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# The role of women in the blue swimming crab fisheries supply chain from gender perspective in Pamekasan

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**Abstract.** The blue swimming crab (*Portunus pelagicus*) fishery industry bring positive impact on women in coastal areas by providing livelihood opportunities through active involvement in various gender roles, both in preparation and post-capture processes as well as in the production chain. This study aimed to analyze the roles of women in the crab fishing supply chain. This study was conducted in June 2023 at Pagagan Village, Pademawu District, Pamekasan Regency. The research employed interview methods, field observation, and secondary data sources, including articles and journals. Six respondents participated in the study, representing fishermen's wives, mini-plant owners, crab pickers, and crab suppliers. Results showed that fishermen's wives play a significant role in marketing and selling the crab catch, as well as assisting their husbands in making and repairing fishing gear. In the case of crab suppliers, women or housewife contributed in weighing and boiling the crabs. At the mini-plant level, women play the main role as pickers in sorting and stripping process, while the mini-plant owner supervises the overall process. The study highlighted the substantial contribution of women in coastal areas to the local community, demonstrating a strong reliance on marine resources, which fluctuate with the seasons. Additionally, the income earned by coastal women significantly contributes to their families finances, thereby enhancing their household's economic condition.

**Keywords:** crab fisheries; gender perspective; role; supply chain; women

## 1. Introduction

The potential of coastal and marine resources is very beneficial for coastal communities. Along with the development of crab fishing activities as one of the main sources of livelihood in some coastal communities, especially in Pagagan Village, Pademawu District, and Pamekasan Regency, the crab catch has provided opportunities for life, which was initially said to be limited for coastal women, and is now starting to open up with their involvement in taking on a role from a gender perspective, starting from the process of preparation, post-capture, to the production process. In a household, the role of women is no less important, with their obligations to take care of household interests such as housework, cooking, washing, and others. However, there are still many women who work to help their husbands earn a living for their families because the role of women can improve the family's



economy so that they can live more prosperously and even overcome poverty [1]. The involvement of all family members in coastal community households in earning a living has become a pattern of strategies based on tradition and forms of socio-economic environmental conditions [2]. The role and support of women are two of the social potentials that are quite important in the development of coastal areas [3]. The role of women in the household as economic actors should not be neglected, and even support is needed so that women can allocate more time for productive activities without leaving the role of women in domestic activities [4].

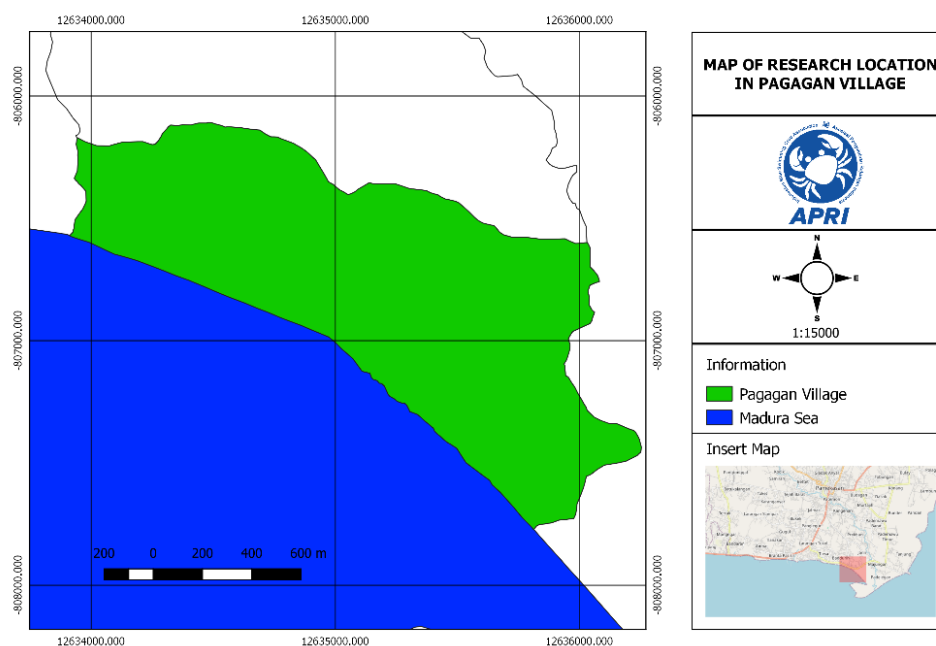
In general, one of the reasons for the large role of coastal women in revised to increase income is the dependence of fishing communities on marine resources, which are influenced by the season, and the fishing gear used is still traditional. The factor is that fishermen's places are remote and far from cities and crowds, so there are limitations in accessing more developed environments. In addition, human resources in the field of fisheries are generally still weak. This is evidenced by the labor structure and low level of education, and fishing communities usually have large families, so their catch can only be enough to make ends meet. For this reason, gender roles in coastal communities are an important factor in meeting their needs, where men and women in a family both have a large share of earning income. Women's equality is not only about pursuing economic interests or increasing income but also about increasing the role and participation of women in society in managing natural resources so that they can be sustainable.

Identification of conditions from a socio-economic perspective (employment and income) as well as women's empowerment in the fisheries sector needs to be studied further considering their contribution to the supply chain in the crab fisheries sector, which indirectly improves the economic welfare of a family. This study aims to understand the role of women in the crab fishing supply chain.

## 2. Methods

### 2.1. Study Area

This research was conducted in June 2023 in Pagagan Village, Pademawu District, Pamekasan Regency. The choice of this location was based on the living conditions of the people in Pagagan Village, who have a source of income from fishing activities, especially crab resources (Figure 1).



**Figure 1.** Map of the research location in Pagagan Village, Pamekasan.

## 2.2. Data collection

Data collection was carried by using interviews, field observations, documentation, and secondary data sources such as articles or journals. According to [5], the technique of determining informants carried out by researchers used a purposive sampling method, which means that the sample selection method is considered to know the most and play an important role in exploring the object of this research. Interviews were conducted with six female informants, of whom two were representatives of fishermen's wives who were active and cooperative in participating in activities in Pagagan Village; two were owners and workers at collectors; and two were owners and pickers at mini plants. The questionnaire was used as reference material for interviewing the six informants to make it easier to obtain information regarding the contribution of respondents to the crab fisheries supply chain. Observation activities are used to determine the role of women in procuring productive capital for the small crab fishery business by following the daily activities of small crab fishermen in Pagagan Village.

## 2.3. Data Analysis

Data obtained from distributing questionnaires and interview results were processed descriptively and qualitatively. The research method used is a case study with descriptive analysis. [5] states that the descriptive method is used to analyze data by describing the data that has been collected. These results are used to identify the characteristics of coastal women and the socio-economic conditions of the crab female actors and workers in Pagagan Village.

# 3. Results and Discussion

## 3.1. Pagagan Village Profile

Pagagan Village is a coastal area that has potential in the field of fisheries, especially crab fisheries, in Pademawu District, Pamekasan Regency. The potential for crab fisheries in this village is increasing every year, as evidenced by the growing number of collectors (up to 3 people), and all of the workers are women. The collectors work with several subsidiaries or Miniplants in Pademawu, one of which is the Jumiang Indah Miniplant owned by H.Aziz, which is located in Padelegan Village, Pademawu District, Pamekasan Regency. Every year, this company has increased, as evidenced by the increase in production and workforce. MP Jumiang Indah has distributed processed crab meat to the Sumber Mina Bahari (PT. SMB) company in Rembang. The processing process at MP Jumiang Indah consists of boiling, cooling, peeling, storage, and packaging. The crabs obtained by this Miniplant are mostly the result of the landing of the crabs in Pagagan Village.

The topography of Pagagan Village is a stretch of flat land with a beach (coastal). The boundary of Pagagan Village to the north is Jarin Village; to the east is Majungan Village; to the west is Baddurih Village; and to the south is the Madura Strait [6]. Based on demographic data, the population density of Pagagan Village is 1,315.88 per KM, the number of heads of families is 758, the number of men is 1068, and the number of women is 1169. 85% of the Pagagan Village community works as fishermen, so it has great potential for the development of the fisheries sector, especially crab fisheries.

## 3.2. Characteristic of Pagagan Village Women

Data from [6] refer that the number of women in Pagagan Village is greater than the number of men. The characteristics of the respondents (women) are one of the factors that will be used in this study because the characteristics can be identified by the age, level of education, and occupation of the respondents. These three characteristics are very closely related because they can influence a person's mindset, where the higher a person's age and level of education, the higher the level of knowledge, so that the job obtained will adjust to the last level of education completed. Table 1 shows the total female population based on the last education level.

The highest level of education for women is at the age of 7–18 y.o., who are currently attending school (591 people), while many fishermen's women and wives have graduated to elementary school level. The large number of women whose education only includes elementary school or its equivalent

is proof that the education level of the Pagagan Village population is still quite low. Their low level of education is due to a lack of funds to continue at a higher level of education [7]. A person's level of education greatly influences the way of thinking in dealing with one's problems, both for applying work principles, work goals, and the objectives of an activity carried out.

Table 1. The number of female residents in Pagagan Village by education level.

No.	Education level	Total (people)
1	Aged 3-6 y.o. who have not entered kindergarten	9
2	Aged 6-7 y.o. who have entered kindergarten	41
3	Aged 7-18 y.o. who are in school	591
4	Elementary school	264
5	Junior high school	134
6	Senior High school	93
7	Diploma	3
8	Bachelor	22

The age range of the interviewed respondents in this study was between 20 and 45 years old on the adult scale, namely from 20 to 45 years old. The age and education level of the respondent are two of the supports for the job that will be obtained, so that a job can be proportionate based on the level of education. As for the female fishermen respondents who obtained, on average, only the last education, namely Elementary School (SD), only one respondent graduated with a bachelor's degree, namely as a Miniplant owner. This is the initial basis for thinking that the purpose of their work is to help their families (husbands) as fishermen.

### 3.3. *The Role of Women in the BSC Fishery Supply Chain*

Fishing activities, which are quite dense in coastal areas, influence fishermen's wives to participate in doing business. The results of the interviews indicated that their free time could be used to assist in making or repairing their fishing gear. This is a job that has been inherited from generation to generation by women in Pagagan Village. In addition, the results of the data from respondents who work at mini plant locations show that they do sorting and processing (stripping) in order to get additional income. This is due to the increasing needs of the community both in quantity and quality; increasingly expensive needs coupled with erratic catches require fishermen's wives to play a role in improving their family's economy. This is in line with research conducted by [8], which states that the role of fishermen's wives has a very fundamental contribution to the welfare of their family because they are able to independently earn income to help their household.

The basic principle in the processing of blue swimming crab products is an effort to make the best possible use of blue crab fisheries products in the crab fisheries supply chain so that they can be utilized to the fullest [9]. Supply chains are all activities within an integrated organizational network to achieve one goal [10]. The blue swimming crab supply chain in Pamekasan, especially in Pademawu, distributes products in the form of crab meat to fulfill the desires of its consumers by receiving monetary rewards. The first actors in the crab supply chain are fishermen, who catch crabs, which are then sold to collectors and suppliers, sold to Miniplant, and then sent to the Company to be packaged in cans. In general, each supply chain has established cooperation starting with fishermen, who already have ties with suppliers in the form of capital loan bonds (debt receivables), so fishermen must sell the crab to these collectors. In the fisheries supply chain, the role of women in the crab processing business is needed in the following activities,

*3.3.1. Role as a fisherman's wife: Marketing or selling crab catches.* In general, fishermen's wives always prepare their husbands to go to work, both in terms of consumption and the equipment they will take to sea. Then, during fishing activities, the fishermen's wives usually help in making or repairing damaged trap fishing gear, so husbands and wives both have an important role that is only invaluable because they do not get income, but in terms of benefits, it has helped quite a lot in fishing activities. husband in earning income (Figure 2).



**Figure 2.** The work of the fisherman's wife at home.



**Figure 3.** The wife sells her catch to collectors.

In addition, fishermen's wives usually wait for their husbands on the beach to collect their catch and help sell it to suppliers, as well as buy bait and diesel fuel to prepare for the next day (Figure 3). The role of fisherwomen in the post-harvest stage is very important for fishermen because husbands are usually tired, so they have to rest immediately. In addition, the role of fishermen's wives is very important in managing finances because, in addition to managing the income from the catch for their daily needs, they are also able to manage business capital during a famine [7].

*3.3.2. Role as a supplier: Doing the weighing and boiling of the crabs.* The landing location is a location where fishermen and suppliers carry out sales interactions; usually the fisherman or his wife brings the catch to the supplier's home location for weighing so that it can be known how much catch the fishermen get, then it is recorded by the supplier so that catch data can be known every day (Figure 4).



**Figure 4.** Suppliers weigh the crabs.

The crabs that have been weighed are then boiled by the supplier so that the quality of the crabs can be maintained. The caught crabs are put into a pan according to the size of the crab load and then washed thoroughly before the boiling process using a steamer pot. The boiling process is carried out for at least 20–30 minutes, in order to reduce the bacteria found in the crab [10]. Based on the results of interviews with suppliers, it is stated that their income depends on the catch of fishermen, the more catches they get, the more the supplier's income, and if the catch of fishermen is small, the income earned is less.

*3.3.3. Role as a picker: Perform processing or stripping.* The process of stripping the crab is usually done in the Mini plant. Miniplant is a subsidiary company or small factory specifically for crab processing, namely crab meat stripping. Stripping is usually done by pickers, both in the sorting and peeling sections. The stripping of small crabs is usually divided into several tables that have the task of peeling the body parts of the crab; usually 4-6 pickers work per table (Figure 5). In addition, a packaging and weighing process is carried out, where the crabs are packed into different plastic jars based on the type of meat and then weighed to determine the weight of each jar

Regarding wages or salaries, pickers usually get paid once a week, where their wages are in accordance with the meat produced each day and then divided by the number of workers. The wages received by pickers are usually around IDR 40,000–60,000 per day, which are paid weekly by the Mini plant owner. The interesting thing about the income is that usually the pickers don't take all the wages they get because they also want to save them to be used as provisions for Eid al-Fitr, so they don't only get wages but also have savings saved for the Mini plant owner.



**Figure 5.** Picker Activities at Miniplant Locations (Stripping)

*3.3.4. Role as Miniplant Owner: Supervise the processing.* Miniplant owners do not work too much in terms of production, usually only part of the process of supervising and interacting or financial administration. Because the average Miniplant owner also has other businesses, such as selling processed crab products in the form of crab brains and crab chips, they not only get results or income from selling meat but also get income from selling their processed products, which is around IDR 7,000 000–15.000.000 per month.

#### **4. Conclusion**

The role of women in supporting the household economy in the blue swimming crab fisheries supply chain can be assessed quite highly. The role of the fisherman's wife, starting with the activities of making or repairing traps, can help reduce expenses for making fishing gear. Selling crab catch can help the husband when he comes home from work. Women who work as collectors (weighing and boiling) and pickers (crab peelers) can earn income so they can improve their family's economy.

### Author statement

All authors had equal contributions to this study and agreed to the published version of the manuscript.

### Credit authorship contribution statement

**Lailatul Qomariyah:** Conceptualization, Methodology, Data curation, Investigation, Visualization, Writing – original draft. **Apri Arisandi:** Supervision, Writing – review & editing. **Navisa Fairuz:** Data curation, Supervision, Writing – review & editing.

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