohol, Philippines (Photo credit: Asuncion B. De Guzman)

Gleaning as subsistence fisheries

Majority of the Philippine population live in coastal areas with livelihoods almost invariably linked to the sea. "Subsistence fisheries" is a form of artisanal fishing mainly for household consumption or that which earns very little income from selling a portion of the catch. Experts have recently declared that reef gleaning for invertebrates, small fish, and seaweed constitutes the only form of subsistence fishing in the Philippines.

To determine how much reef gleaning contributes to household economy and nutrition amidst widespread poverty of coastal communities as well as the potential damage this established and continual activity has on shallow coastal ecosystems, this study looked into the social, economic, and environmental aspects of reef gleaning in five popular gleaning areas in Mindanao and the Visayas: Laguindingan, Misamis Oriental; Kauswagan, Lanao del Norte; Lopez Jaena, Misamis Occidental; Cortes, Surigao del Sur; and Tubigon, Bohol. Particular focus was given to catch composition, catch-per-unit-effort (CPUE), revenues and income, poverty incidence, and

contribution of gleaned seafood to the daily nutrient intake of gleaning households.

Gleaners' profile and common practices

Reef gleaning is an almost daily activity in all five sites and is largely confined to seagrass beds and rocky reef flats but occasionally along the edge of mangrove forests. It involves men, women and children of various ages (from 4 to 91 years old). Most gleaners report having been engaged in this activity for 20–40 years while a few elderly women have been gleaning for more than 50 years.

The number of male gleaners generally exceed that of female gleaners in most sites surveyed,

which is contrary to previous reports that gleaning is mostly carried out by women and children. The increased male participation is perceived to be a consequence of declining catch from artisanal finfish fisheries or lack of viable employment or livelihood. Regardless, women often invest more effort (in terms of hours) and obtain higher CPUE than men. In some places, children also have increased participation in reef gleaning activities, spurred on by their parents in order to earn a little more to support their education.

Many coastal households (53%) are engaged in reef gleaning at varying intensities depending on season and lunar cycle. Engagement is especially higher (60%–72%) in remote fishing villages and small islands with little access



Gleaning sites surveyed in northeastern Mindanao and central Visayas

to alternative income sources. Many coastal households near town centers, on the other hand, have a wide range of livelihood opportunities and, thus, are less dependent (36%–48%) on gleaning. Depending on the target species, practices in gathering edible invertebrates from reef flats range from simple handpicking to using minor implements (i.e., scoop nets, knives, digging sticks, and rakes).

Catch composition and CPUE

A diverse assortment of invertebrates and small fish (at least 86 species) are gathered almost daily from the reef flats in the areas surveyed. More than 80% of the gleaners' daily catch comprise of gastropods, bivalves, and sea urchins while sea cucumbers and fish are quite rare. In many instances bivalves and sea cucumbers are collected at very small, or juvenile, sizes due to lack of regulation.

Spending an average of 2.3 hours each day, gleaners obtain a CPUE of 0.8–2.12 kg/gleaner per hour which amounts to a daily CPUE of 2.46–5.85 kg. These values are comparable to CPUE estimates obtained in other gleaning areas of the country such as in Batangas, Lagonoy Gulf, Negros and Panay Islands, and the Bohol Marine Triangle but are higher than that reported in the Danajon Bank of Bohol.

Contribution to household income

Across the five sites covered by this study, the average monthly income of gleaning households from all sources is estimated at PhP 6,170—lower than the national poverty threshold established by the Philippine National Statistics Coordination Board (NSCB) in 2012 at PhP7,821/month for a family of five members.

Poverty incidence among the coastal population in the five survey sites (55%–82%) is much higher than the national poverty incidence among fisherfolk (39.2%). A large portion of the coastal population in the survey sites lives in extreme poverty (38%–75%) with subsistence (food) incidence exceeding the national average of 13.4% (Table 1).

Revenue from gleaning barely makes a dent in the economy of the average coastal household in most areas. Only about 17% of gleaners across the five sites sell their entire catch; 31% engage in gleaning mainly for household consumption. Thus, the resulting estimates of daily gross revenues derived from 2–5 hours of gleaning are quite low (PhP 26–PhP 92/gleaner per day). An average daily revenue of PhP 54/gleaner converts to a monthly income of PhP 883, contributing very little (15%) to the household economy.

Contribution to household nutrition

The food intake and the nutritional value of the different kinds of food consumed by gleaning households (including seafood) were analyzed for the five survey sites using the food composition table published by the Philippine Food and Nutrition Research Institute (FNRI) as basis for comparison. It was found that coastal households generally have high energy (86.6%) and protein (85.9%) sufficiency levels. Cereals (mainly rice) are the main source of energy (mean of 80.8%) among coastal households in the study sites, a dependency that far exceeds the national average of 69%.

Seafood contributes 7.3% to energy intake and 33.9% to protein intake of the average coastal household. Much of the seafood eaten by coastal communities comprise of invertebrates obtained from gleaning, which contribute 30.6% and 24.7% of the energy and protein intake, respectively.

Clearly, although seafood forms an important part of the gleaner's household diet and is an essential source of protein for poor coastal communities, study results suggest that coastal residents do not consume enough seafood for their daily protein requirement. This is probably because many of them would rather sell their catch to supplement household income in order to buy rice for the household's daily consumption.

Table 1. Comparative poverty statistics among coastal households in the five survey sites

Poverty Parameter	Laguindingan	Kauswagan	Lopez Jaena	Cortes	Tubigon
Mean monthly income of gleaning HH (PhP)	5905.22	8229.00	6631.28	4740.00	5345.67
Mean monthly income of non-gleaning HH	7287.15	8619.26	7173.15	4765.33	7639.63
Mean monthly income of both gleaning & non-gleaning HH	6596.19	8424.13	6902.21	4752.67	6492.65
Poverty incidence (%) by family	62.79	48.94	70.21	82.14	69.05
Poverty incidence (%) by population	69.77	55.32	72.34	82.14	71.43
Subsistence incidence (%) by family	51.16	40.43	51.06	71.43	50.00
Subsistence incidence (%) by population	55.81	38.30	51.06	75.00	61.90

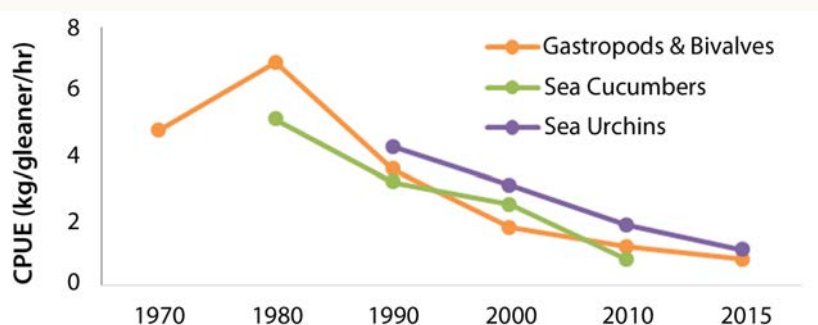


Figure 1. Catch trends of popularly gleaned seafood based on focus group discussions conducted in Laguindingan, Kauswagan and Lopez Jaena

Declining catch trend and environmental impacts

Invertebrate catches from gleaning activities have been declining through the decades in many traditionally popular gleaning areas in the Philippines. The work of Cabanban *et al.* (2014)¹ reported a decline in invertebrate catches by as much as 50%–70% in Negros and Panay islands in the Visayas. In the current study, gleaners observed that since the 1980s their invertebrate catches—mainly of gastropod and bivalves, sea cucumbers, and sea urchins—have steadily declined despite increased level of effort (Figure 1). Decline in gleaning yields can be attributed to increased effort and intensity, physical damage to shallow coastal habitats, and lack of management policies.

Some gleaning practices are potentially damaging to the environment, such as overturning of rocks, use of large digging blades, and the gathering of tiny or juvenile sea urchins and sea cucumbers. Most gleaners, however, do not consider their gleaning practices destructive to the reef environment while few admit that digging for bivalves can accidentally uproot seagrass and that reef trampling can destroy

corals and other animals sheltering in seagrass beds. These practices, if left unregulated, will threaten the natural resilience of these shallow, easily accessible resources, which are virtually unprotected by any statute and management intervention.

Conclusions and policy recommendations

Overall, the study found that, despite its marginal contribution to family income, reef gleaning is an indispensable source of protein and other vital nutrients for Philippine coastal communities. Lack of regulation, however, has contributed to the decline in invertebrate yields in many parts of the country.

To achieve the goal of sustainable gleaning fisheries the study puts forward some recommendations to manage and regulate it. Among those suggested is the registration and licensing of all resident gleaners as well as the regulation of the entry of gleaners from other municipalities. A viable “user fee” system for reef gleaning may also be considered.

Limits on the harvestable size for target species, such as high-value bivalves, sea cucumbers

and sea urchins, should also be implemented. Destructive methods of invertebrate gathering, such as digging mud clams by trampling in mangroves and seagrass areas, using digging blades to gather bivalves in seagrass beds, and overturning rocks, should be prohibited. Establishing a coastal zoning plan that identifies areas for gleaning and “no entry” zones as invertebrate reserve areas is also recommended. The implementation of such policy measures as well as the education of gleaning households on the importance of maintaining the health of shallow coastal ecosystems can be enhanced by implementing a collaborative and comprehensive information, education and communication (IEC) campaign among coastal communities.

Also recommended is the development of a viable alternative livelihood for coastal communities, preferably non-fishery based, in order to enhance supplemental income and help alleviate gleaning households from poverty. Species inventory and catch assessment of gleaning should also be integrated into the fisheries monitoring program of local government units, the Philippine Bureau of Fisheries and Aquatic Resources (BFAR), and academic institutions.

WorldFish Philippine Country Office, SEARCA Building, College, Los Baños, Laguna 4031
Tel/Fax: +63 49 501 7493

Email: admin@eepsea.net

For more information about opportunities available at EEPSEA and to download EEPSEA publications for free visit www.eepsea.org

¹Cabanban, A.S.; I.J. Tajonera; and M.L.D. Palomares. 2014. A short history of gleaning in Negros and Panay Islands, Visayas, Philippines. M.L.D. Palomares and D. Pauly (ed) In Fisheries Centre Research Report: Philippine Marine Fisheries Catches: A Bottom-up Reconstruction, 1950 to 2010. Fisheries Centre, University of British Columbia, Vancouver, Canada. 22(1):105–117.