

FULL PAPER

Gender Participation in the Fisheries Sector of Lake Taal, Philippines

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ABSTRACT

Lake Taal is a source of livelihood and provides for more than 2,000 sustenance fisherfolk. Fish production of the open water fisheries has dwindled over the years with the continuous decline of fish catch, which can be attributed to unsustainable fishing practices such as illegal fishing, overfishing, pollution, and the expansion of aquaculture activities in the lake. Women, as a sector, constitute almost one half of the economically active population in Lake Taal. Men and women performed different roles at different stages of fish capture or fish culture. In terms of their economic and social value, the participation of women in pre- and post-production activities are significant. This study assessed the level of gender participation in the fisheries sector of Lake Taal. Specifically, it determined the roles of men and women in the different fishing activities and described the fisherfolk's socioeconomic profile. A total of 407 randomly selected respondents were interviewed in 11 barangays from eight municipalities in Lake Taal, represented by 54% male and 46% female, consisting of 214 fishers, 76 fish vendors, four processors, 51 helpers, and 62 fish cage or fish pond owners, managers, and caretakers. Profiling of the socioeconomic status was done to assess families' living conditions and constructed primary data based on household's present roles, activities, responsibilities, access to and control over resources, problems, and constraints of men and women. The roles of both men and women in fisheries were categorized into three sectors: capture, post-harvest, and aquaculture.

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1. INTRODUCTION

Women's contributions to fisheries are often overlooked, under-estimated, and under-valued. Fishing is usually classified as men's work, and women are thought to have a small role in the fisheries industry (Kusakabe 2003). In the Philippines, women in fishing communities do not go on fishing expeditions because of the need for them to remain within the premises of the home, where traditionally women's roles were centered on household activities, such as meal preparation, child care, elderly care, and educating children (Siason et al. 2002). Thus, their role in fish capture is limited to mainly near-shore activities and supportive role to fishers. The supportive role primarily focused on domestic fish processing, handling, and grading, which was more of a means of subsistence than an

industry (De Silva 2011).

Medard et al. (2002) noted that there are gender biases in fishing and farming communities. In fishing communities, men and women play complementary roles, and the division of labor is dictated by gender (Nwabeze et al. 2013). It is culturally known that men are for actual fishing, and women are for pre- and post-harvest activities (Ekundayo and Kolo 2005; Lwenya et al. 2005). Women are seen to be involved in activities such as weaving baskets, net mending, gleaning, salt-making, fish sorting, vending, trading and market retailing, as well as processing and preservation (Bennett 2005; Lwenya et al. 2005; Siason et al. 2002; Sobritchea 1999). Women are involved in marketing low-value species while men handle fishes of high commercial value (Shahani 2015; Matthews et al. 2012; Siason 2001).

Access and control over productive resources, according to Siar (2003) is shaped by age and gender. Arenas and Lentisco (2011) stated that extensive studies have shown that women have poorer access to resources than men. The stereotyping that women are weak to meet the physical demands of fishing and women's reproductive responsibilities are common chokepoints for women to have equal access to resources with men. Siar (2003) also stated that there are differences in access to resources because knowledge is not equally distributed. Extension activities, training, and technical assistance, most of the time, target men-dominated organizations and deprive women of learning new technologies and gaining additional knowledge for financial and personal development.

Women are being marginalized in the fishing industry, and their involvement is limited to small-scale (Leendertse 1990). Women's participation as equal and productive partners in the fisheries and aquaculture sector has significant impacts on households' nutrition and living standards (FAO 2012). Gender concerns in the fishery sector can only be identified and addressed by looking at the various gender stereotypes and identifying the gender roles in the fishery sector (Medard et al. 2002). A study by Monfort (2015) showed that there is scarcity in quantitative and qualitative data on women's participation. According to Siason (2001), no research program systematically tackles gender issues, women's participation, and integration in fisheries development as well as sex-disaggregated database. Arenas and Lentisco (2013) added that women barely enjoy benefits and rights from productive resources such as training, access to information, satisfactory working conditions, and facilities because of this deficiency in data on women's role. Samudra (1995) points out that the importance and contribution of women in the fishery sector and their dual role in production and reproduction points to the need to identify gender roles in the fishery sector. Identifying the roles women play and the fishing activities they perform is a critical first step to develop approaches for their participation in fisheries resource management (The WorldFish Center 2010). Documented roles and participation of both genders will be a guide to formulate plans and programs that will address the needs not only of one but both genders.

Lake Taal is the third largest lake in the Philippines, located in the province of Batangas. It contributes significantly to serving as a food basket and primary source of income for people engaged in

fishing and fish farming activities. However, poverty is intensifying in the lake due to the declining fish catch and limited livelihood opportunities. Women in Lake Taal are actively participating and have a vital role in fisheries and aquaculture activities. However, they are not significantly recognized and are undervalued due to gender stereotyping. Thus, this study assesses the level of gender participation in Lake Taal's fisheries sector and recommends measures on how to improve the livelihood of the fisherfolk. Specifically, it describes the socioeconomic profile of fisherfolk and determines the roles of men and women in different fishing activities.

2. MATERIALS AND METHODS

2.1 Study Site

The study was conducted in Lake Taal located in the province of Batangas, CALABARZON Region, Philippines (13°59'05"N 121°00'57"E). The lake and its watershed had been declared a national park, the Taal Volcano National Park, by Proclamation No. 235 in 1967. It was re-established in 1996 as the Taal Volcano Protected Landscape (TVPL) under the National Integrated Protected Areas System (NIPAS) Act of 1992. Its 115-km coastline is surrounded by nine towns and two cities, fisheries as the dominant resource use, including capture fisheries and aquaculture. The fisheries industry of the lake supports 2,311 fisherfolk in 2011 (Mutia et al. 2018). As of 2016, there were 5,889 fish cages installed in the lake culturing "tilapia" (*Oreochromis* spp.) and "bangus" (*Chanos chanos*).

The eight municipalities selected for the study were Agoncillo, San Nicolas, Sta. Teresita, Cuenca, Mataas na Kahoy, Balete, Talisay, and Laurel (Figure 1). These municipalities represent variations in fishery livelihood patterns (capture, aquaculture, and post-harvest) and various rural institutions and fisherfolk organizations, and proximity of fisherfolk households in the lake.

2.2 Gender analysis framework

There are several gender analysis frameworks developed through the years (FAO 2014) such as the Harvard Analytical Framework (HAF), the Moser Framework, the Social Relations Approach (SRA), the Gender Analysis Matrix (GAM), the Women's Empowerment (Longwe) Framework, and the Capacities and Vulnerabilities Analysis Framework (Kabeer 1994). These frameworks differ



Figure 1. The eight municipalities in Lake Taal selected for the study.

in their assumptions of what needs to be analyzed and addressed.

This study followed the Harvard Analytical Framework or Gender Roles Framework in collecting and presenting data (Figure 2). Harvard Analytical Framework was chosen over the other frameworks because it focused principally on the gender division of labor and the activities and roles of men and women and highlighting the key differences in which the primary goal of the study is to assess the level of gender participation in the fisheries sector.

Harvard Analytical Framework was developed by researchers at the Harvard Institute for International Development in the USA published in 1985 and was one of the first frameworks designed for gender analysis. Its objective is to determine or map men's and women's work and resources and highlight the key differences (March et al. 1999). It has four main components which include:

1. activity profile that answers the question "who does what?" and gender, age, time spent, and location of the activity were also included;
2. access and control profile, which identifies the resources used to carry out the work identified in the activity profile;

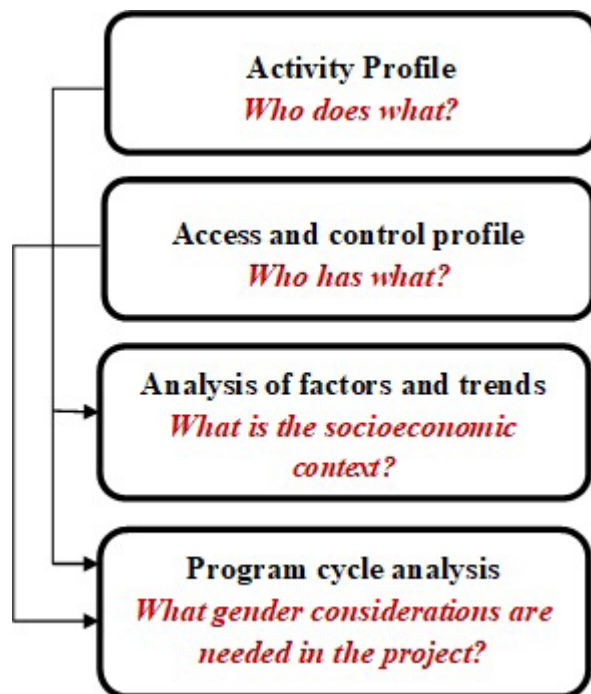


Figure 2. The Harvard Analytical Framework or Gender Roles Framework (Srinivas 2015)

3. influencing factors which influence gender differences; and
4. project cycle analysis, which examines the intervention of gender-disaggregated information.

Several studies have used and assessed the effectiveness of the Harvard Gender Analytical Framework. The study by Wiebe (1997) revealed the Harvard Gender Analytical Framework to be a useful tool in examining data, illuminating the distinctive dynamics of gender work relations in traditional subsistence activities, and in activities linked with the national cash economy and social structure. Okali (2012) analyzed the differences between women and men in labor, tasks, time expenditure, and access to and control over a similar set of assets. FAO (2014) states that the Harvard analytical framework is a method for gender roles analysis. The social relations approach focuses on gender relations analysis while the Moser framework lies between these two, seeing gender roles in the context of relations between women and men. Different frameworks value intangible resources to varying degrees, but the Harvard framework has a particularly narrow definition of resources since it focuses on tangible assets (FAO 2014).

2.3 Data collection

Primary and secondary data were used in the study. Primary data were collected through household surveys using semi-structured questionnaires and focus group discussion (FGD). The household surveys were served to provide relevant and in-depth data on the socio-economic status, present roles, activities, responsibilities, access to and control over resources, and problems and constraints of men and women in the study areas. FGD allowed better background information and expert opinions on the current situation of the municipality's fishing sector. This method of data collection was done to triangulate the responses to achieve sensible analytical results. Related studies were also gathered from published and unpublished articles from libraries and the internet.

The lists of municipal fisherfolk were obtained from the Municipal Agriculture Offices (MAO) of the different municipalities and the Bureau of Fisheries and Aquatic Resources (BFAR) Fisherfolk Registration System (FishR). As of December 2015, there were 2,223 registered fisherfolks in the eight municipalities in Lake Taal (Table 1). The Cochran sample size determination method was employed at a 95% confidence level with a 10% margin of error and

10% precision to determine the sample size, using the following formula:

$$n_0 = \frac{(Z_{\alpha/2})^2 PQ}{e^2}$$

$$n_{adj} = \frac{n_0}{1 + \frac{n_0}{N}}$$

where n is the sample size, Z is the selected critical value of desired confidence level, P is the estimated proportion of an attribute present in the population, Q is $P - 1$, and e is the desired level of precision.

However, during the actual survey, 25% of the randomly selected respondents are not legitimate fisherfolk. According to the Philippine Fisheries Code of 1998 (Republic Act 8550), fisherfolk are people directly or personally and physically engaged in taking and/or culturing and processing fishery and/or aquatic resources. When the National Program for Municipal Fisherfolk Registration or FishR was fully implemented in 2014, the municipal fisherfolk were encouraged to register. In exchange, they will be given a Philippines Health (Philhealth) insurance number and personal crop insurance coverage. This situation led to non-legitimate fisherfolk registering as fisherfolk, which affected the target sample size.

FGDs were organized with the Municipal Agriculturist, Municipal Social Welfare, and fisherfolk representatives from the capture fisheries, aquaculture, fish vendors, and fish processors from the eight municipalities to collect more information regarding the activities and involvement of women in fisheries through questions and idea-sharing. Also, the initial results of the survey were summarized and presented to them for validation.

2.4 Data analysis

Data from questionnaires were encoded and entered into a database system using Microsoft Excel software. Descriptive statistics such as mean, frequency distribution, percentages, and standard deviation were used to describe the variables used in the study.

3. RESULTS

A total of 407 randomly selected respondents were interviewed in 11 barangays from the eight

municipalities in Lake Taal such as Subic Ilaya and Subic Ibaba (Agoncillo), Tagudtod and Abelo (San Nicolas), Saimsim and Calumala (Sta. Teresita), Don Juan (Cuenca), Nangkaan (Mataas na Kahoy), Calawit (Balete), and Sampaloc and Bugaan East (Talisay) from March to September 2016. These barangays were purposely selected because of the high concentration of fisherfolk, and the communities are highly dependent on fisheries. The respondents were represented by 54% male and 46% female, consisting of 214 fishers, 76 fish vendors, four processors, 51 helpers, 62 fish cage/pond owners, managers, and caretakers (Table 1).

Table 1. Number of fisherfolk and respondents by fisheries sector of the eight municipality in Lake Taal

Municipality	Gender	Number of Fisherfolk	Number of Respondents	Capture	Post-harvest			Aquaculture
					Marketing	Processor	Helper	
Agoncillo	Female	154	49	17	17	0	0	15
	Male	334	65	31	6	1	0	27
Balete	Female	24	25	19	2	3	1	0
	Male	169	34	33	0	0	0	1
Cuenca	Female	147	50	2	3	0	45	0
	Male	160	38	29	1	0	5	3
Laurel	Female	43	12	0	7	0	0	5
	Male	87	20	7	2	0	0	11
Mataas Na Kahoy	Female	71	11	2	9	0	0	0
	Male	69	15	15	0	0	0	0
San Nicolas	Female	62	20	7	13	0	0	0
	Male	82	19	19	0	0	0	0
Sta. Teresita	Female	38	14	2	12	0	0	0
	Male	72	12	11	1	0	0	0
Talisay	Female	184	5	2	3	0	0	0
	Male	527	18	18	0	0	0	0
TOTAL		2223	407	214	76	4	51	62
	Female	723	186	51	66	3	46	20
	Male	1500	221	163	10	1	5	42

3.1 Socio-economic profile

Table 2 shows that fisheries in Lake Taal was participated by fishers with a mean age of 43.9 years old, 83% were married while others are single (10%), widow (5%), and separated (2%). In terms of educational attainment, most men and women had only reached elementary (43%) and high school (44%).

Seventy-eight percent (78%) of fishing and fish farming households around the lake are male-headed, and the average household size is five members. Sixty-six percent (66%) of the families have 1-5 members, while ninety-six percent (96%) of the households have 1-5 members who are engaged in

fisheries. The household's average monthly income is PHP 4,525.80, PHP 5,181.76, and PHP 8,012.08 for capture, post-harvest, and aquaculture, respectively (Table 3).

3.2 Gender Roles in Fisheries

The International Labour Organization (ILO 2000) refers to gender roles as the activities attributed to women and men based on their perceived differences. Gender roles are socially determined, change over time and space, and are influenced by social, cultural, and environmental factors characterizing a specific society, community, or historical period.

Table 2. Age, civil status, and educational attainment of the respondents

Range	Capture (n=214)		Post-Harvest (n=131)		Aquaculture (n=62)		Total (n=407)	
	Female Frequency %	Male Frequency %	Female Frequency %	Male Frequency %	Female Frequency %	Male Frequency %	Female Frequency %	Male Frequency %
Age								
≤20	0	6	1	1	0	0	1	7
21-30	10	19	11	8	2	4	23	30
31-40	20	38	35	27	6	19	61	57
41-50	8	47	33	25	7	9	48	57
51-60	9	33	21	16	4	6	34	44
>60	4	20	14	11	1	2	19	26
Civil Status								
Single	4	21	10	8	1	2	15	31
Married	41	139	93	71	17	36	151	186
Separated	2	1	1	1	0	0	3	2
Widowed	4	2	11	8	2	3	17	2
Educational Attainment								
Elementary	20	79	53	40	4	11	77	98
High School	27	67	44	34	13	24	84	97
College								
Undgraduate	0	9	10	8	3	2	13	12
College Graduate	2	5	4	3	0	2	6	8
Vocational	0	2	3	2	0	3	3	5
Never attended school	2	1	0	0	0	0	2	1

Table 3. Head of household, family members, and income of the respondents

	Capture (n=214)		Post-harvest (n=130)		Aquaculture (n=62)		Total	Percentage
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage		
Head of Household								
Male	69	79	99	76	49	79	317	78
Female	40	19	29	22	7	11	76	19
Both	5	2	2	2	6	10	13	3
Number of Family Members								
1-5	139	65	78	60	50	81	267	66
6-10	67	31	49	38	11	18	127	31
11-15	8	4	2	2	1	2	11	3
16-20	0	0	1	1	0	0	1	0
Number of Family Members Engaged in Fishing								
1-5	204	95	123	95	62	100	389	96
6-10	10	5	7	5	0	0	17	4
11-15	0	0	0	0	0	0	0	0
16-20	0	0	0	0	0	0	0	0
Income								
	Average Monthly income				Minimum			
Capture	4525.8				400			
Post-Harvest	5181.76				400			
Aquaculture	8012.08				800			

3.2.1 Reproductive Roles

The reproductive role or domestic role refers to all activities necessary for the maintenance and survival of human life (ILO 2000). It includes childbearing, looking after and educating children, cooking food, washing clothes, and growing or foraging food for home use. Figure 3 shows that men and women jointly served as the primary provider (46%) and decision-maker (45%), while women are mostly responsible for budgeting (79%) and housekeeping (70%) within the family.

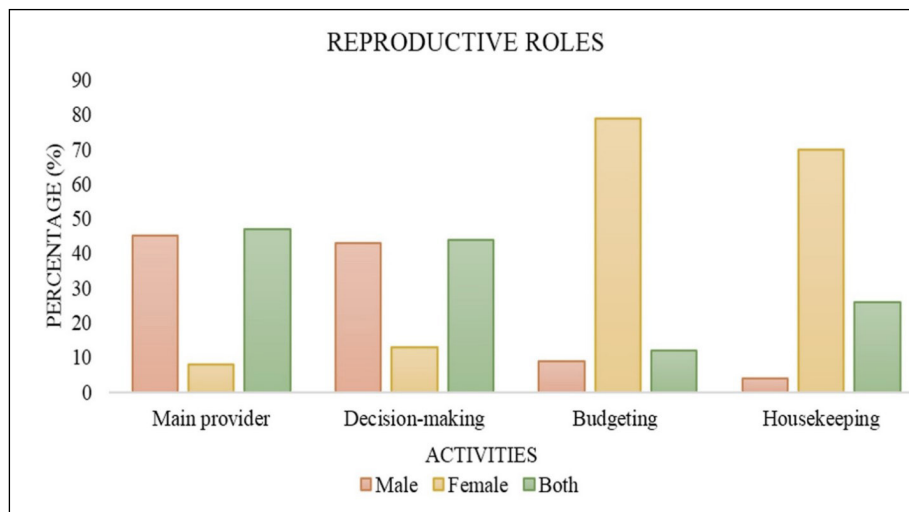


Figure 3. Main provider, decision-maker, and reproductive roles of men and women in fishing and fish farming household

3.2.2 Productive Roles

Productive roles include activities related to the production of goods for consumption or trade and income-generating activities. In the Philippine Fisheries Code of 1998, fisheries were denoted as all activities related to actual fishing, culturing, preserving, processing, marketing, developing, conserving, and managing aquatic resources. The roles of both men and women in fisheries were categorized into three sectors: capture fisheries, post-harvest, and aquaculture. Post-harvest in this study is composed of three sub-sectors: traders, helpers, and processors. Aquaculture, on the other hand, is comprised of the respondents who are engaged in pond and cage culture.

3.2.2.1 Capture fisheries

Fishing is perceived as a laborious activity because it requires great physical strength, especially during throwing and picking up of the nets, and endurance for days of work. Fishing is considered a masculine job because of how it is characterized, but numerous studies have shown that women have also occupied a space in this sector. In Lake Taal, women engage in this type of job for additional income or to accompany their husbands.

A total of 214 respondents engaged in capture fisheries were interviewed. Seventy-six percent (76%) of the respondents were male, and 24% were female. Table 4 shows that most of the respondents are engaged in fishing for ≤ 10 years (30% male; 37% female). Fishing grounds of male and female fishers differ. Male respondents are fishing both nearshore and offshore, while women are mostly fishing near shore. The majority of male and female fishers spent 6-7 days fishing and spends ≤ 5 hours per day fishing. Fifty-eight percent (58%) of male respondents are boat-owners, while 53% of women

are the non-boat owner. Since Lake Taal is considered municipal waters, only small boats are allowed for fishing, and most fishers either go alone or with only one companion.

During peak season, male fishers can catch more than 20 kilograms of fish, while 35% of female fisher can catch up to 10 kilograms. Both males (60%) and females (86%) caught ≤ 5 kilograms of fish during the lean season. The caught fish are both sold and consumed by most of the fishers' household. Male fishers sold their catch directly in the market (37%), thru middle people (31%) or to their neighbors (29%) and neighboring barangays (4%), while women mostly sold their catch to their neighbors (43%). Male (60%) and female (73%) respondents earned between PHP 100.00 and PHP 500.00 per day of fishing, respectively. Fishers practice several sharing schemes such as 75:25 (meaning 75% of profit goes to the boat owner and 25% goes to fisher companion) and 60:40 (60% profit for the boat owner and 40% for fisher companion). Still, most of them are equally dividing the amount earned among them after deducting the expenses for the operation (Table 4).

Seventy percent (70%) of female respondents said they are responsible for preparing food and materials for fishing operations. Respondents for actual or open fishing are also involved in several fishing activities. Both men (15%) and women (16%) are involved in the pre-fishing activities or *paggayak* for the locals of Lake Taal. It includes affixing or tying of sinkers and floaters to the net. This is considered a paid job. Fishers are paid PHP 120.00 - 200.00 for every 40 - 50 meters of the net that they will finish. Eighty-one percent (81%) of male respondents are fish marketers (15%), fish processors (13%), helper (9%), fish cage installer/assembler (9%), fish cage caretaker (7%), harvester (7%), and fish cage owner (7%). On the other hand, 86% of women are also involved in marketing (37%), fish processing (27%), and six percent (6%) were also engaged as helpers and fish cage bookkeepers (Table 4).

Table 4. Involvement of respondents in capture fishing activities

	Male (n=163)		Female (n=51)	
	Frequency	Percentage	Frequency	Percentage
Length of involvement in fishing (years)				
0-10	46	30	19	37
11-20	43	28	17	33
21-30	38	25	7	14
31-40	20	13	6	12
41-50	9	6	2	4
51-60	4	3	0	0
>60	3	2	0	0

	Male (n=163)		Female (n=51)	
	Frequency	Percentage	Frequency	Percentage
Fishing ground				
Nearshore	50	31	24	47
Offshore	49	30	13	25
Both	63	39	14	27
Number of days spent in fishing				
1-3	34	21	12	24
4-5	12	7	8	16
6-7	117	72	31	61
Number of hours spent in fishing				
0-5	97	60	33	65
6-10	32	20	10	20
11-15	30	18	7	14
16-20	4	2	1	2
Boat ownership				
Boat owners	94	58	24	47
Non-boat owners	69	42	27	53
Number of crew				
1-2	140	95	36	71
3-4	19	13	4	8
5 and above	4	3	11	22
Volume of fish caught (kg)				
Peak season				
0-5	38	23	8	16
6-10	38	23	18	35
11-15	14	9	2	4
16-20	37	23	9	18
>20	36	22	14	27
Lean season				
0-5	97	60	44	86
6-10	31	19	5	10
11-15	10	6	0	0
16-20	12	7	0	0
>20	13	8	2	4
Catch destination				
Sold	74	45	22	43
Consumed by Family	8	5	2	4

	Male (n=163)		Female (n=51)	
	Frequency	Percentage	Frequency	Percentage
Both	81	50	27	53
Buyers				
Market	60	37	8	16
Middlemen	50	31	20	39
Neighbor	47	29	22	43
Others	6	4	1	2
Profit				
≤100	2	1	4	8
100-500	97	60	37	73
501-1000	24	15	6	12
1001-2000	24	15	4	8
2001-3000	10	6	0	0
>3000	6	4	0	0
Sharing scheme				
Equal sharing	76	47	26	51
75:50	60	37	22	43
60:40	6	4	0	0
Depends on boat/catch/gear owner	21	13	3	6
Preparation of materials and food for fishing				
Both	30	18	12	24
female HH member	86	53	36	71
Male HH member	47	29	3	6
Extra fisheries-related jobs of fishers				
Pre-fishing	24	15	8	16
Marketing	24	15	19	37
Processing	21	13	14	27
Helper	14	9	1	2
Fish cage owner	11	7	0	0
Fish cage assembler/installer	14	9	0	0
Fish cage caretakere	12	7	0	0
Fish cage Book keeper	0	0	2	4
Harvester	12	7	0	0
None	31	19	7	14

3.2.2.2 Post-harvest

The post-harvest sector is composed of three sub-sectors: fish traders, helpers, and fish processors. A total of one hundred thirty-one respondents were interviewed in this study (12% male, 88% female).

Helpers in Lake Taal served as assistants in entangling the catch from the net. Table 5 shows a significant difference ($p < 0.05$) in males' and females' fishing experience. Seventy-five percent (75%) of male respondents had ≤ 20 -year experience in fishing while 30% of female helpers had ≤ 10 years, 24% had ≤ 20 years, and 20% had ≤ 30 -year experience in fisheries. The majority of both male and female respondents spent 4-7 days per week in fishery activities with 80% and 69%, respectively, and most of them spent ≤ 5 hours a day doing this activity. All male and 91% female respondents said that this job is not paid by cash, but they are only given a small amount of fish as an incentive for helping. Most of the respondents (60% male; 74% female) said they are working for male boat or gear owners. Aside from being a helper, two male respondents are also engaged in fishing and marketing, while all female helpers are also involved in pre-fishing (17%), fishing (20%), and marketing (4%) as their secondary fisheries job (Table 5).

Table 5. Involvement of male and female helper in post-harvest activities

	Male (n=5)		Female (n=46)	
	Frequency	Percentage	Frequency	Percentage
Length of involvement in fisheries (years)				
0-10	0	0	14	30
11-20	3	75	11	24
21-30	0	0	9	20
31-40	1	25	7	15
41-50	0	0	4	9
51-60	0	0	0	0
>60	1	25	1	2
Number of days spent in fisheries				
1-3	1	20	14	30
4-5	2	40	12	26
6-7	2	40	20	43
Number of hours spent in fisheries				
0-5	4	80	35	76
6-10	1	20	9	20
11-15	0	0	2	4
16-20	0	0	0	0
Is this a paid job?				
Yes	0	0	4	9
No	5	100	42	91
Gender of catch/boat/gear owner				
Male	3	60	34	74
Female	2	40	10	22
Both	0	0	2	4

	Male (n=5)		Female (n=46)	
	Frequency	Percentage	Frequency	Percentage
Extra fisheries related jobs of helpers				
Pre-fishing	0	0	8	17
Fishing	1	20	9	20
Marketing	1	20	2	4
Others	0	0	1	2
None	3	60	26	57

Fish trade had been traditionally associated with women. In Lake Taal, 88% of female fish traders had ≤ 30 years of experience, spending 5 hours per day (59%) and 6-7 days per week. Females can sell more than 6-10 kilograms (35%) and up to >20 kilograms (33%) of fish during peak season, while male traders (70%) can sell 16-20 kilograms. During the lean season, 74% of female traders can sell ≤ 5 kilograms of fish, while 50% of males can sell 6-10 kilograms. Most of the traders, regardless of their gender, are selling their catch to their neighbors and nearby markets. The major problem of most female traders is their product transportation, while male traders cited too much or excess catch as the major problem in their business (Table 6).

Table 6. Involvement of male and female in fish trading activities

	Male (n=10)		Female (n=66)	
	Frequency	Percentage	Frequency	Percentage
Length of involvement in fish trading (years)				
0-10	7	70	24	36
11-20	2	20	21	32
21-30	0	0	13	20
31-40	1	10	6	9
41-50	0	0	1	2
51-60	0	0	0	0
>60	0	0	1	2
Number of days spent in fish trading				
1-3	1	10	25	38
4-5	3	30	8	12
6-7	6	60	33	50
Number of hours spent in fish trading				
0-5	6	60	39	59
6-10	4	40	19	29
11-15	0	0	7	11
16-20	0	0	1	2

	Male (n=10)		Female (n=66)	
	Frequency	Percentage	Frequency	Percentage
Product destination				
Market	2	20	25	38
Middlemen	2	20	6	9
Neighbor	4	40	31	47
Neighboring barangays	2	20	4	6
Volume of fish sold (kg)				
Peak season				
0-5	1	10	7	11
6-10	0	0	23	35
11-15	0	0	2	3
16-20	7	70	12	18
>20	2	20	22	33
Lean season				
0-5	2	20	49	74
6-10	5	50	3	5
11-15	2	20	10	15
16-20	0	0	4	6
>20	1	10	0	0
Species sold				
Tilapia	6	60	45	68
Bangus	6	60	25	38
Tawilis	5	50	26	39
Dugong	1	10	9	14
Dalag	1	10	6	9
Biya	1	10	18	27
Arroyo			12	18
Ayungin			6	9
Others (marine fish)				
Tulingan	1	10	43	65
Galunggong	1	10	3	5
Problem				
Capital	2	20	12	18
Excess catch	4	40	6	9
Transportation	1	10	20	30
Market	2	20	8	12
Others	1	10	20	30

	Male (n=10)		Female (n=66)	
	Frequency	Percentage	Frequency	Percentage
Extra fisheries-related jobs of fish traders				
Pre-fishing	1	10	4	6
Fishing	0	0	15	23
Processing	0	0	11	17
Helper	1	10	1	2
None	8	80	35	53

Fish processing is a way of preserving fish, and, at the same time, improving their quality. There are different techniques for fish processing, such as salting, drying, curing, pickling, canning, etc. In Lake Taal, all four fish processing respondents (one male and three females) are practicing fish drying because, according to them, it is easier than other types of processing and is already practiced in their area. One female respondent has been practicing fish drying for 21-30 years already, the other two females had been practicing for ≤ 10 years, and the male respondent for 11-20 years. Female respondents spent 4-5 days per week and almost 10 hours per day in fish drying. Most of them said that they are engaged in this type of activity because of better income and due to excess in fish caught. Their products are dried "tawilis" (*Sardinella tawilis*), "dugong" (Jaguar guapote), and "bia" (goby), which are sold either through middlemen or at the local market. The volume of fish they processed does not exceed five kilograms. The female processor respondents are also engaged in pre-fishing and fishing activities while the male processor is involved only in the pre-fishing activity. Problems encountered by the processors are lack of capital and materials, and bad weather (Table 7).

Table 7. Involvement of male and female fish processor in fisheries

	Male (n=1)		Female (n=3)	
	Frequency	Percentage	Frequency	Percentage
Length of involvement in fisheries (years)				
0-10	0	0	2	67
11-20	1	100	0	0
21-30	0	0	1	33
31-40	0	0	0	0
41-50	0	0	0	0
51-60	0	0	0	0
>60	0	0	0	0
Number of days spent in fisheries				
1-3	1	100	1	33
4-5	0	0	2	67
6-7	0	0	0	0
Number of hours spent in fisheries				
0-5	0	0	2	67
6-10	1	33	1	33
11-15	0	0	0	0
16-20	0	0	0	0

	Male (n=1)		Female (n=3)	
	Frequency	Percentage	Frequency	Percentage
Why engage in fish processing?				
Better income	1	50	3	100
Preserve fish	0	0	0	0
Excess in fish catch	1	50	0	0
Type of fish processing				
Drying	1	100	3	100
Destination of processed products				
Catch are sold	1	33	2	67
Family consumption	0	0	0	0
Both	0	0	1	33
Buyers				
Middleman	1	50	3	100
Market	1	50	0	0
Problems encountered				
Capital	0	0	2	67
Lack of materials	1	100	0	0
Weather	0	0	1	33
Volume of fish processed (kg)				
Peak season				
0-5	1	100	3	100
6-10	0	0	0	0
11-15	0	0	0	0
Lean season				
0-5	1	100	3	100
6-10	0	0	0	0
11-15	0	0	0	0
Species Processed				
Tawilis	1	100	0	0
Dugong	0	0	1	25
Biya	0	0	3	75
Extra Fisheries-Related Jobs of Fish Traders				
Pre-fishing	1	100	1	33
Fishing	0	0	2	67

3.2.2.3 Aquaculture

A total of 62 pond and cage owners and operators were interviewed (68% male, 32% female ($p < 0.05$)). Male dominates the aquaculture sector in the lake and women are mostly hired as bookkeepers in this field. Forty-eight percent (48%) of male operators have been involved in this business for 11-20 years. On the other hand, women were noted to be engaged in this activity for ≤ 10 (40%) and 11-20 years (40%). Most cage owners or managers (male 80%, female 65%) take charge of the operation of ≤ 5 cages with ≤ 5 male and female crew. In most cases, male and female crews receive equal wages; however, some owners pay men and women crew differently depending on the weight of their tasks. Tilapia (*Oreochromis* spp.) is the major species cultured in cages in the lake and is usually sold through a middleman (Table 8). Male dominates the aquaculture activities such as buying supplies, bookkeeping, banking, bill paying, packing or dispatching orders, maintenance or repair, net-making/mending, applying and fulfilling government licenses, marketing, feeding, stocking, and harvesting. On the other hand, women are mostly involved in bookkeeping, banking, and bill paying (Figure 4). Similar to the first two sectors, fisherfolk engaged in fish cage or pond operations also have secondary fisheries-related jobs. Forty-eight percent (48%) male and 30% female are engaged in fishing, while 26% male and 30% female are also involved in pre-fishing and marketing.

Table 8. Involvement of the respondents in aquaculture

	Male (n=1)		Female (n=3)	
	Frequency	Percentage	Frequency	Percentage
Length of involvement in Fisheries				
0-10	16	38	8	40
11-20	20	48	8	40
21-30	4	10	3	15
31-40	2	5	1	5
Number of fish cages owned/managed				
0-5	35	83	13	65
6-10	4	10	5	25
11-15	0	0	1	5
More than 15	3	7	1	5
Number of Crew				
0-5	34	80	16	80
6-10	2	5	4	20
11-15	4	10	0	0
More than 15	2	5	0	0
Do male and female crew receive equal wages				
Yes	12	29	5	25
No	30	71	15	75
Species cultured				
Bangus	5	12	2	10
Tilapia	37	88	18	90

	Male (n=1)		Female (n=3)	
	Frequency	Percentage	Frequency	Percentage
Buyers				
Market	17	40	3	15
Middleman	18	43	7	35
Neighbor	0	0	1	5
Financer	2	5	2	10
Harvester	4	10	7	35
Consumer	1	2	0	0
Extra fisheries-related jobs of fishers				
Pre-fishing	5	12	3	15
Fishing	20	48	6	30
Marketing	6	14	3	15
None	11	26	8	40

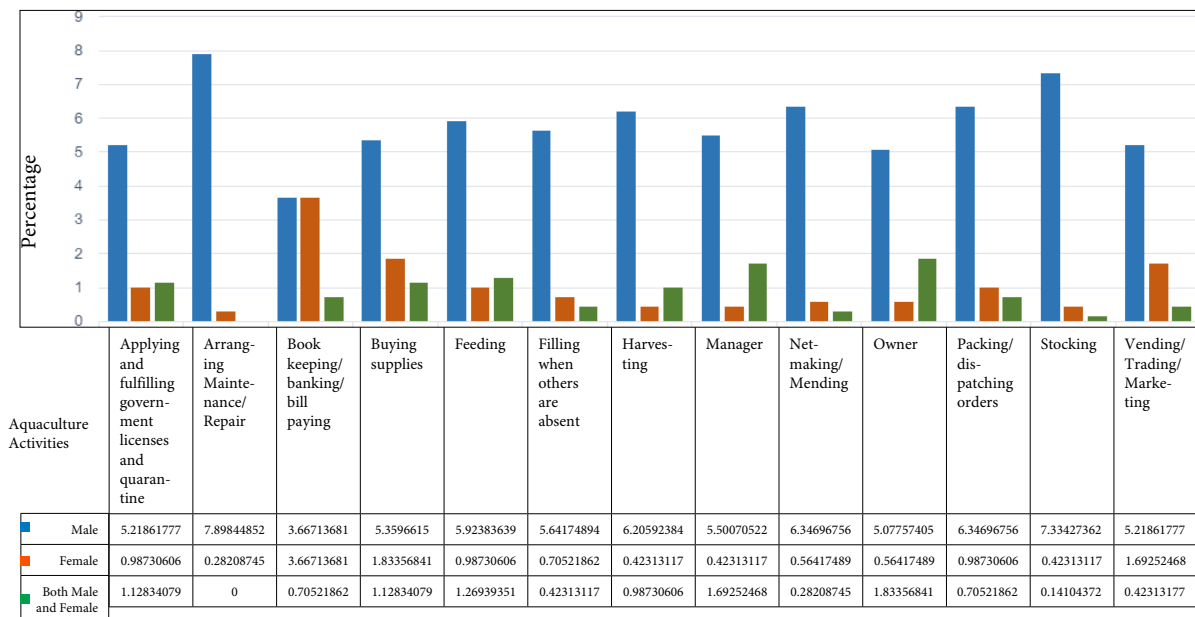


Figure 4. Gender participation in aquaculture activities

3.3 Access to productive resources

Associations served as a bridge for extension services from government and non-government organizations to the fisherfolk. Most of the assistance extended is fishing and processing equipment. Table 9 shows that 80% of fishing households in Lake Taal have 1-5 members who belong in an organization. Sixty-one percent (61%) of the respondents (27% male and 34% female) had received assistance from the organization.

Forty-seven percent of the respondents (both male and female) have availed credits and loans mostly provided by commercial banks and women are usually availing loans for the family. Loans acquired by female members are often used for buying fishing paraphernalia and for household needs. Twenty-nine percent (29%) male and 25% female have received extension services, mostly fishing gears.

Table 9. Access to organization, loans, credit, and extension services of the respondents

	Male		Female	
	Frequency	Percentage	Frequency	Percentage
Membership to Organization				
Number of HH members who are members of organizations				
1-5	198	89	135	72
6-10	6	3	3	2
11-15	0	0	1	1
None	17	8	47	25
Assistance Received from Organization				
Fishing and Processing Equipment	45	20	51	27
Capital/ Financial Assistance	7	3	7	4
Trainings/Seminars	9	4	5	3
Have loans and credits				
Yes	101	46	88	47
No	120	54	96	52
No answer			2	1
Who usually avail loans in the family?				
Male	38	38	10	11
Female	47	47	72	82
Both	16	16	6	7
Source of Credit				
Commercial Bank	17	29	55	36
Cooperative	1	2	13	8
Family	18	31	32	21
Friend	16	27	30	19
Government	0	0	1	1
Informal Lenders/ Private Individuals	4	7	13	8
Traders	3	5	5	3
Feeds Company	0	0	5	3

	Male		Female	
	Frequency	Percentage	Frequency	Percentage
Use of Credit				
fingerlings/ other farm implements	11	26	13	12
fishing gears/engines/ boats	13	30	48	45
HH needs	12	28	30	28
Children's Education	2	5	7	7
Capital	5	12	7	7
Labor	0	0	1	1
Received extension services				
Yes	64	29	46	25
No	155	70	133	72
No answer	2	1	7	4
Type of extension services received				
Capital	5	9	6	11
Fishing gears	49	87	50	87
Processing equipment	2	4	1	2

3.4 Access to and control over resources

Table 10 shows that both men and women have access, use, and control of the social capital and financial capital but limited control over human capital. In contrast, women have access but limited control in terms of natural resources and physical capital. "Access to" refers to right and opportunity. "Control over" refers to right and power over the productive resources. Access to, use of, and control over productive resources are essential to ensuring their right to equality and an adequate standard of living (United Nations Women 2013).

Table 10. Summary of access and control over resources by men and women

RESOURCES	Women	Men
Natural Resource		
<i>Water resources</i>	A	A/C
Physical capital		
<i>Vehicles and transportation</i>	A	A/C
<i>Agricultural and business equipment</i>	A	A/C
Social Capital		
<i>Membership in organizations and groups</i>	A/C	A/C
Human capital		
<i>Education</i>	A	A
<i>Skills</i>	-	A
<i>Knowledge</i>	-	A
Financial Capital		
<i>Credit</i>	A/C	A/C

Note: A- indicates who has access to resources; C- indicates who has control over resources

3.5 Focus Group Discussion

A total of 210 fisherfolk, comprised of 50% male and 50% female, attended at the same time the focus group discussions conducted in the municipalities of Agoncillo, Cuenca, Laurel, Mataas na Kahoy, San Nicolas, Sta. Teresita and Talisay in the province of Batangas. These municipalities were chosen based on the Key Informant Interview (KII) conducted with their Municipal Mayor and Municipal Agriculturist that they are willing to assist either financial or material support. The result of the collected data during the survey interview were presented and validated.

Table 11 shows that ninety-two percent (92%) of the respondents, both male and women, would like to engage in additional income-generating activities. However, 94% had cited financing as the major constraint. The participants identified the different kinds of livelihood programs during the FGD. From this list, the most appropriate livelihood training that they would like to have was chosen. Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis was also conducted to assess the feasibility of the livelihood program.

4. DISCUSSION

Women engaged in fishing can be credited to the fact that their husbands are fishermen (Olowosegun et al. 2005). Women in Lake Taal rely mainly on the resources inshore for subsistence purposes; however, due to the continuous exploitation of resources in this area, some women have to adapt and engaged in offshore fishing. This conforms to the result of the study by Branch et al. (2002) and Weeratunge et al. (2011) that male dominates capture fishing, and most boat owners are male.

In Lake Taal, the difference in the fishing method between men and women is dictated by the fishing ground and fishing gear they are using. This is supported by Kusakabe (2003), who stated that women are considered independent fishers, but their methods and techniques are quite different from those of men. In the FGD, it was mentioned that there are several gears used in Lake Taal, and most are used by both men and women; however, in some cases, women cannot participate totally in operation due to some reasons. In the operation of beach seine, women perform and take the place of men as *hilador* (net hauler) and get better income; however, being a *hilador* will take much of their time and reduce their time for

reproductive duties. In the operation of fish traps or pots where these gears are placed at the bottom of the lake through diving, women can only operate them at the shallow part of the lake. Men in the lake only use spears and hook and line. The use of these gears requires longer working hours outside the house; thus, using these gears may sacrifice women's time for reproductive duties. Most of the small-scale fishers in the lake are using gill nets or *pante* for fishing. After hauling of catch, one of the most-often undocumented post-harvest activities mostly done by women is the entangling of fish from the net or *pananagtag*. This activity is usually done at dawn along the lakeshore, where helpers are waiting for the fishermen to dock. Aside from women, men of old age are also engaged in this activity. The number of hours spent by helpers depends on the volume of fishers' catch. But in most cases, more hands are involved in this activity, which results in faster work and faster delivery of fish to the buyers and lesser post-harvest losses. Although this job is essential in reducing post-harvest losses, helpers were not paid by cash; instead, they were just given a small amount of fish as an incentive just enough for a family to consume for one day.

Differences in the volume of catch of men and women may also be accounted to the fishing ground and gear they are using. Most of the catch of fishers in Lake Taal are both sold and consumed by their family. The products or catch of fishers in Lake Taal were distributed and retail traded by women. Women dominate seafood trading and selling, although, there are also several men engaged in this activity. Most women in Lake Taal dealt with the marketing of fresh fish in nearby markets such as their neighbors and neighboring barangays. Male traders used motorized boats for faster and easier access to the market. In contrast, female traders need to hire a boat from a "sitio" (a territorial enclave that forms part of a barangay) to the main island. From there, another payment is again needed for the transport of the product going to the public market. The problem with transportation leaves them with no choice but to sell the products to the middlemen. This problem affects most of the fishers since the middlemen dictate the price of the fish. Fisherfolk living at the Vulcan Point strategized to lessen the cost of transportation of products. Contributions were collected from each organization member, and a person was assigned to transport and market all the products.

In aquaculture, women's roles and the extent of their participation in value chains are more significant than often assumed (Ndanga et al. 2013).

Table 11. Additional source of income, hindrance in engaging in other livelihood and suggested livelihood program of the respondents

Additional Source of Income	Capture				Post-harvest				Aquaculture			
	Male		Female		Male		Female		Male		Female	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Yes	145	88	46	90	14	88	109	96	40	98	17	94
No	19	12	5	10	2	13	5	4	1	2	1	6
Hindrance in starting own business												
Contact with customers	4	3	1	2	0	0	7	6	0	0	1	7
Financing	127	96	48	98	11	100	98	90	36	97	13	87
Funding premises	1	1	0	0	0	0	3	3	0	0	1	7
Family Issues	0	0	0	0	0	0	1	1	1	3	0	0
Suggested Livelihood Program												
Capital	7	5	2	3	0	0	3	3	1	3	0	0
Fish Cage	7	5	4	6	0	0	3	3	4	12	3	17
Fish Processing	25	16	9	15	1	7	23	20	5	15	1	6
Fishing gear	79	51	18	29	8	53	41	36	12	35	7	39
Livestock	28	18	12	19	5	33	22	19	10	29	1	6
Store	7	5	9	15	0	0	8	7	2	6	3	17
Soap/Candle/Dish-washing making	0	0	5	8	0	0	4	4	0	0	3	17
Net mending	0	0	3	5	0	0	3	3	0	0	0	0
Handicrafts	1	1	0	0	0	0	3	3	0	0	0	0
Farming materials	1	1	0	0	0	0	0	0	0	0	0	0
Water Lily Livelihood Program	0	0	0	0	1	7	0	0	0	0	0	0
Garments	0	0	0	0	0	0	4	4	0	0	0	0

Women are engaged as financiers, managers, and owners of fish cages, the male members of the family take control of the management of stocks. Men are involved in all stages of culture, from buying supplies to the trading of harvest. In contrast with the scenario in capture fisheries, marketing of aquaculture products is done by males. Fish cage operators sold their stocks to intermediaries, neighbors, or the harvesters. Harvesters act as a middleman. They are buying the harvested stocks on-site, and they are responsible for marketing the products to other places. Like in cage culture, men and women are involved in every step of the fish farming process in ponds. Pond owners hired both male and female caretakers and paid equal wages. In minimal cases where cage owners pay less to women, it is due to the male crew's weight of work.

Women also complement men's fishing activity by engaging in on-site production of non-conventional marketable commodities (The World Fish Center 2010). In the small-scale fisheries of Lake Taal, women's roles are dominant in the post-harvest sector. Home-based income-generating activities such as fish processing and fish trading significantly contribute to the family's cash income while women are doing their household responsibilities. Women engaged in fish processing mainly for better income and to preserve fish when there is oversupply. Their main products include dried *tawilis*, *biya*, *dugong*, and *tilapia*. There are several ways women processors gain access to fish; some obtained their raw materials from their fisherman husband while others get the fishery products from their neighbors' catch. Women with capital bought fish either from the landing sites or from the market. Drying is one of the simplest fish preservation and value-addition techniques known in the country. This processing technique requires low capital and a few processing materials, and the produced dried fisheries products are both for selling and family consumption. The dried products are usually sold to intermediaries which command lower prices. Processors can earn better if the products are directly sold in the markets. However, it is not practical for them to transport their product due to the distance and transportation cost to the market.

Both genders have access to social capital since both are given the right to join an organization. However, the majority of recorded fishers in the fisheries registration and membership in the fisheries organization were male; thus, the benefits often go to them. Despite fewer number of female organization members recorded, most of them received extension services from different government and non-

government organizations. In Lake Taal, extension services are usually given during fisherfolk meetings. Women typically attended these meetings as representatives of their husbands; thus, they are the ones receiving the said services. However, most services are in the form of fishing paraphernalia, mainly used by men, and increases pressure in the lake. In both genders, only a few had received training and seminars. Intervention efforts, such as providing skills and livelihood training, will give the women excellent opportunities to develop their potentials and self-confidence. To continuously increase the participation of men and women in the fisheries, agencies responsible for the extension must widen the scope of the services and focus on other sectors such as the post-harvest and aquaculture sectors. Training and provision of storage facilities will help develop and improve the marketing of fishery products in the lake. Public awareness must also be conducted to solve the problem with women's double burden for them to engage more in productive activities. Women have an essential role in Lake Taal's fisheries industries, and they must be recognized in the distribution of benefits.

Both genders have access to financial capital since they have both availed credits and loans provided by commercial banks. A significant number of respondents stated that they had availed credits and loans provided by commercial banks in which women are usually availing loans for the family. Credits were used mainly for buying fishing gears, engines, and boats, which were used by male fishers. In the works of Goetz and Sen Gupta (1994) and D' Espallier et al. (2011), it was stated that women are reasonable credit risk since they have a high propensity of paying back their loans. Another reason stated by McGoodwin (2001) is that women have "numerous, extensive, and more complex" social networks compared to men who are working away from the community. Although women acquire credit for the household, this does not ensure that they have control over this because loans enter the family's general fund, which is used for multiple purposes. Regardless of gender-role differences, wealthier groups of women and men play dominant roles in the lake, while the poor have weak bargaining power and are more vulnerable to decreases in catch and reduced services.

This study showed that the primary users of Lake Taal resources are middle-aged adults. They are responsible for providing the basic needs and education for other household members. The latter are either too young or too old to provide for themselves. Philippine fisherfolk are considered the

poorest of the poor. According to the Philippine Statistics Authority (2017), fishermen families posted 2nd of the highest poverty incidence in 2015 at 34.0% next to farmers with 34.3%. The households of respondents engaged in open fishing and fish trading are earning less than PHP 7,890.00 in which, according to Albert et al. (2015), is the average monthly income of poor families. Most of the respondents, both men and women, had low educational attainment. Due to poverty, most households cannot afford to provide for the children's education in the family. Fishers of Lake Taal are engaged in multiple jobs, which shows that fishing alone as a source of income is not enough to meet the household's needs. Fishing households in Lake Taal are male-headed, which conforms to the Philippines' cultural belief that men are the primary provider of income in the family. Women complement or subsidize men's roles by performing several reproductive activities, while male members of the household are doing productive work. Female members of the family are responsible for the preparation of food and finances for the whole household. These findings are supported by the work of Williams (2010) and Lentisco and Lee (2015), which claims that women are the principal caregivers in households in small-scale fishing communities. They usually carry the responsibility of providing food and nutrition security, taking care of young and older people, and managing their finances. Dowling (2011) stated that women are the "accountants behind fishermen." Both men and women in the fishing household of Lake Taal jointly served as the household's main provider and decision-maker.

5. CONCLUSION

Access to the fisheries resources of Lake Taal is open to both men and women; however, the use of the resources is often controlled by men fishers, especially in the off-shore areas. The difference in the lake's resources' access and control resulted in differential economic benefit to both genders. Unequal division of reproductive roles and male-focused programs are among the major bottleneck in women's contribution to fisheries. The need for women to remain within the household premises so they can attend to their designated responsibilities limits their activities near-shore. Nevertheless, these activities either contribute to household income or provide direct food for the table. While women have moved from reproductive to productive domain, men are still limited in doing domestic work to ease the multiple burdens of women.

This study recognized the participation of women before and after fish capture. These pre- and post-production activities are significant in terms of their economic and social value. Recognizing the role and participation of gender in the fisheries sector provided a clear view of Lake Taal's fisheries industry. This study eliminates the common notion that women have a minimal contribution to the fisheries sector and showed that women have valuable participation in the fisheries sector along with men, and these contributions make the fishing industry viable.

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