

## Women in subsistence fisheries in the Philippines: The undervalued contribution of reef gleaning to food and nutrition security of coastal households

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### Introduction

Most of the Philippines' population lives in coastal areas where livelihoods are invariably linked to the sea, which is the lifeblood of many of the poorest communities in this maritime nation. This is not surprising as the Philippine archipelago, comprising over 7,600 islands, has one of the largest coral reef areas in the world (Spalding et al. 2001), providing a vast and productive resource that supports a multi-gear, multispecies artisanal fisheries (De Guzman et al. 2016). Wide seagrass meadows and reef flats in many parts of the Philippines support a high diversity of edible invertebrates and seaweeds exploited for food and livelihood (Savina and White 1986; Kleiber et al. 2014; Palomares et al. 2014). Gleaning on shallow reef flats during low tide (called *panginbas* in the local dialect in the Visayas and Mindanao, and *pamumulot* in much of Luzon) is a common and traditional activity among fishing communities across the country. It is mainly done to provide daily household protein needs (i.e. 'subsistence fisheries') and is a source of supplemental income for marginal fishing households (De Guzman et al. 2016) that are considered to be among the poorest sectors of Philippine society (Cervantes 2012). Through hand collecting and using minor implements (e.g. knives, rakes, spoons), gleaners collect mostly invertebrates such as shellfish, crustaceans, sea cucumbers and sea urchins, and a wide variety of other edible seafood (De Guzman 1990; McManus et al. 1992).

Edible invertebrates and seaweeds from reef gleaning activities provide one of the cheapest but best sources of high-quality protein for both poor and rich consumers of seafood, although these benefits have not been properly documented in most coastal areas in the Philippines. A subsistence type of fishery, reef gleaning is considered an 'informal sector' (LeBlanc 1997) and, thus, no data are available in national fisheries statistics produced by the government.<sup>2</sup> While gleaning is a commonplace fishing activity along many Philippine shores, its impact on biodiversity, coastal ecology, and society is not very well documented nor is there a programme of monitoring and management in place among local governments to conserve and sustain these valuable resources. Available data in selected areas indicate that reef gleaning catches are

fast declining due to overharvesting and the absence of a management policy (Palomares et al. 2014; De Guzman et al. 2016). More importantly, the role of women and children in subsistence fisheries, and their contribution to food and nutrition security of the household, have been largely neglected, undocumented and unvalued (Siason 2001; Weeratunge et al. 2010; De Guzman et al. 2016).

### Invisible women in fisheries

Gender equity in fisheries has long been a prevailing issue in Southeast Asia and small Pacific Island countries (Johannes 1981; Chapman 1987; Takeda 2001), where the role of women in artisanal fisheries is often undervalued (Dye 1983, cited in Kronen 2002) or overlooked (Matthews 1993). Women are known to participate in many small-scale fisheries throughout the Philippines and in the Asia-Pacific region, but quantification of this participation is rare (Siar 2003). Documentation of women's active involvement in fishing challenges the traditional paradigm that small-scale fishing is the exclusive domain of men (Weeratunge et al. 2010). On the other hand, Kleiber et al. (2014) believe that the lack of quantification of women's fishing effort and output underestimates their contribution to fisheries (Mills et al. 2011), making them 'invisible' in the management of small-scale fisheries and marine resources. The invisibility of women in small-scale fisheries is largely a consequence of lack of gender-focused research to capture their vital role in fisheries production in many parts of Asia and the Pacific where vast nearshore areas are highly accessible to women and children lacking the brawn of adult men for gear-based fishing activities. Ignoring the role of women in small-scale fisheries largely underestimates fishing effort and production (Kleiber et al. 2014) and can lead to poor governance of nearshore resources that are vital to food and nutrient security of marginalised coastal communities.

Although several works describe women's participation in subsistence fisheries in the Philippines (Savina and White 1986; McManus 1989; Cabanban et al. 2014), quantification of their contribution to fishing effort, production, and supplemental family income is rarely carried out (Kleiber et al. 2014; De Guzman et al. 2016). Assessment of gender participation in various artisanal fishing activities at

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<sup>2</sup> For example, Countrystat database of the Philippine Statistics Authority, and annual fisheries reports of the Bureau of Fisheries and Aquatic Resources.

Danajon Bank, Bohol Province undertaken by Kleiber and colleagues (2014) in collaboration with Project Seahorse revealed that almost all of the women surveyed ( $n = 752$ ) engaged in reef gleaning on a regular basis while only half of the men ( $n = 755$ ) gleaned for food or income. More than just a source of supplemental income, the vital contribution of reef gleaning to food security, nutrition and health of poor coastal communities in the Philippines has received scant attention in the existing literature.

### Evaluating women's vital role in subsistence fisheries

Women have long been active participants in the tradition of subsistence fisheries in the Philippines and in the Asia-Pacific region, but until recently their contribution to coastal fisheries production and the family economy has been undervalued or ignored (Harper et al. 2013; Kleiber et al. 2014; De Guzman et al. 2016). The vital role of women in providing food and nutrition for marginalised coastal communities in the Philippines is clearly demonstrated through their chronic gleaning on shallow reef flats, which of late is also carried out by men, largely as a consequence of declining catches from gear-based artisanal fisheries.

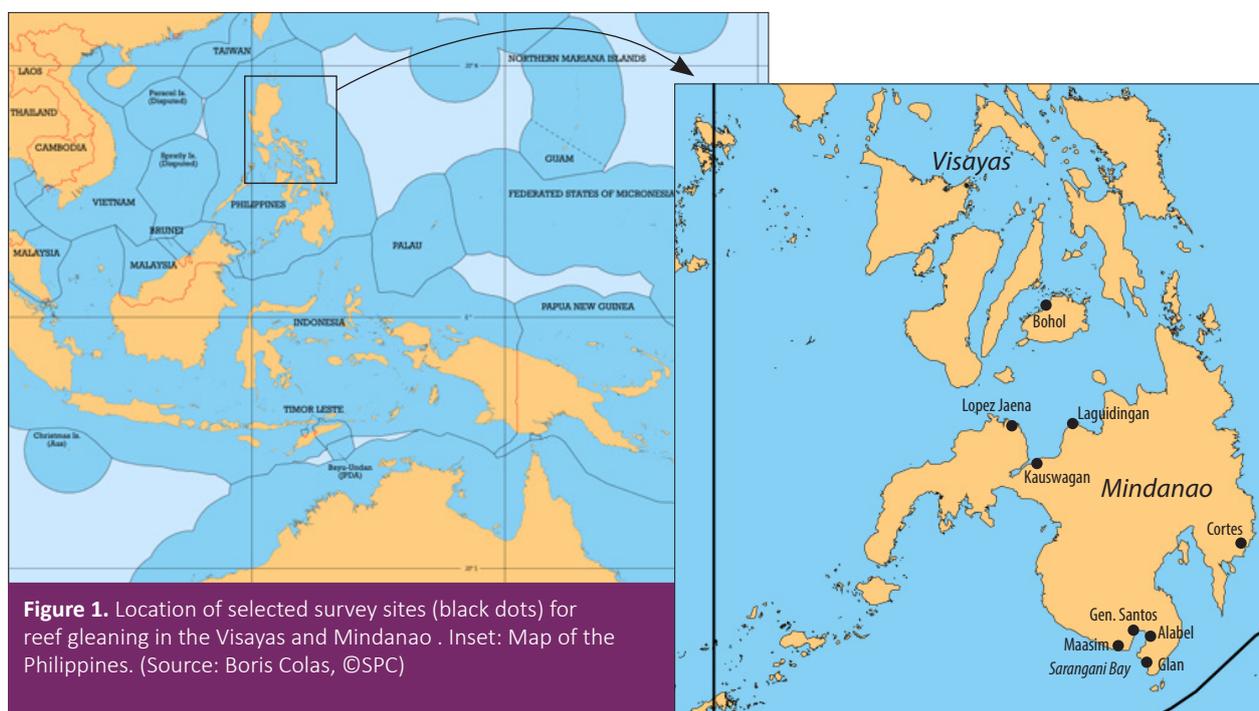
Case studies on reef gleaning were carried out in important gleaning sites in the Visayas and Mindanao (Fig. 1) to obtain a profile of gender participation in subsistence fisheries in terms of gleaning effort, catch composition, catch per unit effort (CPUE) and revenues, and the contribution of gleaning to the food security and nutrition of coastal communities. De Guzman and colleagues (2016) surveyed gleaners in five sites in Mindanao and the Visayas ( $n = 504$ ), and four sites ( $n = 257$ ) in Sarangani Bay in southern

Mindanao (DENR-PENRO Sarangani 2017). Data on gleaning activities from other sites in the Philippines (Samonte-Tan et al. 2007; Kleiber et al. 2014; Cabanban et al. 2014; Palomares et al. 2014) also provide relevant information on gender proportion and age structure.

### Comparative gleaning effort and catch rates

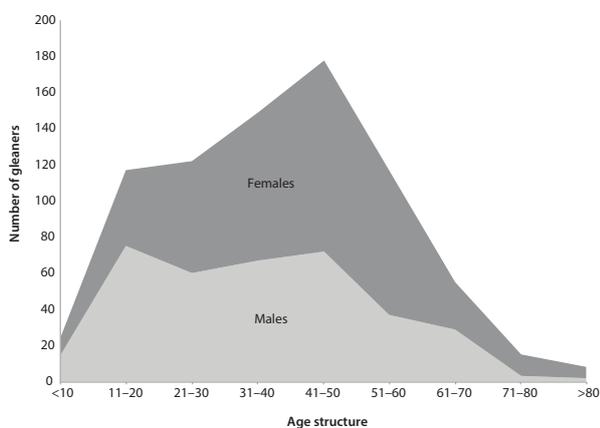
In marginalised coastal communities of Mindanao and the Visayas, women are considered resilient participants in shallow reef artisanal fisheries, withstanding the test of time and weather condition (Fig. 2). Female gleaners, both children and adults (60%), generally exceed the number of males in many sites of the Philippines. A comparison of the age structure of gleaners (Fig. 3) shows that majority (63%) of women actively glean between the ages of 31 and 60, while the majority of men (55%) typically glean between the ages of 21 and 50. More elderly women than men continue to glean even into their 80s. The oldest gleaner encountered in the surveys was a 90-year-old woman in Laguindingan, Misamis Oriental who gathers shellfish year-round and sells all of her good catch in order to give her grandchildren a school allowance. At least 11 elderly women (aged 60 and older) declared they have been gleaning for more than 50 years.

On average, women spend more days each week but fewer hours on gleaning than men, but this varies from one area to another (Fig. 4). Across the survey sites, women obtain consistently higher CPUE ( $4.4 \text{ kg gleaner}^{-1} \text{ day}^{-1}$ ) than men ( $3.0 \text{ kg gleaner}^{-1} \text{ day}^{-1}$ ), and contribute 60% to the daily catch from gleaning across all sites (Fig. 4). Kleiber et al. (2014) also found a similar pattern of subsistence production from Bohol Island at Danajon Bank, reinforcing





**Figure 2.** Women, men and children actively engage in subsistence gleaning on reef flats in many coastal areas of the Philippines. (images: A.B. De Guzman and E. Hataas)



**Figure 3.** Age structure of female and male gleaners in different reef sites across the Philippine archipelago (data sources: De Guzman et al. 2016, DENR 12-PENRO Sarangani Province, 2017, and Palomares et al. 2014).

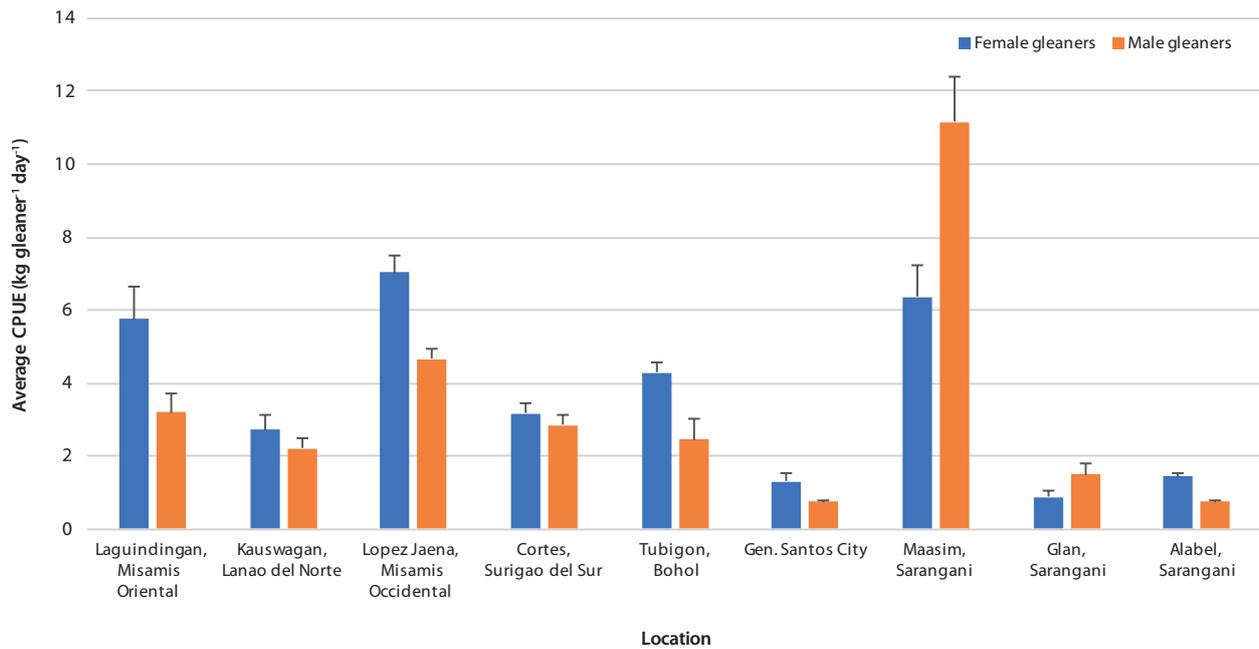
the suggestions of Chapman (1987) and Matthews (1993) that women contribute significantly to marine food yields in the Pacific Islands region. At Danajon Bank, women are responsible for catching 26% of the total estimated weekly catch mass (kg), mostly from gleaning, and 23% of the weekly fishing effort (in hours). Although women’s mean weekly effort and mean weekly catch volume were less than half that of men’s, their average CPUE was slightly higher.

### Contribution to household economy

Small-scale fishers earn marginal incomes from fishing, which has earned them a consistent place in Philippine poverty statistics as having the highest poverty incidence

among Filipinos. Average monthly incomes from fishing and other forms of livelihood indicate that poverty incidence among the artisanal fishing population in the surveyed sites is much higher (39–83%) than the national poverty incidence (39.2%) among fisherfolk. Consequently, a large portion (38–76%) of the coastal population in the survey sites lives in extreme poverty or below subsistence level, far exceeding the national average of 13.4% (De Guzman et al. 2016).

Gleaning is not only done for sustenance, but can also be a supplemental livelihood and a means of alleviating poverty in the poorest of coastal communities (Béné 2007), especially in portions of the Visayas (Cabanban et al. 2014; Del Norte-Campos et al. 2005) and many areas in northern Mindanao (De Guzman et al. 2016), and Sarangani Bay, southwestern Mindanao (DENR 12-PENRO Sarangani 2017) where a large proportion of the gleaning catch is sold rather than kept for family consumption. The harvest is often sold to neighbours, to the local market, or to people from adjacent urban areas. Incomes earned from gleaned seafood from nine sites, however, are generally small. Higher estimates of CPUE by female gleaners earn them higher average daily revenues than men, although these seldom exceed USD 2.00 per day as most of the catch (>50%) is retained for family consumption. Women who glean for at least 14 days per month earn monthly revenues of less than USD 20 or annual revenues of less than USD 250. Similar low values were obtained from the Bohol Marine Triangle (Samonte-Tan et al. 2007) and in Bais Bay and Banate Bay (Cabanban et al. 2014). The results indicate that across Mindanao and the Visayas, reef gleaning for invertebrates and other seafood contributes very little to the household economy.



**Figure 4.** Comparative CPUE (kg gleaner<sup>-1</sup> day<sup>-1</sup>) values across nine survey sites in the Visayas and Mindanao. (Data sources: De Guzman et al. 2016 and DENR 12-PENRO Sarangani Province 2017.)

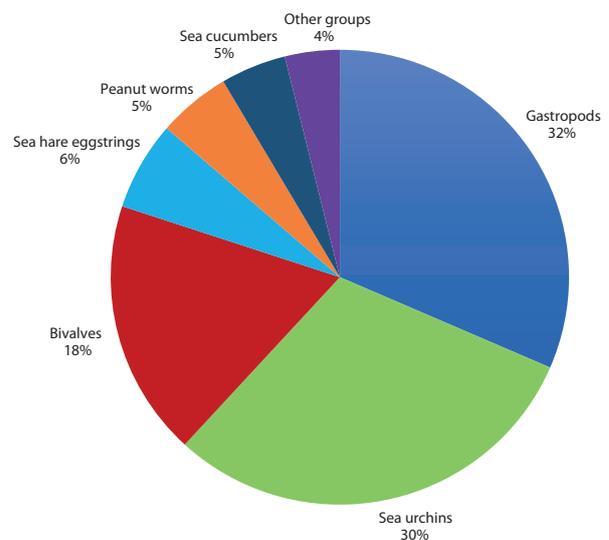
### Contribution to food security and nutrition

Gleaning in the Philippines is carried out mainly for a family's consumption (LeBlanc 1997; Schoppe et al. 1998; Palomares et al. 2014) and nutritional requirements. As catches from artisanal fishing activities decline as a consequence of overfishing and unsustainable fishing practices, coastal communities become increasingly dependent on reef gleaning for household food and nutrition. Gleaning is an essential source of high-quality seafood that provides energy, protein and other vital nutrients for the family.

A case study by De Guzman and colleagues (2016) estimated the amounts of food consumption and nutrient sufficiency of coastal households in five study sites, and evaluated the contribution of gleaning to households' nutrient intake. Across all sites, 52% of the gleaned harvest, on average, is retained for family consumption, and consists of a large assortment of bivalves, gastropods, sea urchins and sea cucumbers (Figs. 5 and 6). Per capita energy (87%) and nutrient sufficiency (e.g. protein, 86%) among coastal households are generally high, although they fall below the recommended daily energy and protein requirement. Unfortunately, it was not possible to compare energy and nutrient intake among men, women and children because the household survey did not delineate amounts of food intake across age and gender. Owing to their more active lifestyle, however, men require higher amounts of energy (2,378 kcal) and protein (71 g) per day than women (1,820 kcal; 62 g) (FNRI 2015). Results of per capita nutrient analysis show that many coastal residents do not eat enough, most probably due to meagre incomes from fishing and other marginal livelihoods, although household surveys have shown that most coastal families are relatively healthy and exhibit low incidences of major illnesses associated with poor nutrition. While fish make up the main source of

seafood protein among coastal families, on average, shellfish and other invertebrates obtained from gleaning make up a significant portion of per capita energy and protein from all seafood at 30.6% and 24.7%, respectively.

The case study demonstrated the importance of seafood from reef gleaning in providing an additional source of energy and high-quality protein for the household although contributing little to augmenting the family income. Women who make up the majority of the gleaning population are mainly accredited for ensuring that the family does not go hungry, despite earning marginal incomes from artisanal fisheries.



**Figure 5.** Relative proportion of edible seafood from gleaning at nine survey sites across the Visayas and Mindanao. (Data sources: De Guzman et al. 2016 and DENR 12-PENRO Sarangani Province 2017).



**Figure 6.** Typical gleaners' daily catch of edible seafood from shallow reef flats can be extremely diverse. (images: A.B. De Guzman except photo in middle of bottom panel by G. Cavinta)

### Shifting the paradigm: Mainstreaming women's contribution to fisheries

Gender is a key consideration for identifying fishing strategies because women and men often have distinct but interacting roles in small-scale fisheries (Chapman 1987; Siar 2003), with women and men often targeting different marine life and habitats (Bliege Bird 2007; Hauzer et al. 2013). Writing about women fishing in the reefs of Oceania, Chapman (1987) and Matthews (1993) observed that women contribute significantly to food production largely from fishing in nearshore habitats. Moreover, the highly regular nature of women's fishing makes women more reliable and effective suppliers of protein for subsistence. In the Danajon Bank case study, women, part-time fishers, and gleaners represented 35%–55% of fishers, and accounted for between 25% and 35% of the total weekly catch volume.

Kleiber et al. (2014) concluded that the non-inclusion of women's effort and contribution results in inadequate representations of fishing and creates an incomplete understanding of the diversity and totality of social and ecological interactions in small-scale fisheries, which would hinder ecosystem-based fisheries management approaches. Excluding the contribution of gleaners to fishing effort in artisanal or sustenance fisheries in the Philippines obscures the participation of women in food security of Filipino households.

Case studies in Mindanao and the Visayas (De Guzman et al. 2016; DENR 12-PENRO Sarangani 2017) revealed that incomes from gleaning by both men and women are small

and barely make a dent in alleviating the poverty in coastal areas. Perhaps the greatest contribution of gleaning and, by association, women in small-scale fisheries, is in securing food and high-quality protein and nutrients for coastal households. This paper, among others, demonstrates that sustaining gleaning as a component of subsistence fisheries, not only in Mindanao and the Visayas but in the entire Philippines, through concerted effort among national and local governments, non-governmental organisations, and the private sector is crucial to the economic and nutritional well-being of poverty-stricken coastal communities. Further work on evaluating gender roles in sustenance fisheries and quantifying women's contribution to household economies and food security will turn the paradigm of the 'invisible women in fisheries' into one of resilient producers and empowered resource managers in coastal communities across the Philippine archipelago.

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