



## Coastal women involvement on the various fisheries management programs in the Coastal Municipalities of Pampanga

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**Key words:** Coastal communities, Women empowerment, Fisheries management program

### Abstract

The study was conducted to determine the extent of involvement of women in three coastal municipalities of Pampanga to various fisheries management programs implemented by local and national government agencies. Result of the study revealed that most of the women respondents are dominated by the age group of 31-40, married, secondary undergrad and graduates, and having a household size of 1-3 members. Most of the respondents are not members of a civic organization and most of them did not receive trainings or seminars related to fisheries management. In terms of socio-economic profile, most of the women don't have a source of income and efforts are mainly on domestic workloads that usually unpaid. Result also indicated that level of awareness of women on fisheries management is low with verbal interpretation of "slightly aware". Awareness was found to affect participation in which level is very low with a verbal interpretation of "slightly aware". A strong positive association between level of awareness and level of involvement was revealed. Furthermore, women considered conflict among resource users as the main problem identified needing implementation of management programs. Lastly, reproductive and childcare responsibility was considered a major barrier to their participation in resource management. Trainings, seminars, workshops, and another study are highly indispensable.

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## Introduction

Fisheries resources provide livelihood opportunities for many coastal communities in the Philippines through direct extraction, fish farming, transportation, and recreation. Fishing is an old form of livelihood and still the major type of income generating activity in many coastal communities. The contribution of the resources extracted or taken from communal bodies of water cannot be ignored particularly in the protein requirement and economic status of coastal dwellers. However, due to the open access regime of the country's capture fishery, many of these resources are now under the constant threat of decimation. Proper management of the remaining resources is a key factor to achieve sustainability and food security.

Fisheries management involves a complex and wide-ranging set of tasks, which collectively have the achievement of sustained optimal benefits from the resources as the underlying goal (Cochrane, 2001). The overall goal of fisheries management is to produce sustainable biological, social, and economic benefits from renewable aquatic resources (Lackey, 2005). Fisheries management is synonymous to managing people (Degen and Leng, undated). The fishers are the primary resource users or extracting resources from its natural environment. The open access regime in Philippine waters has given an unlimited opportunity for a fisher to decide where and when to fish using an available fishing gear. However, decision of a fisher depends on decisions made at other levels of stakeholders, such as fish markets, fishery laws, law enforcement, availability of capital, alternative labor opportunities, etc. (Degen and Leng, undated). The integration of gender and development in fisheries can be cited to many reports globally. However, level of participation of men and women in fisheries is still a major concern in research. Generally, men invest in fishing vessels, nets, other gears, pond construction and are involved more on production. On the other hand, women investing more in processing equipment and they are responsible for fish purchasing, processing, and retailing however, this differs in every fishing area and country (De Silva, 2011).

Studies on women in fisheries so far have been more or less concentrated on fish processing and preservation techniques and activities, extension, and socio-economic status of women, on women's participation in fishing or in aquaculture, and the rights of women in fishing communities (Harrison, 2000; Ahmed *et al.*, 2012; FAO, 2013; Singh *et al.*, 2014; Ur Rashid, 2015; Lentisco and Lee, 2015).

Awareness and involvement of women on various fisheries management programs, projects, and regulatory measures is so far not substantial. Recognizing and quantifying the role of women in decision making and implementation of such programs and regulations may provide profound implications for management, poverty alleviation and development policy. Because men and women do different tasks in the fisheries sector, their knowledge may differ particularly in fisheries management. Hence, this study was undertaken to determine the women's awareness and involvement in fisheries management in Pampanga.

### *Objectives of the Study*

The ultimate purpose of the study is to explore the level of awareness and participation of coastal women on various fisheries management programs/projects.

Specifically, the study sought to:

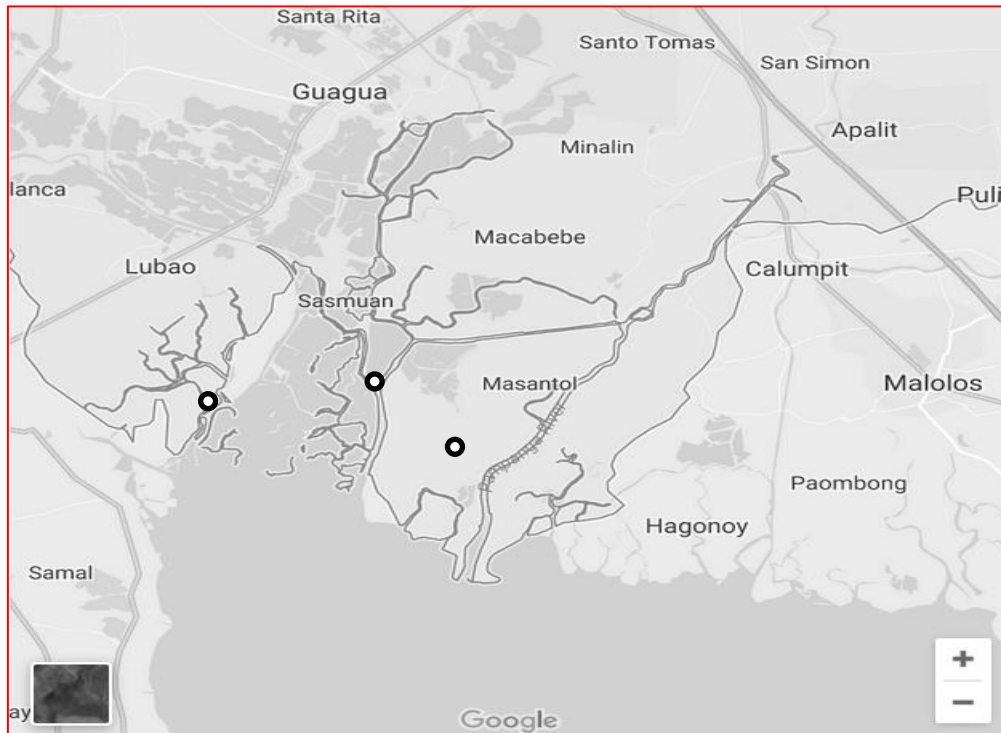
1. Describe some socio-demographic and socio-economic characteristics of women in coastal municipalities of Pampanga;
2. Examine the awareness and participation of women on various fisheries management programs/projects implemented by the government;
3. Ascertain the relationship between the level of awareness of women on various fisheries management programs and level of their involvement in the implementation of the fisheries management programs.
4. Determine the perception of women on the need for fisheries management programs/projects in coastal municipalities; and
5. Identify constraints on the participation of women to fisheries management.

## Materials and methods

### *Locale of the Study*

The study was conducted in three coastal municipalities of Pampanga to wit: Lubao, Sasmuan, and Masantol. These municipalities are located in the southwestern portion of the province facing Manila

Bay. Pampanga River and its tributaries traverses in these areas and drained to Manila Bay. The three municipalities are also the center of brackishwater aquaculture in the province in which huge volume of fish transported and traded in the province and nearby provinces were produced.



**Fig. 1.** Location of the Study.

### *Research Method*

The study employed the non-experimental method of research specifically sample survey. The research project was mobilized through sending letter of request to the Local Government Units of the three municipalities. Upon approval, the researchers seek the assistance of concerned offices of each LGU in the survey proper. Primary data on the total number of households in the coastal areas of the three municipalities were acquired from the municipal registry office.

Respondents of the study were selected through simple random sampling. Personal interview was done through house-to-house visitation of key respondents in the coastal communities. However, some considerations were also taken such as (1) availability of the respondent for an

interview; (2) involved in various fisheries activities, and (3) accessibility.

A total of 372 women in three coastal municipalities were interviewed during the course of the study. In Lubao, 133 respondents were interviewed with the aid of barangay officials and civic volunteer officers. In Masantol, a total of 83 women were interviewed. In Sasmuan, there were 156 respondents surveyed, the highest among the three municipalities.

### *Data Gathering Procedure*

A personal interview was conducted to the target population with the use of structured questionnaire comprising items intended in generating relevant data. The questionnaire was developed based on the objectives of the study.

*Data Treatment and Analysis*

Simple descriptive statistics such as frequency and percentage were used to achieve the distribution of respondents according to socio-demographic and socio-economic characteristics. Women’s awareness and involvement was measured by a 5-point Likert scale on 15 selected items. Awareness is measured from 1 to 5 (1 = not aware; 2 = slightly aware; 3 = somewhat aware; 4 = moderately aware; and 5 = extremely aware).

On the other hand, involvement or participation of women in the implementation of fisheries management programs was measured from 1 to 3 (1 = not involved; 2 = slightly involved; 3 = somewhat involved; 4 – moderately involved; and 5 – totally involved). Interpretation of the results in the level of awareness and involvement of the respondents, mean scores of women for every fisheries management program were computed and used the following ranges with verbal interpretation.

Range	Verbal Interpretation	
	Awareness	Involvement
1.00-1.50	not aware	not involved
1.51-2.50	slightly aware	slightly involved
2.51-3.50	somewhat aware	somewhat involved
3.51-4.50	moderately aware	moderately involved
4.51-5.00	extremely aware	totally involved

Relationship of women’s level of awareness and level of involvement in each management program was analyzed using Pearson moment correlation with a following formula:

$$r = \frac{\sum(X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum(X_i - \bar{X})^2} \sqrt{\sum(Y_i - \bar{Y})^2}}$$

On the other hand relationship between overall level awareness and overall level involvement of women on various fisheries management programs, projects, and regulatory measures was determined using the Spearman rank Correlation Coefficient (*r*). Level of awareness and participation of women to individual management programs were subjected to ranking.

The formula for computing Spearman *r* is:

$$r_s = 1 - \frac{6 \sum d_i^2}{N^3 - N}$$

Where:  $d_i = X_i - Y_i$ , N = total number of respondents

Perception of women on the need for fisheries management was evaluated using a 5-point scale. Perception on current issues and problems in fisheries is measured from 1 to 5 (1 – not intense; 2 – low intense; 3 – moderately intense; 4 – intense; and 5 – very intense). Mean scores for the selected problems were computed and used the following range of verbal interpretations.

- 1.00 - 1.50 - not intense
- 1.51 - 2.50 - low intense
- 2.51 - 3.50 - moderately intense
- 3.51 - 4.50 - intense
- 4.51 - 5.00 - very intense

For the achievement of objectives number 5, frequency counts, and ranking were made to identify the most common constraints on the participation to fisheries management programs. Ranking was based on the frequency obtained per item. All treatment and analysis was aided by Microsoft excel ver. 2010.

**Result and discussion**

*Socio-Demographic Profile*

*Age*

The distribution of women respondents as to age is presented in table 1. Most of the respondents in the municipality of Lubao belong to the age group of 41-50 comprising 32.33% of the total respondents in the randomly selected in the town. This indicates that women in this age group were dominated the gender population in the coastal areas of the town. In Masantol, 31-40 is dominant age group of women is identified representing over one-third (37.35%) of the respondent size. Identical to the Municipality of Masantol, most of the women in Sasmuan’s coastal areas were found to belong in the age group of 31-40 (36.84%).

On the other hand, aggregate data (Fig. 2) as to age of the respondents in 3 municipalities also showed that 31-40 age group comprised the highest frequency and percentage among given age groups.

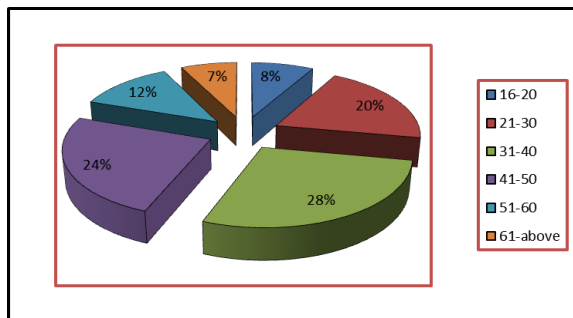
The result can be related to the findings of ur Rashid (2015) showing majority of women in the coastal areas of Bangladesh with an average age of 35. 92

years old dominated the involvement in various agricultural and fisheries production. Williams (1996) indicated highest percentage of women in the fishing communities of Nigeria was in the age bracket of 20-59 years old.

The result infers that the common individuals engaging in the fisheries sector were in the middle adulthood. The three coastal municipalities of the province are endowed with vast natural resources and most people living in the coastal areas derived their income from the bounties of aquatic resources. The identified women age groups recognized fishing and other activities related to fisheries an important means for subsistence and support to their husband's income for daily necessities.

**Table 1.** Distribution of women respondents according to age per municipality.

Municipality	Age group	Frequency	Percentage
Lubao	16-20	12	9.02
	21-30	20	15.04
	31-40	28	21.05
	41-50	43	32.33
	51-60	21	15.79
	61-above sub-total	9	6.77
Masantol	16-20	8	9.64
	21-30	20	27.10
	31-40	31	37.35
	41-50	14	16.87
	51-60	7	8.43
	61-above sub-total	3	3.61
Sasmuan	16-20	10	6.58
	21-30	23	15.13
	31-40	56	36.84
	41-50	34	22.37
	51-60	18	11.84
	61-above sub-total	11	9.87



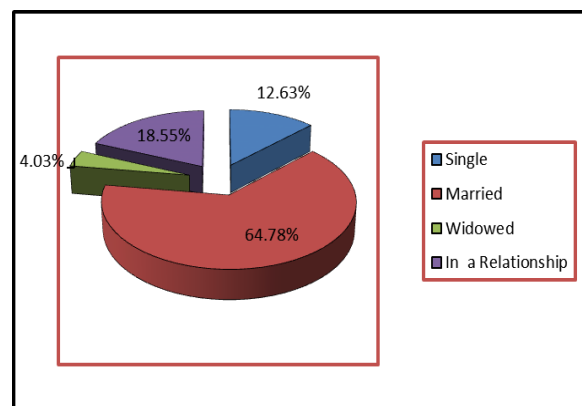
**Fig. 2.** Women's Distribution as to age.

*Civil Status*

As shown in table 2, it can be noted that women have different distribution when it comes to civil status. However, most of these women in were dominated by married individuals with 72.93%, 50.60%, and 65.38% distribution in Lubao, Masantol, and Sasmuan, respectively. This was followed by women having an intimate relationship or those having already a partner, however, not yet entered the sacramental ritual of marriage. Women in a relationship status were found at 15.79%, 26.51%, and 16.67% in Lubao, Masantol, and Sasmuan, respectively. On the other hand, women that are still single comprised lower portion of the respondents having 8.27% in Lubao, 16.87% in Masantol, and 14.10% in Sasmuan while widowed women only represented by very small number in each municipality.

**Table 2.** Civil status of women per municipality.

Municipality	Civil Status	Frequency	Percentage
Lubao	Single	11	8.27
	Married	97	72.93
	Widowed	4	3.01
	Unmarried with partner	21	15.79
	Sub-total	133	
Masantol	Single	14	16.87
	Married	42	50.60
	Widowed	5	6.02
	Unmarried with partner	22	26.51
	Sub-total	83	
Sasmuan	Single	22	14.10
	Married	102	65.38
	Widowed	6	3.85
	Unmarried with partner	26	16.67
	Sub-total	156	



**Fig. 3.** Aggregate data on Civil Status.

The same result was revealed when data from the three coastal municipalities aggregated (Fig. 3). The result is somehow identical to the result of the study conducted by Williams (1996) in the fishing communities of Nigeria.

*Educational Attainment*

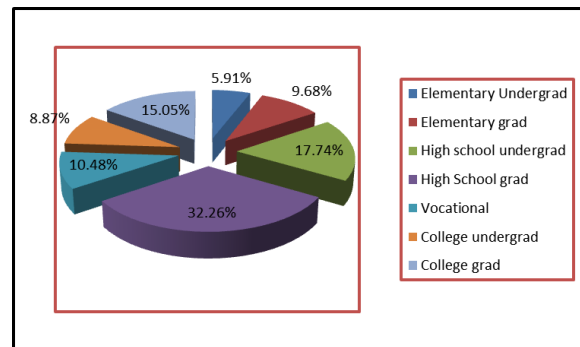
Depicted in Table 3 is the information on women’s distribution according to their educational attainment. The result showed that all respondents formal education, however, most of them were secondary graduates. Aggregate data (Fig. 4) in three municipalities showed that 32.26% had finished high school, 17.74% reached secondary education but not graduated, 15.05% acquired bachelor’s degree, 10.48% have technical and vocational certificate, 9.68% completed primary educations, 8.86% did not finish tertiary level, and the remaining 5.91% represents women that did not complete elementary level. The result is not in conformity to the report of Williams (1996) in other parts of the globe that most of the women in coastal communities are not attending formal education. Access to general education in children of fishing families often denied due to their huge contribution in the labor force in fisheries working as crew on fishing boats, as fish sorters, and other fisheries based livelihoods. According to AusAID (1997), boys often have better access to education than girls because parents prefer boys to attend school. Although it was found out in this study that all of the women attended formal education, educational attainment of the majority is still low which can be enhanced by further coastal education development. This situation could be attributed also to the insufficiency of infrastructures and inadequacy of efficient transportation in coastal communities.

The result implies that involvement in various fisheries activities particularly in fishing as a source of livelihood does not require high educational attainment. However, some women strived in the tertiary education to elevate their economic status and escape the stereotype culture of early marriage and pregnancy in coastal communities. As observed, these women were directly or indirectly involved in the fishing communities disseminating the

importance of education in relation to the current status of aquatic resources. Some are actively involved in law enforcement serving as catalysts of change in the present implementation and enforcement of management measures in the locality.

**Table 3.** Distribution of respondents as to educational attainment.

Municipality	Educational Attainment	Frequency	Percentage
Lubao	Elementary Undergrad	4	3.01
	Elementary grad	8	6.02
	High school undergrad	31	23.31
	High School grad	40	30.08
	Vocational	13	9.77
	College undergrad	11	8.27
	College grad	26	19.55
	Sub-total	133	
Masantol	Elementary Undergrad	4	4.82
	Elementary grad	10	12.05
	High school undergrad	21	25.30
	High School grad	27	32.53
	Vocational	7	8.43
	College undergrad	5	6.02
	College grad	9	10.84
	Sub-total	83	
Sasmuan	Elementary Undergrad	14	8.97
	Elementary grad	18	11.54
	High school undergrad	14	8.97
	High School grad	53	33.97
	Vocational	19	12.18
	College undergrad	17	10.90
	College grad	21	13.46
	Sub-total	156	



**Fig. 4.** Aggregate data on educational attainment.

*Household Size*

On the basis of household size, most of the women’s household in the coastal municipalities of Pampanga consisted of 4-6 members. This also indicates that most of the married and unmarried women already in a relationship have 2-4 children. This was followed by women with household members of only 1-3 indicating that these women are still living with their parents, having only one child, living alone or had no

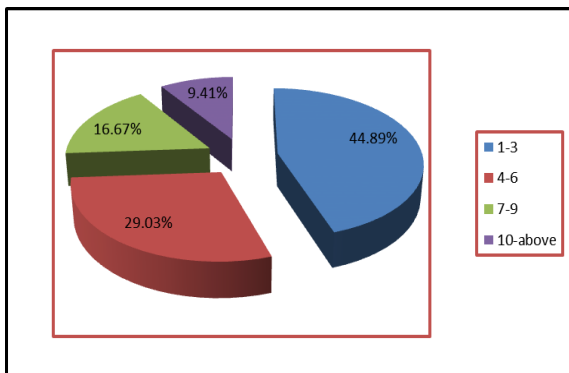
children yet. Some of the respondents were having household members ranging from 7-9 and 10 above inferring higher numbers of dependents.

Having an average and larger household size are common in coastal communities (Williams, 1996; Lentisco and Lee, 2015). The driving force maybe the traditional expectation that women can bear as many children as possible to meet the required labor force providing income for the family and in doing household chores.

Venkatesh (2006) stressed that many of the coastal households depend on income from at least two earners to make ends meet, and it is not unusual for a family of six to be simultaneously involved in four different transient occupations. Thus, living in a coastal area depends as much on physical labor for their sustenance particularly when the only source of income is from artisanal type of fishing.

**Table 4.** Distribution of women in terms of household size.

Municipality	Household members	Frequency	Percentage
Lubao	1-3	41	30.83
	4-6	56	42.11
	7-9	25	18.80
	10-above	11	8.27
	Sub-total	133	
Masantol	1-3	24	28.92
	4-6	40	48.19
	7-9	13	15.66
	10-above	6	7.23
Sub-total	83		
Sasmuan	1-3	43	27.56
	4-6	71	45.51
	7-9	24	15.38
	10-above	18	11.54
Sub-total	152		



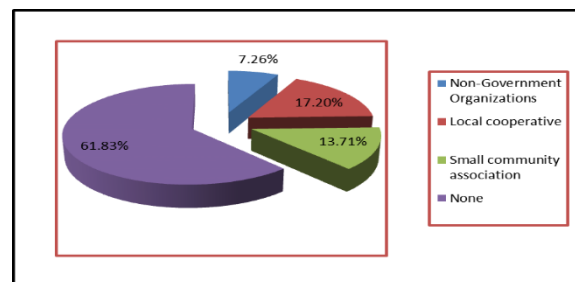
**Fig. 5.** Aggregate data on household size.

*Civic Organization Membership*

Table 5 shows the organizational affiliation of the respondents. Result revealed that most of the respondents in the 3 municipalities are not affiliated to any organization. However, there were few that are involved in different activities focused on community empowerment. In Lubao, some women are members of local cooperatives (12.03%), non-government organizations (9.02%), and small community associations (3.76%). In Masantol, few women were found to be members of a local cooperative (25.30%), non-government organizations (4.84%), and only 1.20% is affiliated to small community association. In Sasmuan, 28.85% of the respondents are affiliated to small community associations, 17.31% are in local cooperatives, and 7.05% are members of non-government organizations. The result infers that most women in the coastal municipalities have less access to facilities and credit from the significant projects of the government and non-government institutions.

**Table 5.** Distribution of respondents as to membership in organization.

Municipality	Civic Organization	Frequency	Percentage
Lubao	Non-Government Organizations	12	9.02
	Local cooperative	16	12.03
	Small community association	5	3.76
	None	100	75.19
	Sub-total	133	
Masantol	Non-Government Organizations	4	4.82
	Local cooperative	21	25.30
	Small community association	1	1.20
	None	57	68.67
Sub-total	83		
Sasmuan	Non-Government Organizations	11	7.05
	Local cooperative	27	17.31
	Small community association	45	28.85
	None	73	46.79
	Sub-total	156	



**Fig. 6.** Aggregate data on organizational membership.

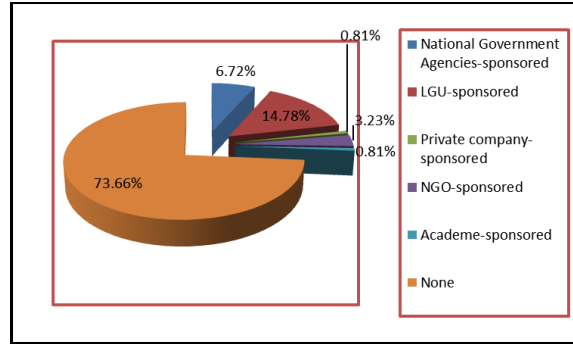
*Trainings Attended related to Fisheries Management*

Seminars and trainings are essential to empower women in the field of fisheries particularly in managing resources. The result revealed that most of the respondents in the coastal municipalities have not attended seminars/trainings regarding fisheries management. However, there were some of them have undergone trainings/seminars sponsored by the local government units (14.78%), national government agencies (6.72%), non-government organizations (3.23%), and the academe (0.81). The result infers that women in coastal areas were not commonly receiving training/seminar assistance when it comes to fisheries management from various concerned agencies.

The result of the study is in accordance with the report of Willams *et al.* (2002) that women in fishing communities are often illiterate, and lack access to training and other opportunities to improve their marketable skills. Men mainly attended training courses because most women in fishing communities may have their domestic duties, which prevent them from being away from home for a period of days.

**Table 6.** Trainings Attended by women respondents.

Municipality	Training/Seminar	Frequency	Percentage
Lubao	National Government Agencies-sponsored	8	6.02
	LGU-sponsored	13	9.77
	Private company-sponsored	0	0.00
	NGO-sponsored	3	2.26
	Academe-sponsored	0	0.00
	None	109	81.95
	Sub-total	133	
Masantol	National Government Agencies-sponsored	3	3.61
	LGU-sponsored	6	7.23
	Private company-sponsored	1	1.20
	NGO sponsored	4	4.82
	Academe-sponsored	0	0.00
	None	69	83.13
	Sub-total	83	
Sasmuan	National Government Agencies-sponsored	14	8.97
	LGU-sponsored	36	23.08
	Private company-sponsored	2	1.28
	NGO-sponsored	5	3.21
	Academe-sponsored	3	1.92
	None	96	61.54
	Sub-total	156	



**Fig. 7.** Aggregate data on the trainings attended by respondents.

*Socio-Economic Profile*

*Major Source of Income*

The Food and Agriculture Organization (2012) reported that women accounted for 5.4 million of the 45 million people engaged full time or part time in the primary fisheries and aquaculture sector, which means that they represented 12% of the sector’s total workforce. According to Siason (2001), approximately 990,872 people are employed in the fisheries sector, about 5% of the Philippines’s labor force. At present this could be higher due to the ballooning population of coastal areas and different fisheries activities forms the economic backbone of most coastal communities. Further, of these fig.s, 68% are employed by municipal fishing, 26% by aquaculture, and 6% by commercial fisheries (BFAR, 2004). In the 1995, it has been reported that 91.7% of those employed in fisheries are male and 8.2% are female, indicating that fisheries is a male dominated field.

Based from the result generated from this study, it was noted that most of the women in three coastal municipalities do not have a source of income. This infers that most of the women are mainly dependent on the income provided by their husband for the family’s requirement for a living.

On the other hand, it was noted that there were few of them have sources of income. Some are engaged directly in fisheries while others are not. Women having paid in fisheries activities were dominated by those involved in fish trading, net weaving/mending, and processing comprising 44.09% of the total respondents. This result is in accordance with the



report that women undertake 50 percent to 70 percent of local fish processing and marketing activities in the Philippines. They are also involved in mending the nets and tending the fishing equipment, among others (Philippine NGO BPA+10 Report, 2005). Previous studies also showed that men worked predominantly in fish extraction while women are glared towards post-harvest activities including the construction of fishing gears, fish sorting, fish handling, and fish processing (Sirisambhand, 1997; Lambeth *et al.*, 2002; Medard *et al.*, 2002; Siason *et al.* 2002; Williams *et al.*, 2002; Bennett 2005). Low involvement of women in the extractive side of fisheries may be due to a stereotype perception that women are physically weak and unsuited to the physical demands of fishing (Arenas and Lentisco, 2011). Women’s involvement in capture fisheries limited only to subsistence side. Extraction of resources are commonly conducted in shallow intertidal, estuarine, lakes, and riverine areas using only bare hands or non-bulky fishing gears such as dredge, gill nets, cast nets, and pots. Mendoza (2014) claimed that shellfish and sea cucumber gathering in the intertidal portion of Dasol Bay were dominated by women. The fishing activities of women in Pantar Island, Indonesia were conducted in mangrove areas, intertidal areas and inshore coastal waters out to approximately 2.5 km as revealed by Fitriana and Stacey (2012). This demonstrates that women do fish and participate in a range of fishery related activities which in turn contribute significantly to household food security and income.

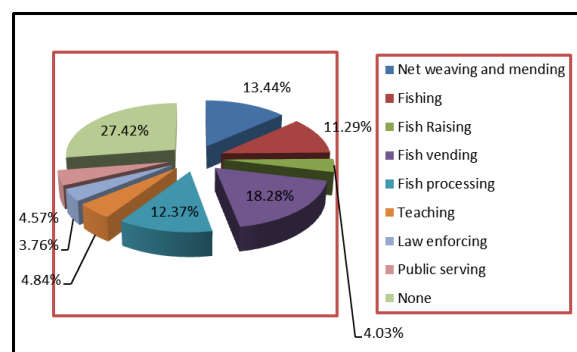
As also revealed, some of the respondents are employed far from the stereotype coastal income-generating activities. There are teachers and civil servants. These women from the coastal areas of the province worked hard for their education to escape the dwindling opportunities from fishing and other related activities. The result is in conformity to the study conducted by Williams (1996) in which professionals are increasing in coastal areas.

Despite of their great participation to the fisheries sector, their contributions are still considered unrecognized and undervalued. Research studies

showed that women are treated as dependents despite the fact that they play a substantial role in household (Yasmin, 2004). Macro-level sex-disaggregated data remains limited (Matthews *et al.*, 2012).

**Table 7.** Main source of income of women.

Municipality	Source of Income	Frequency	Percentage
Lubao	Net weaving and mending	19	14.29
	Fishing	17	12.78
	Fish Raising	7	5.26
	Fish vending	23	17.29
	Fish processing	14	10.53
	Teaching	7	5.26
	Law enforcing	4	3.01
	Public serving	6	4.51
	None	36	27.07
	Sub-total	133	
	Masantol	Net weaving and mending	10
Fishing		8	9.64
Fish Raising		3	3.61
Fish vending		18	21.69
Fish processing		11	13.25
Teaching		3	3.61
Law enforcing		6	7.23
Public serving		3	3.61
None		21	25.30
Sub-total		83	
Sasmuan	Net weaving and mending	21	13.46
	Fishing	17	10.90
	Fish Raising	5	3.21
	Fish vending	27	17.31
	Fish processing	21	13.46
	Teaching	8	5.13
	Law enforcing	4	2.56
	Public serving	8	5.13
	None	45	28.85
	Sub-total	156	



**Fig. 8.** Aggregate data on major source of income.

Arenas and Lentisco (2011) emphasized that gender – disaggregated data is also lacking in most Asian countries, thus, appropriate interventions and policy changes supporting women’s empowerment in field of fisheries were not implemented. Cognizant to these studies, it is imperative that intensive data collection

and broadened gender researches should be conducted in order to determine specific and concrete programs for women.

*Other Sources of Family Income*

Based from the result of the study, most of the women have no other sources of income (70.43%). However, in order to augment the limited income from the fisheries sector, some of the respondents tend to explore secondary economic activities to meet the daily financial requirements of the family.

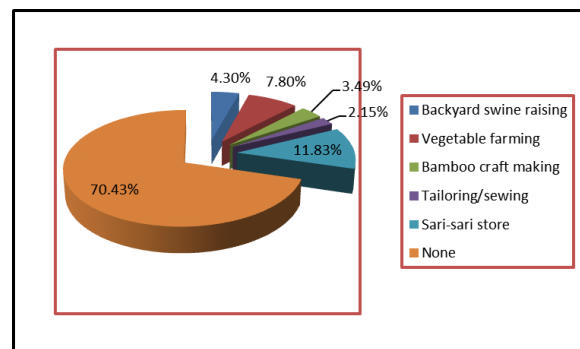
These include backyard swine/chicken raising (4.30%), vegetable farming (7.80%), bamboo craft-making (3.49%), tailoring/sewing (2.15%), and selling cooked foods and other goods (11.38%). Based on personal interview, these respondents disclosed that artisanal fishing and other related activities are now becoming their secondary source of income due to inevitable decline of resources.

Women usually raised 2 to 4 swine in their backyards that fed on kitchen leftovers and rice bran. For chicken and ducks, kitchen leftovers were also used with the supplementation of small snails and bivalves. Collection of these mollusks is conducted with the help of their children. Women engaged in growing vegetables harvested their produced product such as okra, *sitaw*, *pechay*, and *ampalaya* mainly for home consumption then sold part of it to neighborhood and by-passers. Handicrafts made from bamboo and tailoring making were also practiced in the coastal areas, however, only few engaged in this activities.

This could be due to lack of capital in investing significant tools and equipment. Lastly, vending of cooked food and other items is popular in women. Food items such as cassava and cereal based cakes, fishballs, meat barbecues were auctioned in streets to attract different types of consumers. Siason (2001) claimed that engaging work outside the home is common to coastal women to increase or augment the dwindling income of their husband from fishing through sewing, weaving, running sari-sari (variety) stores, selling beauty products, and food peddling.

**Table 8.** Secondary sources of financial requirements.

Municipality	Other Sources	Frequency	Percentage
Lubao	Backyard swine/chicken raising	8	6.02
	Vegetable farming	11	8.27
	Bamboo craft making	5	3.76
	Tailoring/sewing	2	1.50
	Sari-sari store/selling of cooked food	9	6.77
	None	98	73.68
	Sub-total	133	
Masantol	Backyard swine raising	5	6.02
	Vegetable farming	16	19.28
	Bamboo craft making	2	2.41
	Tailoring/sewing	6	7.23
	Sari-sari store/selling of cooked food	14	16.87
	None	40	48.19
Sub-total	83		
Sasmuan	Backyard swine raising	3	1.92
	Vegetable farming	2	1.28
	Bamboo craft making	6	3.85
	Tailoring/sewing	0	0.00
	Sari-sari store	21	13.46
	None/selling of cooked food	124	79.49
	Sub-total	156	



**Fig. 9.** Aggregate data on the secondary source of income.

*Monthly Net Income*

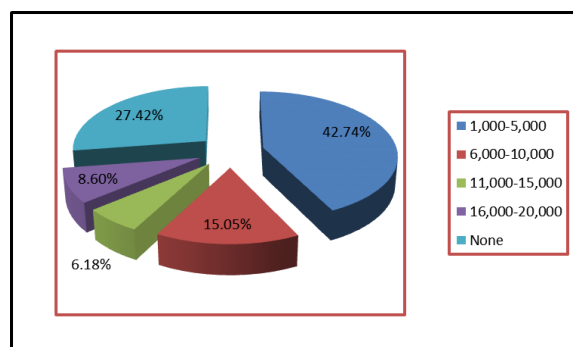
With respect to the net income of women, the findings in Table (9) can be said that most of the women in three municipalities have low monthly net income from major and other sources. Aggregate data showed that 42.74% of the total respondents have a meagre monthly net income of 1,000 to 5,000 pesos. On the other hand, there few of them enjoying monthly net income above 5,000 pesos as evidenced by 15.05%, 8.60%, and 6.18% of the respondents with monthly net income of 6,000-10,000, 11,000-15,000, and 16,000-20,000, respectively. However, it can be noted also that more than a quarter (27.42%) of the respondents have no financial contribution to their respective household. The result is not surprising due to the reproductive responsibility of the women in their

household which is most of the time not paid. They were considered as assistants to their husbands and frequently not paid (Di Ciommo and Schiavetti, 2012).

According to Lentisco and Lee (2015), the contributions of women to the huge sector of fisheries have been undervalued for too long. Their significant role in the sector has often been seen in the processing and trading, but, their important role in the household as mother and caregiver to for young and older members of the family are still invisible and neglected for valuation (Williams, 2010). Most of the women involved in subsistence fisheries gleaned shells and sea cucumbers and are often not valued due to direct household consumption (Fitriana and Stacey, 2012)

**Table 9.** Monthly net income of the respondents in three municipalities.

Municipality	Monthly Net Income (P)	Frequency	Percentage
Lubao	1,000-5,000	56	42.11
	6,000-10,000	22	16.54
	11,000-15,000	11	8.27
	16,000-20,000	8	6.02
	None	36	27.07
	Sub-total	133	
Macabebe	1,000-5,000	34	40.96
	6,000-10,000	13	15.66
	11,000-15,000	3	3.61
	16,000-20,000	12	14.46
	None	21	25.30
	Sub-total	83	
Sasmuan	1,000-5,000	69	44.23
	6,000-10,000	21	13.46
	11,000-15,000	9	5.77
	16,000-20,000	12	7.69
	None	45	28.85
	Sub-total	156	



**Fig. 10.** Aggregate data on net monthly income of respondents.

*Level of Awareness*

The Food and Agriculture Organization emphasized that fisheries is playing preponderant role in the

economic well-being of millions of rural people in developing world. Fisheries alone provide direct employment for millions of people. However, due to increasing fishing effort declining situation of our fish stocks exacerbates causing poverty elevation in coastal communities. According to Williams *et al.* (undated), widespread poverty is among the most pressing issues particularly in fishing villages trying to make a living from the resources that are now under the constant threat of being decimated. Integration of gender equality in resource access and management is an important step in creating better policies and successful implementation.

As seen in table, the respondents rated their level of awareness on selected management measures and programs of the local and national government. It can be noted that mangrove reforestation obtained the highest weighted mean of 3.35 and a verbal interpretation of “somewhat aware”. This was followed by the awareness on the provision of alternative livelihood, and aquasilviculture project with weighted mean not less than 3.0 and also with verbal interpretation of “somewhat aware”. In the year 2012, the Bureau of Fisheries and Aquatic Resources (BFAR) in collaboration with the Commission of Higher Education (CHED) launched an environment-friendly project through the production of aquatic commodities in harmony with mangal ecosystem. This is known as the “Philippine National Aquasilviculture Program”, a project aiming to achieve food security in coastal provinces and reduce poverty incidence among fisherfolks and disadvantage groups. The level of awareness of the respondents on those fisheries management projects could be attributed to the trainings and seminars conducted by the national and local government agencies in cooperation with the fisheries organizations of the coastal municipalities to increase the awareness of fisherfolks on the significance of the PNAP in mitigating problems on over-exploitation of resources and the alternative livelihood that can be generated from the integration of fish culture in mangal forests.

Level of awareness on other management programs such as coastal clean-up, establishment of marine

protected area, implementation of closed area/season, prohibition of destructive fishing gears and practices, treatment of discharge water from aquaculture, restriction of fishing and aquaculture structures, water quality enhancement, registration of fisherfolk, gear and vessel, and delineation of municipal waters obtained a lower weighted compared to the preceded programs. However, verbal interpretations of “slightly aware” to “somewhat aware” covered the figures obtained. This infers that level of awareness of women on these management programs is lower. Awareness on a specific management measure could be affected by the amount of information received by the resource users. The lower the intensity of information and education campaign or promotional procedure for a management program may engender lower feedback and participation.

On the other hand, prohibition of catching, selling, and consuming of species on red list status, implementation of catch limit and quota, and stock enhancement projects obtained the mean scores of 1.99, 1.98, 1.70 and 1.58, respectively, with a verbal interpretation of “slightly aware”. However, coral reef restoration obtained the lowest mean score of 1.48 with a verbal interpretation of “not aware”. This indicates that women are not knowledgeable on this management program. This program was not given much emphasis by the provincial and local government due to the absence of coral reefs in the province’s territorial waters and focusing its IECs on aquasilviculture project that could also enhance fish population by providing breeding, spawning, and feeding grounds for different species of fish and aquatic invertebrates.

Efficient awareness building concerning sustainable fisheries management will in the long run substantially reduce the costs of management was emphasized by Degen and Leng (undated). However, based from the result derived from this study efficient awareness building is still lacking in women’s perspective. Siason *et al.* (2002) emphasized that women receive minimal assistance in terms of training and extension services. This infers that a

broad information and education campaign is still insufficient to have an effective and wider participation from the coastal communities.

**Table 10.** Level of awareness of coastal women on fisheries management programs.

Programs/projects	Awareness	
	Mean Scores	Verbal Interpretation
Establishment of marine protected area	2.02	Slightly aware
Coastal clean-up	2.69	Somewhat aware
Stock enhancement	1.70	Slightly aware
Mangrove reforestation	3.35	Somewhat aware
Implementation of closed season and closed area	2.23	Slightly aware
Prohibition of destructive fishing practices	2.64	Somewhat aware
Coral restoration	1.48	Not aware
Provision of alternative livelihood	3.09	Somewhat aware
Aquasilviculture project	3.02	Somewhat aware
Implementation of catch limit and quota	1.98	Slightly aware
Treatment of discharged water from aquaculture and reduction of domestic effluents	2.55	Somewhat aware
Restriction of fishing and aquaculture structures in navigational and migratory path	2.41	Slightly aware
Prohibition on the catching, selling, and consuming of rare, threatened and endangered species	1.99	Slightly aware
Water quality enhancement	2.19	Slightly aware
Registration of fisher, fishing vessel, and fishing gear	2.93	Somewhat aware
Delineation of municipal waters	2.05	Slightly aware
Grand Mean	2.40	Slightly aware

*Level of Participation*

When it comes to the level of participation, the result revealed that the most participated management program is aquasilviculture project with a weighted mean of 2.19 and a verbal interpretation of “somewhat involved”. The level of participation could be attributed to the intensive information campaign of the lead agencies in promoting the “Philippine National Aquasilviculture Project” in the year 2012. This level of participation was indubitably observed in the municipality of Sasmuan through the efforts of the local government and its Municipal Fisheries and Aquatic Resources Management Council (MFARMC).

The least participated management program is coral reef restoration. This could be due to the absence of reef areas in the province. However, some of the women interviewed said that they abides all the rules and regulations in the utilization of coral reef areas in

which they have visited particularly in the nearby province of Bataan where a broad management project for coral reefs is implemented. The type and extent of involvement of women in fisheries activities varies depending on the features of the coastal/nearshore areas (Matthews *et al.*, 2012). Participation of women in fisheries management can be seen greatly in the post-harvest activity as reported by Medard *et al.* (2002) in Lake Victoria.

**Table 11.** Level of involvement of women in fisheries management.

Programs/projects	Involvement	
	Mean scores	Verbal Interpretation
Establishment of marine protected area	1.71	Slightly involved
Coastal clean-up	2.52	Somewhat involved
Stock enhancement	1.72	Slightly involved
Mangrove reforestation	2.97	Somewhat involved
Implementation of closed season and closed area	2.14	Slightly involved
Prohibition of destructive fishing practices	1.98	Slightly involved
Coral restoration	1.42	Not involved
Provision of alternative livelihood	2.01	Slightly involved
Aquasilviculture project	3.22	Somewhat involved
Implementation of catch limit and quota	1.66	Slightly involved
Treatment of discharged water from aquaculture	2.10	Slightly involved
Restriction on aquaculture structures	1.72	Slightly involved
Prohibition on the catching, selling, and consuming of rare, threatened and endangered species	1.70	Slightly involved
Water quality enhancement	1.87	Slightly involved
Registration of fisher, fishing vessel, and fishing gear	2.62	Somewhat involved
Delineation of municipal waters	1.70	Slightly involved
Grand Mean	2.07	Slightly involved

On the overall basis of participation, it was noted that involvement of coastal women on fisheries management is low as evidenced by the obtained grand mean of 2.07 with a verbal interpretation of “slightly involved”. The result infers that women’s contribution in the management of aquatic resources is significantly low and resource management issues are still potential key to expand their involvement in the fisheries sector. Different constraints on women’s

involvement in fisheries activities were indicated in previous studies (Lambeth *et al.*, 2002; Gillet and Lightfoot, 2001; Matthews, 2012). Women are commonly not attending meeting due to their childcare and household chore responsibilities as barrier. The result may linked also to Sriputinibond *et al.* (2007) claiming that women’s involvement in fisheries mainly in the contribution of labor but not at the management as well as for decision making at both community and higher level.

Another reason for low involvement could be due to the non-provision of favorable environment that makes women comfortable to speak about their perceptions and concerns as reported by Di Ciommo and Schiavetti (2012). Reyazati *et al.* (2015) claimed a significant relationship on the accessibility of rural women to facilities and their participation in preserving natural sources.

*Relationship between Level of Awareness and Level of Participation*

Due to the large number of observation, Pearson correlation was used to provide more reliable result despite of the ordinal nature of the data. Looking at the details (Table 12), result of the study bared a medium to strong positive association between the level of awareness and level of participation of coastal women on various fisheries management projects and programs of the government. Correlation coefficient ranges from 0.51 to 0.93. On the other hand, coefficient of determination ranges from 0.25 to 0.86 suggesting that 25% to 86% of the total variation of the women’s participation to fisheries management is accounted for the linear relationship with the level of awareness. Highest correlation coefficient and coefficient of determination was noted between the level of awareness and level of participation on the implementation of catch limit and quota. Statistical analysis on the relationship between level of awareness and level of participation revealed highly significant relationship ( $p < 0.001$ ). This infers that awareness and participation of women are significantly associated. Moreover, it suggest that the higher the level of awareness of women, the higher their participation.

Using the Spearman correlation, the levels of awareness and involvement of women on different fisheries management programs were ranked to determine overall relationship between the two variables. Result revealed a highly significant relationship ( $p < 0.01$ ) (Table 13). This is in conformity to the result on individual management programs in which awareness and participation of women are significantly associated.

**Table 12.** Relationship between level of awareness and level of participation.

Programs/projects	Relationship		
	Correlation coefficient (r)	Coefficient of Determination ( $r^2$ )	Sig
Establishment of marine protected area	0.72**	0.52	0.00
Coastal clean-up	0.51**	0.26	0.00
Stock enhancement	0.83**	0.69	0.00
Mangrove reforestation	0.63**	0.40	0.00
Implementation of closed season and closed area	0.57**	0.32	0.00
Prohibition of destructive fishing gears and practices	0.90**	0.81	0.00
Coral restoration	0.83**	0.69	0.00
Provision of alternative livelihood	0.64**	0.40	0.00
Aquasilviculture project	0.85**	0.73	0.00
Implementation of catch limit and quota	0.93**	0.86	0.00
Treatment of discharged water from aquaculture	0.67**	0.45	0.00
Restriction on aquaculture structures	0.91**	0.83	0.00
Prohibition on the catching, selling, and consuming of rare, threatened and endangered species	0.90**	0.81	0.00
Water quality enhancement	0.62**	0.38	0.00
Registration of fisher, fishing vessel, and fishing gear	0.58**	0.34	0.00
Delineation of municipal waters	0.86**	0.73	0.00

\*\* = Highly significant

There is still no published account delving on the involvement of women in fisheries management. However, Korsieporn (2000) stated that level of participation of women depend on their level of

knowledge. Further, men in a fishing community outnumbered women in receiving seminars and trainings. Technologies in aquaculture are commonly transferred directly to men; however, difficulties in comprehending the technology obstructed the relay of information to women (Korsieporn, 2000).

Some studies on resource management suggest that several factors may affect the level of awareness and participation of women. The socio-demographic and economic characters of the respondents significantly affect their level of participation as reported by Williams (1996), Dowlati and Hemati (2012), and Rezayati *et al.* (2015). Baticados (2003) reported that there is no impediment to female cooperative members (62%) participating in resource management. However, the factors that positively influenced members' participation were the number of children, perceived fishery conditions, awareness of mangrove conservation and rehabilitation, and assessment of enforcement of the ban on dynamite and cyanide fishing.

**Table 13.** Relationship between overall awareness and overall participation.

Variable	P	Remarks
Overall level of awareness vs overall level of participation	0.849**	Highly Significant

*Perception on the Need for Fisheries Management*

The table (11) shows the reasons on the need for fisheries management in coastal areas and their perception on the intensity of these problems. Decreasing fish catch, conflict among resource users, and encroachment in respective municipal waters had mean scores of 3.73, 3.81, and 3.66, respectively, with a verbal interpretation of "intense". On the other hand, degradation of important habitats, water quality deterioration, some aquatic species are threatened to extinction, and unregistered fisher, fishing vessel, and fishing gear had mean scores of 2.82, 3.49, 2.66, and 3.39, respectively, with a verbal interpretation of "moderately intense".

The data reveals that women in coastal municipalities are directly and indirectly impacted by the identified

problems on the status and utilization of aquatic resources. Selected problems are intertwining, meaning once a certain problem occurs there is a possibility that another problem could arise or intensify the existing problem. The respondents rated the conflict among resource users with the highest mean. This infers that women are now concerned with the current competition and conflict in the utilization of resources. This problem rooted from the open access regime of Philippine waters (DA, 2004). In addition, increasing coastal population and unemployment rate exacerbates the problem. The stocks in municipal waters are becoming scarce due to large number of dependencies. Despite of myriad laws and regulations environmental problems and poor economic condition are still common in coastal areas due to lack implementation of coastal management programs at local and national levels (Primer on Coastal Resource Management, 1998). The collapse of fisheries and degradation of other natural resources not only undermines food, health, energy and water security (UNDP, 2009), it also increases the vulnerability and decreases the resiliency of rural women and their families to external forces such as rapid demographic shifts, rapid economic growth, and war and conflict (Lambrou, 2000 as cited in Matthews *et al.*, 2012).

**Table 14.** Problems/issues to be address for fisheries management.

Problems/issues to be addressed for fisheries management	Intensity	
	Mean scores	Verbal Interpretation
Degradation of important habitats	2.82	Moderately intense
Decreasing fish catch (overfishing)	3.73	Intense
Water Quality deterioration	3.49	Moderately intense
Some Aquatic species are threatened to extinction	2.66	Moderately intense
Conflict among resource users	3.81	Intense
Unregistered fisher, fishing vessel, and fishing gear	3.39	Moderately intense
Encroachment in respective municipal waters	3.66	Intense
Grand Mean	3.37	Moderately Intense

*Constraints in Participating Fisheries Management Programs*

Results of the study indicated that reproduction/childcare responsivities of women were

the first and foremost factor that affects their level of participation in fisheries management negatively. Multiple responses of the respondents revealed that 327 of them perceived that this constraint totally impedes their participation. This constraint may result to an additional responsibility of women in the household such as cleaning, washing, cooking, etc. as evidenced by 312 respondents considering household chores as one of the major constraints.

Reproductive and childcare responsibility is the most common factor that affects the involvement of women on fisheries management. Women as wage earners are not always ideal due to their traditional role in household level. This result is in accordance to the report of Fawole and Tijani (2015) on the participation of women on workshops for extending the use of cereal legumes due to the lactating responsibility of mothers. However, positive relationship was revealed by Dowlati and Hemati (2012) between the number of children and rural women's participation rate in the management of groundwater. Matthews *et al.* (2012) referred the domestic responsibilities, childcare and community responsibilities as “women’s double day” I addition to their full time work outside household and these workloads considered as burden to women. However, fisherwomen are obliged to leave their children alone, or put their eldest daughters in charge of the household.

With respect to household chores, women were involved in all aspects of household chores moving from one to another (Williams, 1996). Siason *et al* (2010) emphasized that women divides their time between household chores and income-generating activities. Choo *et al.* (2006) highlighted the “invisible” work of women in fisheries and production and marketing and the links between women resource users and their lack of participation in marine or fisheries management. Siar *et al.* (1998) findings also showed that women work longer hours than men.

The two commonly encountered constraints were followed by the physical, emotional, and psychological stress with 304 responses. The result of the study is in accordance to the report of Sumudra

(1995) in which women are hindered to join/participate in resource management activities due to physical, emotional, and psychological stress. These stresses were obtained from the combined pressure brought by household and outside workloads. In some countries, growing health problems in coastal areas forced women to shift in caring the sick (Medard, 2002).

On the other hand, low educational attainment and socio-cultural constraint ranked 4<sup>th</sup> with 276 responses. The level of women’s literacy is a major concern particularly in distant rural and coastal areas. This is one of the factors considered by women for not completely participating in various fisheries management programs implemented by the local and national government. The accessibility and utilization of essential materials and management tools is greatly affected by their level of literacy. Ikiara (2009) also pointed out that most fishers are poorly educated and women were in disadvantage condition compared to men. This condition limits their opportunities (Mutoro, 1997).

Limited knowledge on the management programs was noted in ranked 5<sup>th</sup>. This implied that women in the 3 municipalities were not receiving ample information on fisheries management programs. Women in fishing communities are often illiterate, and lack access to training and other opportunities to improve their marketable skills (Williams *et al.* 2002). This was supported by Siason *et al.* (2001) in their study in Asia that women receive minimal assistance in terms of training and extension services compared to their contribution to the country's overall fish production, processing and marketing potential. In Malaysia, trainings and seminars relating to skills upgrading are mainly attended by men that may linked to women’s domestic duties (Siason *et al.*, 2010). Matthews *et al.* (2012) stressed that accounts regarding active involvement of women in fisheries management are difficult to find. Jallow (1997) and Willimas (1996) emphasized community-based fisheries management is a best platform to increase active participation of women. In this study,

it was learned through personal interview that information on fisheries management was only relayed to women through their husband who attended a training or seminar.

Moreover, constraints such as economic constraints and lack of encouragement from the government ranked 6<sup>th</sup> and 7<sup>th</sup>, respectively. Sumudra (1995) claimed that financial constraint is one of the factors for unequal representation of men and women in the sector. Due to inadequate financial support, women tend to look for some sources of income and often neglected the invitation of fisheries extensionists in the information dissemination of a management program. The result may indicate also that the government should intensify its effort to eliminate the barrier on women’s involvement to fisheries management. According to Matthews *et al.* (2012), women are efficient in enforcing such measures in fisheries; however, involvement in decision-making is still a major issue. Bagsit and Jimenez (2006) reported that women are more active in mangrove reforestation project as compared to their male counterparts.

**Table 15.** Constraints faced by women in participating fisheries management.

Constraints	Frequency	Rank
Reproductive/childcare responsibility	327	1 <sup>st</sup>
Household chores	312	2 <sup>nd</sup>
Economic problems	258	6 <sup>th</sup>
Low educational attainment and socio-cultural constraint	276	4 <sup>th</sup>
Limited knowledge and skills on management programs	272	5 <sup>th</sup>
Physical, emotional, and psychological stress	304	3 <sup>rd</sup>
Lack of encouragement from the government	232	7 <sup>th</sup>

*Review of Related Literature*

According to Arenas and Lentisco (2011), the degree of participation of women in the fisheries sector is an overall reflection of the prevailing culture, the laws of a country and the priority given by the State to ensure gender equity.

Based on the report of the United Nations Development Program (1995) as cited in Williams *et*



*al.* (2002), 70% of the 1.3 billion people living in poverty are women. Further, more women than men are malnourished. In many poor countries pregnancy complications are the largest single cause of death among women in their reproductive years. Wages of women are 30-40% less than men for comparable work. Women constitute less than one-seventh of administrators and managers in developing countries; Women hold only 10% of the seats in the world's parliaments and 6% in national cabinets (UNDP, 1995 as cited in Williams *et al.*, 2002).

Young (1993) as cited in Williams *et al.* (2002) stated that Sustainable development cannot occur without equal opportunities for women in the economic, social and political spheres.

According to the European Parliamentary Research Service (2013) women play a key role in fisheries and in maintaining households and communities, however, they remain largely invisible, and their roles unacknowledged. In Europe, over 100,000 women are statistically recorded as being employed in the fisheries sector; however, contributions are still hard to measure. Statistics overlook women who work part or full time for the family business without legal recognition or associated social benefits (EPRS, 2013). In Asia, women are active in both artisanal and commercial fisheries. In the Pacific, women account for 56% of annual small-scale catches, and resulting in an economic impact of 363 million USD (Harper, 2013). In parts of India, women net prawns from backwaters; in Lao PDR they fish in canals; in the Philippines, they fish from canoes in coastal lagoons (Kusakabe, 2003). In China, rural labor force statistics for 1991 showed that women accounted for 26.3% of the rural labor force in fisheries (Kusakabe, 2003). Women's role in aquaculture and fisheries are becoming increasingly important (Suwanrangsi, undated).

Correa (2015) described the crucial role of women in the marine environments and ocean economies particularly in the artisanal and small-scale sector. Women's activities, paid and unpaid, include the full range along the value chain, as well as pre- and post-

harvest activities. This includes seaweed and shellfish collection, fishing, weaving and repairing nets, processing, sales, and local and intra-regional trade (UN WOMEN, 2015). According to the 2012 World Bank 'Hidden Harvests' study, nearly half of the workers are women, concentrated in but not limited to the processing sector and marketing jobs.

Women also play preponderant role in inland fisheries (Kusakabe, 2003). Ahmed *et al.* (1998) in their survey in Cambodia found three equally important reasons for choosing fishing as a preferred activity: fishing is the only alternative available for food and income; fishing is part of traditional food collection for family food supply; and it is cheaper to catch fish than to buy it from the market.

Arenas and Lentisco (2011) stated that women (wives or daughters) from fisher households in Southeast Asia, Africa and Latin America are often overworked, with their contribution unrecognized, unvalued or undervalued. Further, women in these regions are lowly-paid and exploited by employers, illiterate, undernourished, with poor productivity, and lacking opportunities for skills upgrading and access to training (Arenas and Lentisco, 2011).

Williams and Awoyomi (1998) emphasized that poverty is a major issue in the fishery sector. Whitehead (2003) described women are more likely than men to be seen as being economically inactive or to work as unpaid family worker. Extensive studies showed that women producers have poorer access than men to all resources, from land to credit and technology. Moreover, women are less mobile and have less access to information and most vulnerable to natural disasters and climate change (Davis *et al.*, 2005).

When it comes to division of labor, studies have shown that women with dual working roles consistently spend two or three hours more than men every day in work related activities (Levine *et al.*, 2001). Quisumbing (2002) explained that malnourishment and long working hours may have sociological, economic and health implications for women.

### Conclusion

Based on the findings of the study it was disclosed that most of the women in three coastal municipalities of Pampanga are not receiving adequate amount of seminars and trainings to suffice their knowledge in fisheries management. Consequently, low level of involvement in the implementation, enforcement, and participation is common. Women also faced different constraints that impede the progress of their participation in resource management.

### Recommendation

It is recommended that concerned agencies from the local and national level should provide more and continuous trainings, seminars, workshops, and activities related to the upgrading of knowledge and skills of women in fisheries management. It is also recommended to aid coastal women in the establishment of civic organizations that focused mainly on resource management to further recognize their potentials in the said area. Furthermore, it is highly indispensable to conduct a sequel or deeper study on the contributions of women in fisheries development and sustainability.

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