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Research Paper *Gender and Development*

Involvement of men and women in gleaning macro-invertebrates in Baganga, Davao Oriental, Philippines

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ABSTRACT

Gleaning macro-invertebrates is an essential activity for coastal dwellers, providing food and a source of income. Despite its significance, little is known about its gendered nature in the country. This study aimed to document the gender patterns of men and women involved in gleaning in Davao Oriental. The researcher conducted interviews, field observations, and mapping in two coastal barangays of Baganga, Davao Oriental. Men and women engaged in gathering macro-invertebrates were noticeably different regarding the methods used, presence and absence of target species, and gleaning grounds. Women were found to be more involved in gleaning than men. The accessibility of women to macro-invertebrate resources was influenced by factors such as distance to gleaning grounds, occurrences of low tide, and good weather conditions. However, accessibility to economically important species limits women due to their lack of implements and fear of waves and even depths. The tools in gleaning used by both men and women in gathering macro-invertebrates were exploitative, which may pose potential destruction to seagrass beds, if unregulated. Men can quickly shift gleaning grounds to look for high-value species, whereas women generally stay at shallow intertidal areas to gather preferably low-valued species. High dependence on gleaning was observed providing income for both men and women in Kinablangan and food source for men and women in San Victor. Though women had higher gleaning efforts than men, gleaning provides them low daily revenues.

Keywords: *gleaners, gender, gleaning efforts, accessibility, dependence*

INTRODUCTION

Small-scale fisheries are a dynamic and evolving fishery sector in the world. Millions of people rely on this, particularly in Asia, Africa, and Latin America (Sowman, 2006). Coastal residents are highly dependent on fisheries to provide food, livelihood, and income (Perez et al., 2012). Gleaning is a typical and traditional small-scale activity that involves men, women, and even children (De Guzman et al., 2016). This activity requires the least of implements or tools, thus, considered a highly favored activity in coastal communities (Wagey et al., 2017). Gleaning comes in two different ways: (1) collecting species encountered in the reef flat; and (2) when the gleaners have target species to gather (Del Norte-Campos et al. 2005). Significantly, gleaning plays a vital role in coastal communities: food source for household consumption and livelihood supporting local market demands (Máñez & Pauwelussen 2016; Palomares & Pauly 2010).

Generally, information on gleaning is scarce in the Philippines despite its importance to various coastal communities. In particular, the gendered nature of this kind of activity has caught little attention since there were only a few studies conducted in the country, including those of De Guzman (2019) and De Guzman et al. (2016), considering the vital roles played by both men and women in this subsistence fishery. Instead of showing the broader gender pattern, most fishery researches conducted were founded on the general assumption that fisheries are usually male-dominated and less attention or focus is given to women (Máñez and Pauwelussen, 2016).

Given this lack of information, this research undertaking is vital in providing valuable knowledge about the gender roles in subsistence fishery, considering the critical contributions of men and women to coastal food security and the economy. Generally, this study examines the broader gender perspective in fisheries, recommends relevant and appropriate policies or institutional strategies/actions to the local government that could help these coastal men and women uplift their socio-economic well-being, particularly in this poorly studied fishery sector.

MATERIALS AND METHODS

Locale of the Study

The study was conducted in the two gleaning areas of Sitio Poo, Brgy. Kinablangan and Brgy. San Victor, located in the eastern coastal municipality of Baganga, Davao Oriental, Philippines (Figure 1). These areas were chosen due to their wide rocky intertidal, seagrass beds, and mangroves, where gleaning activities of men and women are commonly observed. Geographically, Sitio Poo is an island, and the macro-invertebrate resources are easily accessible for both men and women whose houses are built near the shorelines. On the other hand, houses of the gleaners in San Victor (not an island) are constructed far from the shore, approximately 1-2 kilometers. Hence, men and women need to walk that far to reach the gleaning grounds.

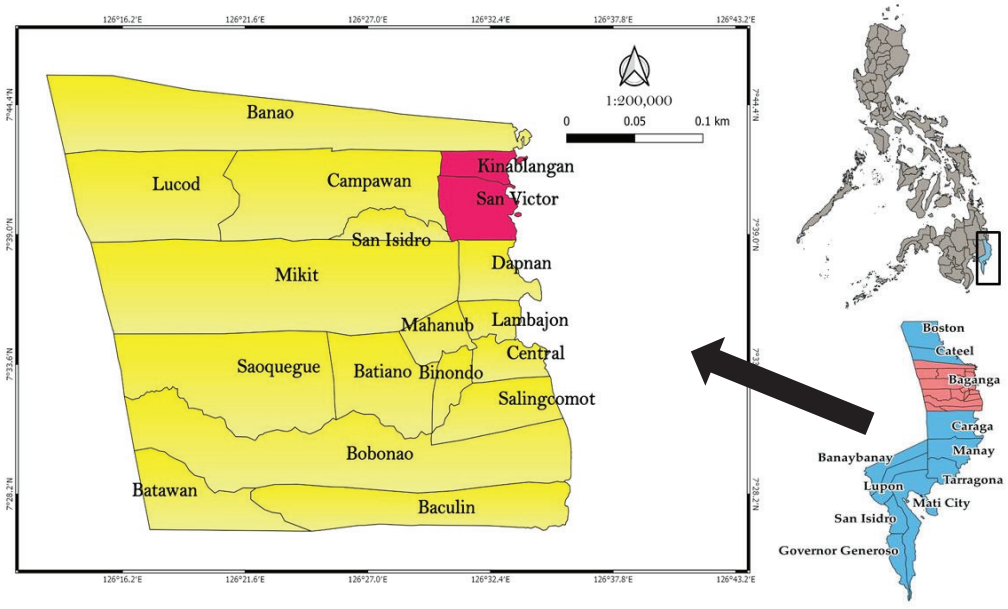

Figure 1. The map showing the sampling areas of Kinablangan and San Victor sites.

Research Design, Sampling, and Data Collection

This quantitative study was carried out from January to March 2017. Since the households typically occur in irregular clusters in the coastal areas, simple random sampling adopted from De Guzman et al. (2016) was used in this study to cover at least 20 % of the coastal community population or just a minimum of 30 household respondents in each of the study areas. A total of 61 respondents were interviewed in the two barangays using the semi-structured questionnaires.

Field observations were also conducted to understand the movement and distribution of the gleaners in various gleaning grounds. Specifically, the gleaners were counted, and their coordinates were recorded using Garmin eTrex 30x. The coordinates were then plotted using Manifold version 8.0 to generate a map showing their spatial distribution in those areas. Macro-invertebrates documented in the catches were identified through the aid of local knowledge of the gleaners and field identification guides such as Food and Agriculture Organization (FAO) Species Identification Sheets (1985), Purcell et al. (2012) for sea cucumbers, and open-access online databases such as World Register of Marine Species (WORMS) and SeaLifeBase.org.

Data Analysis

Descriptive statistics was employed in this study using means and percentages in analyzing the data gathered. The catch per unit effort (CPUE) from gleaning and daily income/revenue of the gleaners were calculated using their actual yields and respective fishing efforts. The t-test (2-paired) was used in determining significant differences in the CPUE of men and women in the two gleaning areas.

RESULTS AND DISCUSSION

Socio-demographic characteristics of the gleaners

There are more adult women (52.4%) than men (40%) in Kinablangan and more adult men (50%) than women (27.3) in San Victor (Table 1). No teenage/youth are involved in gleaning in Kinablangan, and more young women (13.6%) than men (12.5%) are into the gathering of macro-invertebrates in San Victor.

The majority of the respondents in both study areas are married; only a few are single or widowed. Most of the men in Kinablangan (80 %) and San Victor (62.5 %) reached elementary level or have an elementary diploma. Similarly, women in San Victor finished elementary education (72.7 %). More than half of women in Kinablangan (52.4 %) earned high school diplomas. Fishing is the primary occupation of all men in Kinablangan while farming in San Victor (75 %). The majority of women in Kinablangan are homemakers (90.5 %), while less than half of the women in San Victor are engaged in farming (40.9 %). Women in Kinablangan have found more time gathering macro-invertebrates in the reef flats, whereas women in San Victor have less time in gleaning since farming is their primary source of income.

Gleaning Practices of Men and Women

Women were more involved in gleaning than men (Table 2). The dominance of women in gleaning can be attributed to factors such as the occurrences of low tide and good weather conditions. Since macro-invertebrates are highly accessible, gathering them is easy. Thus, women do not need to exert more effort and time. The majority of the respondents were involved in gleaning for over ten years.

Similarly, women were more frequently engaged in gleaning than men. Most women in Kinablangan (86.4 %) and San Victor (90.9%) were gathering macro-invertebrates for more than five days a week. However, men in both study areas were less frequently involved in gleaning activities, considering that all men in Kinablangan and a few in San Victor are primarily engaged in fishing. Accordingly, the domain of women and men are slightly different since women tend to collect and process invertebrate species while men are more often to catch fish (Matthews 1992).

The gleaners preferred to go to the reef flat either during daytime or both daytime and nighttime. No gleaners are involved in gathering macro-invertebrates at nighttime. All women in San Victor and 77.3 % of women in Kinablangan preferred to glean during daytime only. Aside from the fact that women tend to collect macro-invertebrates in providing food for the family, women widely do so through gleaning, especially during daytime when their children are still in school or if their husbands assume the responsibility of taking care of their children at home. More than half of men in Kinablangan (60%) preferred to collect macro-invertebrates during daytime and nighttime. Gleaning was limited during nighttime, especially for women, considering the risk of going to the gleaning ground and the lack of

implements to be used in gleaning such as headlamps, which men commonly use in their fishing activities.

In providing food for the table, women were widely observed gleaning, especially during daytime when their children are still in school or if their husbands assume the responsibility of taking care of their children at home. Accordingly, the reproductive roles of women in the private domain where they take care of the family are typically valued than their productive roles, in this case, women who gather macro-invertebrates to provide food for their families. More than half of men in Kinablangan (60%) preferred to collect macro-invertebrates during daytime and nighttime. This figure demonstrates their role as the family provider, collecting more macro-invertebrates to support their basic needs, especially if fishing is not viable due to bad weather conditions or low fish catch. Most men in San Victor (77.3 %) preferred daytime only, considering the distance they need to travel to reach the gleaning grounds.

Table 1. Socio-demographic characteristics of the gleaners (%) in both study areas.

Characteristics	*Kinablangan*		*San Victor*	
	Men (%) (n=10)	Women (%) (n=21)	Men (%) (n=8)	Women (%) (n=22)
Age Group				
11-20	0.0	0.0	12.5	13.6
21-30	20.0	14.3	25.0	9.1
31-40	40.0	52.4	50.0	27.3
41-50	30.0	9.5	12.5	13.6
51-60	10.0	19.0	0.0	22.7
61-70	0.0	4.8	0.0	13.6
Civil Status				
Single	10.0	9.5	12.5	9.1
Married	80.0	66.7	87.5	90.9
Widowed	10.0	23.8	0.0	0.0
Educational Attainment				
Elementary	80.0	38.1	62.5	72.7
High School	10.0	52.4	37.5	27.3
Vocational	10.0	9.5	0.0	0.0
Occupation/ Business				
Fishing	100.0	0.0	25.0	0.0
Sari-sari store	0.0	9.5	0.0	22.7
Homemaker	0.0	90.5	0.0	36.4

Table 2. The temporal gleaning involvement of men and women in the study areas.

Variables	*Kinablangan*		*San Victor*	
	Men (%) (n=10)	Women (%) (n=21)	Men (%) (n=8)	Women (%) (n=22)
Number of years in gleaning				
10 years and below	30.0	22.7	25.0	18.2
above 10 years	70.0	77.3	75.0	81.8
Frequency (days) of gleaning in a week				
< 5 days	70.0	13.6	75.0	9.1
> 5 days	30.0	86.4	25.0	90.9
Gleaning time				
Daytime only	40.0	77.3	87.5	100.0
Nighttime only	0.0	0.0	0.0	0.0
Both daytime and nighttime	60.0	22.7	12.5	0.0
Season (peak) of gleaning	0.0			
Northeast Monsoon (Amihan)	80.0	72.7	50.0	82.7
Southwest Monsoon (Habagat)	20.0	27.3	50.0	17.3

Most of the gleaners in the two study areas were commonly observed gleaning macro-invertebrates during Northeast monsoon than Southwest monsoon. During the Northeast monsoon or locally known as Amihan, which usually occurs in October to late March, its high peak season brings the best weather condition. Both men and women generally prefer to gather macro-invertebrates during this time, as collection is more efficient. There are minimal gleaning activities during southwest monsoon or Habagat due to the heavy rainfalls and humid weather.

The maps in Figure 2 show the spatial distribution of men and women in various gleaning grounds. They were observed gleaning in irregular clusters due to the spatial distribution of macro-invertebrates. Generally, gleaning ground in Kinablangan was more concentrated in a particular area, while gleaning ground in San Victor covered a greater area along the edge of the intertidal flat. Men and women tend to move from one point to another to gather them. This behavior depends on the species of macro-invertebrates they are collecting (Nieves et al., 2010). In Kinablangan, some men went beyond approximately 500 meters from the shore during low tide looking for the deep-burrowing bivalve *Codakia tigerina* (Local Name: Tambayang), and gastropod *Lambis* sp. (Local Name: Saang), which are of high economic importance. Women were commonly observed gleaning in the intertidal area near their houses, approximately 10-20 meters away. Further, men were observed to be more mobile in shifting gleaning grounds, whereas women generally stay at shallow reef areas looking for low-valued macro-invertebrate species.

The occurrence of low tide also provides both men and women the opportunity to gather macro-invertebrates. The accessibility to marine resources can be attributed to the geographical feature of Poo, Kinablangan, an island. Conversely, the houses of the respondents in San Victor (not an island) were built far from the shore, approximately 1-2 kilometers. Men and women need to walk that far to reach the seagrass beds or mangrove areas where their gleaning activities are usually done.

A total of 21 species of macro-invertebrates were documented in the catch of the gleaners: 16 mollusks, four echinoderms, and one crustacean (Table 3). Mollusks comprise 76 % of the total macro-invertebrates found in the catch. Gastropods are the most commonly-gleaned group of mollusks, which are usually considered target species by the gleaners (Walag and Canencia, 2016). *Codakia tigerina, Cypraea tigris, Lambis* sp., *Strombus* sp., *Terebralia sulcata, Trochus* sp., and *Turbo bruneus* were the common species observed in both study areas. The only species classified under Phylum Arthropoda, *Thalamita crenata,* or crenate swimming crab, was only observed in San Victor. The white threads fish *Holothuria leucospilota* was the most common echinoderm in San Victor and Kinablangan. Other economically valuable holothurian species included *Actinopyga echinites* and *Thelenota anax,* which were observed only in San Victor. The bivalves *Anodontia philippiana* and *Austriella corrugata* were observed in the catch of the gleaners, mainly gathered in the muddy substrate of mangrove areas in San Victor. Men and women were commonly observed using one or more methods in gleaning (Table 4). Simple handpicking was used by all women in both study areas (Figure 3C). Though handpicking only needs bare hands in gathering macro-invertebrates, this method is still considered exploitative to the environment if unregulated. As women do not need special or modified implements to gather macro-invertebrates, this method has offered them more opportunities to gather anything in the reef flat or seagrass beds. Consequently, this has caused them to collect even those less-valued species that are more commonly found in shallow area.

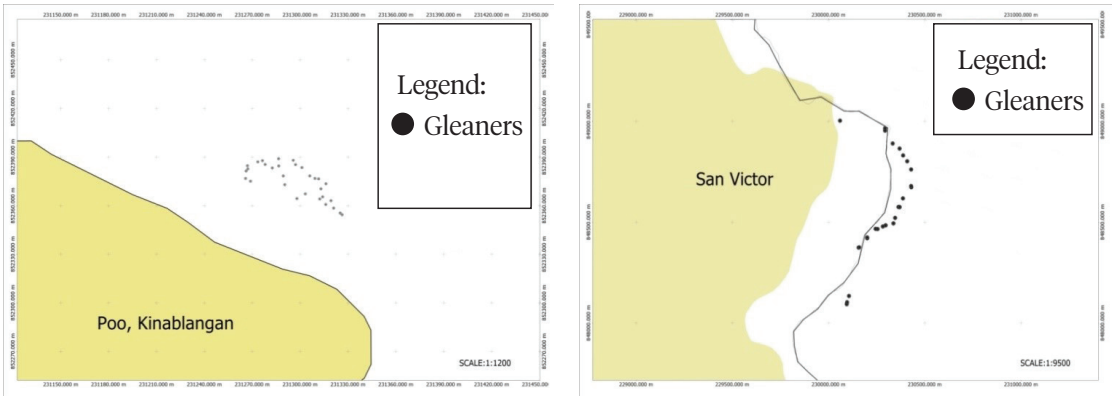

Figure 2. Distribution of the gleaners in the gleaning areas of Kinablangan (left) and San Victor (right).

Three methods commonly used by men in both study areas were perceived as potentially destructive to the environment. Implements or tools such as the wooden stick with pointed steel provide men high accessibility for collecting high-valued species, particularly deep-burrowing bivalves and gastropods (Figure 3A). Consequently, this limits women since finding these macro-invertebrates requires energy to get to large distances approximately 500 meters from the shore, which women considered already deep for gleaning.

Accordingly, women do not venture offshore activities due to the fear of waves or deep water (Kleiber et al., 2014), requires a lot of time, energy and is considered very risky (Medard et al., 2001). Digging macro-invertebrates using spade or knife provides both men and women accessibility to commercially important species (Figure 3B). However, tools used for digging were perceived to have a minimal impact, particularly on seagrasses (De Guzman et al., 2016).

On the other hand, the overturning of rocks was another method commonly used by men in both areas. Considerably, this activity increases disturbance to macro-invertebrates which may cause the removal of more species in their natural habitat, thereby reducing potential colonists (McCabe & Gotelli, 2000). In addition, few women were observed overturning the rocks during field observations (Figure 3C). If they need to, women considerably put back the rocks to their original positions after looking for macro-invertebrates. As such, minimal disturbance is done to the species hiding in rock crevices and holes.

The macro-invertebrates documented in this study were based on the actual catches of the gleaners during the interviews. Most of the gleaners, particularly women in both study areas, did not have target species to collect. That is, they gathered whatever macro-invertebrates they encountered in the reef flat. There were women in Kinablangan who carried wide-mouthed containers full of less-valued gastropods. For those men and women with target species to collect, bivalves and gastropods were the common macro-invertebrates (Table 5). There were men in Kinablangan (n=8) and San Victor (n=6) who target deep-burrowing bivalves, and gastropod which are usually high-valued species collected using their special or modified implements (Figure 4). Nieves et al. (2010) emphasized knowing exactly where to look for certain macroinvertebrate species and employing different dig or pull-out methods is a specialized skill. A summary of the factors influencing the gleaning effort and access of men and women to macro-invertebrate resources is presented in Table 6.

Gleaning Efforts of Men and Women

During the peak and lean months, a higher average number of hours in a day was spent in gleaning by women than men in the two study areas. Comparatively, women were found to spend higher average hours per day in gleaning during peak months than lean months (Figure 5). Peak months from April to May and October to December allow women more gleaning opportunities since the weather

conditions are good. The low tide period is extended, thereby exposing more macro-invertebrates in the reef flat, leading women to obtain higher catch volumes. Men chose to go fishing instead of gleaning during lean months since the low tide period is short.

Table 3. The catch composition of the gleaners in the study areas.

	Macro-invertebrates		Gleaning areas	
Taxon/Group	**Scientific Name**	**Common Name**	**Kinablangan**	**San Victor**
Echinodermata:				
Echinoidea	*Tripneustes gratilla*	collector urchin	/	x
Holothuroidea	*Actinopyga echinites*	deepwater redfish	x	/
Holothuroidea	*Holothuria leucospilota*	whitethreads fish	/	/
Holothuroidea	*Thelenota anax*	amberfish	x	/
***Crustacea*:**				
Malacostraca	*Thalamita crenata*	crenate swimming crab	x	/
Mollusca:				
Bivalvia	*Anadara inaequivalvis*	inequivalve ark	/	x
Bivalvia	*Anodontia philippiana*	chalky buttercup	x	/
Bivalvia	*Austriella corrugata*	corrugated lucine	x	/
Bivalvia	*Codakia tigerina*	Pacific tiger lucine	/	/
Gastropoda	*Angaria delphinus*	dolphin snail	/	x
Gastropoda	*Conus sp.*	cone snail	/	x
Gastropoda	*Cypraea tigris*	tiger cowrie	/	/
Gastropoda	*Monetaria annulus*	ring cowrie	x	/
Gastropoda	*Nerita sp.*	nerite	x	/
Gastropoda	*Terebralia sulcata*	sulcate swamp cerith	/	/
Gastropoda	*Lambis sp.*	spider conch snails	/	/
Gastropoda	*Strombus canarium*	dog conch	/	x
Gastropoda	*Strombus sp.*	conch	/	/
Gastropoda	*Tectus fenestratus*	fenestrate top	/	x
Gastropoda	*Trochus sp.*	top shell	/	/
Gastropoda	*Turbo bruneus*	brown Pacific turban	/	/

Figure 3. Some common methods used in gleaning macro-invertebrates: (A) use of wooden stick with pointed steel, (B) use of spade/knife in digging and (C) simple handpicking.

Table 4. Gleaning methods used by men and women in gathering macro-invertebrates.

Methods Used*	***Kinablangan***		***San Victor***	
	Men (%) (n=10)	Women (%) (n=21)	Men (%) (n=8)	Women (%) (n=22)
Handpicking	9	21	6	22
Overturning of rocks	6	2	5	3
Digging using knife/blade	3	2	6	2
Gathering using wooden stick with pointed steel	1	0	7	0

**Multiple responses*

The differences in catch volumes can also be attributed to the number of hours spent in a day and the methods employed by the gleaners. Though men in Kinablangan had a higher catch volume of 10.5 kg and spent an average of 3.5 hours/day in gleaning than women with only 9.1 kg and 2.2 hrs/day, respectively, women were found to have a higher CPUE of 4.2 kg/gleaner/hr/day than men with only 3.1 kg/gleaner/hr/day. This CPUE of women was noticeable most especially during the lowest low tide where macro-invertebrates are highly accessible to them through employing simple handpicking only.

Comparatively, women in San Victor had a higher catch volume of 2.4 kg and gleaning hours spent (2 hrs/day) than men with only 1.1 kg and 0.9 hr/day, respectively. This has led women to a higher CPUE of 1.9 kg/gleaner/hr/day than men with 1.1 kg/gleaner/hr/day only.

Figure 4. *Codakia sp.* (bivalve) and *Lambis sp.* (gastropod) usually gleaned by men using special/modified implements

Table 5. Frequency of the target species gleaned by men and women in both study areas.

Target species	*Kinablangan*		*San Victor*	
	Men (%) (n=10)	Women (%) (n=21)	Men (%) (n=8)	Women (%) (n=22)
Frequency of present and absent target species				
Absent	2	18	2	19
Present	8	3	6	3
Group of macro-invertebrates*				
Bivalves	8	3	6	3
Gastropods	8	3	6	3
Sea cucumbers	4	3	1	0
Sea urchins	2	3	0	0
Peanut worms	1	0	0	0

Generally, men and women in Kinablangan had a CPUE twice higher than the CPUE of men and women in San Victor (Table 7). The t-test (2-paired) showed a significant difference in the CPUE between men and women in Kinablangan ($p < 0.05$) and no significant difference in San Victor ($p > 0.05$) (Table 8).

Allotment of Men and Women's Catch to Household Consumption and Income

As shown in Table 9, all men in Kinablangan and San Victor (75 %), who are fishers and farmers, respectively, did not consider gleaning their primary source of income. Since most women in Kinablangan (90.5 %) are homemakers

Table 6. Factors influencing gleaning effort of men and women and their access to macro-invertebrates resources.

Factors	***Men***	***Women***
1. Methods/implements used	Digging with the use of blade/ knife Gathering using wooden stick with pointed steel	Usually simple handpicking
2. Presence and absence of target species	Usually high-valued species	Usually low-valued species
3. Gleaning grounds	Few meters away from the shore	Preferably shallow areas only
4. Occurrences of low tide	Can collect target species	Can collect more macroinvertebrate species (usually less-valued)
5. Good weather conditions	If fishing is not viable, they glean	Can collect more macroinvertebrate species (usually less-valued)
6. Fear of waves and depths	None	They preferred shallow areas only

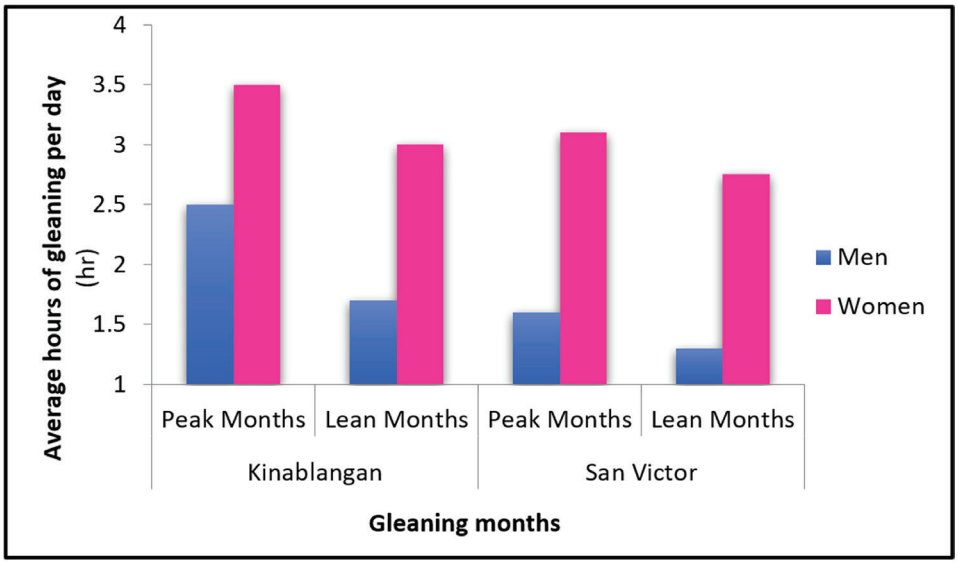

Figure 5. The average hours per day spent in gleaning by men and women during peak and lean months.

Table 7. The CPUE of men and women from gleaning in the study areas.

Gleaning areas	Catch volume (kg)	Ave. number of gleaning hours (hr/day)	CPUE (kg/gleaner/hr/day)
Kinablangan			
Men (n=10)	10.5	3.5	3.1
Women (n=21)	9.1	2.2	4.2
San Victor			
Men (n=8)	1.1	0.9	1.1
Women (n=22)	2.4	2.0	1.9

Table 8. T-test (2-tailed) result of CPUE between men and women in the two gleaning areas.

	Paired Differences							
Gleaning area	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		*t*	Df	Sig. (2-tailed)
				Upper	Lower			
Kinablangan	-2.971	2.510	0.451	-3.892	-2.050	-6.590	30	0.000
San Victor	0.005	1.293	0.236	-0.478	0.488	0.021	29	0.983

Table 9. Percent distribution of respondents relying on gleaning as a source of income.

Gleaning as a source of income	*Kinablangan*		*San Victor*	
	Men (%) (n=10)	Women (%) (n=21)	Men (%) (n=8)	Women (%) (n=22)
Primary source of income	0.0	90.5	25.0	45.4
Not a primary source of income	100.0	9.5	75.0	54.6
Total	**100.0**	**100.0**	**100.0**	**100.0**

and have no other source of income, they find gleaning as a potential source of income. This was contrary to more than half of women (54.6%) in San Victor who considered gleaning not their primary source of income since they have other sources such as farming and small-scale business. The higher CPUE observed from men and women in Kinablangan has caused them to generate a daily income from gleaning of 137.4 pesos and 149.3 pesos, respectively. Since not all gleaners in San Victor were involved in selling their catches, only a few men (n=2) and women (n=10) have generated a daily income of 27.5 pesos and 86.6 pesos, respectively (Table 10). Although gleaning provides a potential source of income for men and

women, their daily revenues earned from this activity fall under the low-income segment based on the National Statistical Coordination Board (NSCB).

In Kinablangan, most gleaners, especially women (71.4 %), consumed only less than 50 % of their catches, while most were sold to the middlemen (Table 11). Similarly, men (80 %) also allotted less than 50 % of the catch for household consumption, and the rest were sold. Instead of directly consuming the catch, these men and women would instead choose to sell it for household upkeeps such as securing basic needs, including rice. This observation is similar to the study of De Guzman et al. (2016), where residents of the coastal areas do not consume enough seafood because they would rather sell their catch to supplement their household income to buy rice for daily consumption of their family. On the other hand, in San Victor, the majority of men and women considered gleaning as a source of food.

Table 10. The daily revenues of men and women from gleaning in the study areas.

Gleaning areas	Daily revenue from gleaning *(in peso)*
Kinablangan	
Men (n=10)	137.4
Women (n=21)	149.3
San Victor*	
Men (n=2)	27.5
Women (n=10)	86.6

***Not all respondents were involved in selling their catches.*

More than 50 % of their catches were consumed rather than sold. Since these gleaners have other sources of income, such as farming and small-scale business, the majority of them would preferably consume the catch rather than sell them. They also consider the distance they need to cover to glean; consuming their catch is a priority.

CONCLUSIONS AND RECOMMENDATIONS

The differences of men and women in gleaning were noticeable in the methods used, presence and absence of target species, and various gleaning grounds occupied for collecting macro-invertebrates. Women were more involved in gleaning than men. The accessibility of women to macro-invertebrate resources was influenced by factors such as distance to gleaning grounds, occurrences of low tide, and good weather conditions. However, accessibility to various gleaning areas and economically important macro-invertebrate species has limited women, compared to men, due to their lack of modified tools/implements and fear to venture offshore activities due to waves and depths. Tools in gleaning used by men in gathering high-valued species were perceived exploitative, thus, posing potential destruction to the environment than women who were engaged in the simple method of handpicking, which was perceived generally as non-exploitative.

Table 11. Proportion (in percent) of catch from gleaning consumed by men and women.

Proportion of catch from gleaning being consumed	*Kinablangan*		*San Victor*	
	Men (%) (n=10)	Women (%) (n=21)	Men (%) (n=8)	Women (%) (n=22)
50 % and below	80.0	71.4	37.5	36.4
Above 50 %	20.0	28.6	62.5	63.6
Total	**100.0**	**100.0**	**100.0**	**100.0**

Moreover, men are gleaning if fishing is not viable due to seasonal variation and low volume of catch/harvest. They could quickly shift gleaning grounds, whereas women prefer to glean generally in shallow reef areas. High dependence of men and women on gleaning was observed. Generally, it provides a potential source of income for both men and women in Kinablangan and a substantial source of food for men and women in San Victor. Though women had higher gleaning efforts than men but still, gleaning, in general, provides low daily revenue for the gleaners.

These gender patterns demonstrate both men's and women's differences, socio-economic roles, and contributions in the gleaning sector. A broader gender perspective on gleaning fishery challenges assumptions of the well-documented male domain in fisheries and gradually unravels the invisible, undervalued, and under appreciated reality of women as they are observed to be more highly involved in gleaning than men. The involvement of women in gleaning signifies their visible role in providing food for their family in particular, and their hidden role in subsistence fishery in general.

Since both men and women are visible in gleaning fishery, their roles and contributions to daily food security and economy must be recognized even in the local setting. Accessibility of women to various gleaning grounds, economically-valued species, and the provision of appropriate skills and technologies are the critical factors necessary to uplift their socio-economic well-being in the coastal communities of Baganga. The Local Government Unit (LGU) of Baganga should initiate the provision of alternative livelihood opportunities, especially for those men and women who are highly dependent on gleaning considering their daily income generated from this activity alone are not enough to support their household needs.

The LGU should make policy on size limitation and effort regulation on gleaning macro-invertebrates to control overharvesting and allow the species to reach their maturity. The LGU is encouraged to collaborate with other institutions like the Department of Environment and Natural Resources (DENR), Bureau of Fisheries and Aquatic Resources (BFAR), Davao Oriental State University (DOrSU), and People's Organizations (POs) in crafting a Subsistence Fishery Management Plan to conserve the macro-invertebrate resources in Davao Oriental.

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