Women's Vulnerability in Salt Farmer in Facing Abrasion and *Rob* at Kedung Jepara of North Coast of Central Java

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Abstract. Climate change has severe impact on women from lower social groups. In every disaster, female are greater victims than males. Analysis of recent disasters in 141 countries showed that the difference in the number of casualties caused by natural disasters is closely related to economic and social rights of women. Women are the largest proportion of the world's poor, that particularly vulnerable to climate change. The coastal region is an area that most vulnerable to climate change. Tidal floods, abrasion and seawater intrusion are some aspects that threaten coastal areas, which will cause losses. One of the threats on the coast of the Village stage every year is the abrasion of sea water. The purpose of this study was to find out the form of women adaptation, especially the salt farmer families in coping & adapting the disasters. This study uses qualitative descriptive approach. The results showed that women salt farmers in Panggung Village made different forms of adaptation dealing with disasters. In Panggung village women have a role in the family economy and social. That economical adaptation are become salt bearer in the farm to workshop, transfer of work for female salt farmers became a fisherman or use their pond became a milkfish pond and open stalls at home. Social adaptation make a informal networking like *arisan* (collecting money) through PKK to support the family life and planting mangrove.

Keywords: Women, Vulnerability, Salt Farmer, Abrasion, *Rob*

1. Introduction

Climate change is a serious problem and must be addressed immediately. Indonesia is an archipelagic country that is very vulnerable to the effects of climate change. The phenomenon of climate change is characterized by the rising sea levels and high waves, leading to the emergence of coastal abrasions with very serious damages. In the last few years, coastlines in

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several regions in Indonesia have experienced a serious narrowing due to abrasion.Sea abrasion mostly occurs on the beach facing directly into open sea. The North Coast of Central Java is generally an area prone to abrasion. One of the disaster-prone areas and experiencing coastal decline is the Kedung coastal area of Jepara. According to the vulnerability classification of the marine process, the Kedung area is classified into very vulnerable. The vulnerability of the Kedung coastal area is due to an erosion process that extends towards the mainland [1].

Along the Kedung beach, the abrasion that occurred in the last 10 years not only caused the emergence of physical damage in the form of coastline changes, but the erosion also reduces the supporting capacity of the coast with the loss of 960 hectares of productive ponds along the coast [2]. Panggung Village is one of the villages affected by the abrasion. Most of the villagers in Panggung village work as salt farmers who depend on their live of the sea. As a result of the loss of the pond area, many people lost their livelihoods and encouraged the process of impoverishment of people who lived and worked on the coastal area of Kedung.

Besides natural factors, human factors also become aspect that causes abrasion. In the verses of the Qur'an, it has been explained that "it has been seen the damage on land and in the sea due to the humans deed (sinners), so that Allah makes them feel some of their deeds, so that they will return (to the right path) "(QS. Arrum: 41). This verse confirms that human deeds are the source of visible damage on earth.

Based on the problems that occurred in the Kedung coastal area, a study was conducted with focus on adaptation of women salt farmer. *Gender* is an important issue because of its inequality and women's special needs in disaster situations [3]. There are only a few gender studies on abrasion disasters in coastal ecosystems. Therefore, the authors are interested in examining the form of adaptation on women salt farmers to abrasion disasters that occur every year.

Regarding the threat of abrasion from year to year that has the potential to damage the environment, efforts to reduce disaster risk are important to be immediately implemented. The attitude and response between men and women in the salt farmer’s family is different regarding adaptation to abrasion disasters. Adaptation is needed so that the community can survive both in its natural and social environments. Adaptation is a handling action of unavoidable impacts in environmental changes.

In this study, the adaptation process is presented in the household analysis unit that focuses on women salt farmers of Panggung Village. Thus, the output of this study is to describe how the salt farmer family adapted to the environmental changes due to abrasion. So that it is expected to become a reference for coastal area management against disaster threats and as input for disaster risk mitigation.

2. Methods

This research uses qualitative research methods with a descriptive approach. In this study carried out with the aim of obtaining specific, complete and in-depth data about the subject and object from various perspectives [4]. The object and subject in this study is the adaptation (social, economic and physical) of the salt farmer's family which is affected by the abrasion and rob that occurs in Panggung Village, Kedung District, Jepara Regency. The method of extracting information is done by observation and in-depth interviews, while the secondary data is explored through literature studies and documentation and previous reports. Data retrieval is done by snowball technique, where in this study the first informant is the village head and from the village head other information informants will be obtained so that complete

information is obtained in accordance with the purpose of the research, namely to know the impact (feeling, experience and adaptation) on abrasion and rob the family of salt farmers. Data analysis was performed by descriptive qualitative analysis by considering the representation of women and men in knowing the perceived vulnerability and how to cope with the condition.

3. Result and Discussion

3.1. Gender & Resilience

Adopting a gender approach in this research requires projects to examine social differences, roles, expectations and needs of the women and men and between those among these gender categories. This means going beyond the women and men couple to look at the intersection and interaction of different social identities (e.g. gender, status, ethnicity, class, age, religion, disability). The aim here is to gain a better understanding regarding the underlying causes of people's vulnerability to climate extremes and longer-term climate change as well as their resilience capacities [5] . The conceptual framework used to examine how development projects that integrating gender is built on the distinction is made by [6] where she addresses people's practical needs and their strategic needs (or 'strategic interests'). The fundamental difference is that, if practical gender needs are met, the women (or men) lives will improve without challenging women's subordinate position in society. On the other hand, if strategic interests are met, the existing relationship of unequal power between men and women will be transformed [7]. Therefore, further strategies that address specific needs and interests can help compensate for historical and social disadvantages that prevent women, girls, and other marginalized groups from otherwise accessing equal opportunities and enjoying equal rights. Accessing these assets is part of developing women and/or other marginalized groups to have absorptive, anticipatory, and adaptive capacities in order to build their resilience to climate change and disasters (see the 3 As the framework for resilience in [8]. In other words, NGOs that promote gender equity are concerned to foster the equal rights, responsibilities, and opportunities of social members as a precondition for an indicator of sustainable people-centered development [9]

3.2. Women & Salt Farming

3.2.1. Salt Ponds and Pond System

Salt farm land becomes a determinant of the production factors of people's salt products. In general, the wider the land (which is cultivated / processed), the greater the amount of production resulted by the land. The size of salt farm land can be represented in hectares (ha) or acres [10]

According to [11], the selected land for salting must meet the criteria related to the height of the sea surface, soil topography, physical properties of soil, biotic (animals/plants), and disruption of natural disasters. The requirements are detailed as follows:

a. The location of the sea level i.e. to facilitate the supply of sea water and its disposal
b. Sloping top or small slope topography, to regulate water flow and minimize construction costs
c. The physical characteristics of the soil are demanded for low permeability

properties, the soil is not easy to crack

d. Disruption of weeds and pests
e. Natural disasters areas and tidal flood.

The ideal location for making salt is fulfilling requirements such as sloping location, water resistant, sea water can rise after salt ponds (with or without the aid of a tool), minimum raw water concentration of 2.5°Be.

Furthermore, it was stated also that the location must be free of freshwater sources, with little rainfall and lots of sunlight for optimal 12 evaporation of seawater. A long dry season will reduce the rain frequency.

3.2.2. Women Salt Farmers

Salt farmers are small scale producers of salt, not industry scale and only make salt in dry season.

Salt farmers are classified based on the ownership of salt land, namely owners, tenants, and farmers for profit sharing. The owner is a salt farmer who has his own salt field. Tenants are farmers who rent salt land in salt processing, while profit sharing is farmers who work on salt land and make production sharing agreements with salt land owners. Community characteristics can be seen from various aspects, i.e. the knowledge system, belief system, women's role, and social structure.

3.3. Gender & Coping Strategy

The impact of climate change is suspected to be deteriorating due to the influence of human actions [12]. Indonesia has also been identified as one of the most vulnerable countries in Asia that receive impacts of climate change because it is the world's third-largest producer in terms of greenhouse gas emissions production. The impacts of climate change are not limited to changes in the rainy-dry season, sea level rise, but also affect various life aspects, from the economy, health, food security, and environmental degradation.

Based on various cases that have been shown, it is known that the impact of climate change is not similar among the community groups, between men and women. Women and children are said to be the most vulnerable groups who directly and indirectly affected by climate change. When there is a long drought, women and girls are usually assigned as collectors of water and fuel, looking for food cattle, and preparing food for the family. In addition, rural women also often take on the responsibility of managing agriculture for food consumption of their families. In times of difficult and uncertain climates, they obviously have to deal with increasingly limited natural resources and heavier workloads. The consequences of longer and heavier workloads for women and children are varied and cover various aspects, such as education, health, and food. There is ample evidence to show that the impacts of climate change are related to gender issues and women's vulnerability.

The impact is particularly felt in sectors traditionally associated with many women's roles, such as agricultural and plantation areas. These sectors are vulnerable to the effects of climate change, thus increasing women’s burden from poor households, as they are heavily dependent on local natural resources to sustain their families' lives. As an illustration, data from the Indonesian Peasant Union shows that almost 70-80% of workers in the agricultural sector are women, while in 2007 approximately 6,676 hectares of agricultural land failed to harvest due to flood disaster. It is certain that a group of female field workers is the most heavily affected by the flood [13].The diminished profit conditions due to the effects of seasonal changes, reduced availability of clean water and agricultural production, and

increasing difficulty of predicting climate for cultivation due to the changing rainfall - dry season, clearly increasing the risk of hunger / poverty among women [14] . Thus, without any intervention from various parties, women's condition that majority of the field workforce / laborers can get worse in poverty. The same conditions are also found in fishermen's households, the occurrence of climate change (one of which is indicated by the rising sea water) has caused changes not only in the ecosystem environment, but also in the life of fishermen households. Reduced water supply, degradation of housing and infrastructure has prompted some households to migrate. When faced with the increasingly limited natural resources, women from poor fishermen households often have to bear a heavier burden than men.

3.4. Characteristics of Salt Farmer Families

Panggung Village consists of 551 households, most of them work as salt farmers. In this village, the level of education of the community is still low. Many only graduated their studies until elementary and junior secondary level, this condition affects the mindset and level of knowledge of abrasion disasters.

Most of Panggung Village residents work as salt farmers, therefore the vulnerability of salt farmers is considered as a collective vulnerability. In the concept of collective vulnerability, by Adger which was stated earlier, the community institutional system is very important to safeguard a group from vulnerability. The case of Panggung Village shows that the group of salt farmers is most vulnerable to the symptoms of climate change. Weather changes and sea tide flows have direct implications for the sustainability of their livelihoods. Besides that, Panggung Village does not yet have an institutional system that helps salt farmers to mitigate and adapt to the threat of abrasion. However, salt farmers have formed groups of salt farmers which have been functioned for mangrove planting and assistance in the form of tools from the government.

3.5. Gender System

The women or wives of salt farmers in Panggung Village mostly work as housewives, the rest being salt porters. There are also several women's empowerment groups that making crackers and processing seafood such as fish. [15] stated that one of the adaptation strategies taken by fishermen households to overcome household economic difficulties was to encourage their wives to join in earning a living. The economic contribution of these female workers is very significant for the fishermen. Women

3.6. Form of Adaptation

3.6.1. Economic Adaptation

A. Double Income Pattern

Most of women in Panggung village as a housewife have side job, like a salt porters, open a shop at home, double income pattern is an alternative way out to sustain the family life when

the catasrope (tidal food and abrassion) occurs in their village. Livelihoods as salt farmers demand that salt workers to adapt. Erratic weather conditions and abrasion waves that can damage the salt ponds at any time, making them look for alternative jobs to stay afloat. Most of the salt workers, when not making salt or if there are problems in their land, go to the sea. For some workers whose physical still strong enough, they go fishing in the sea. Apart from working as salt farmers, they can also work as fishermen. This is done to meet their daily needs.

B. Non-Farm Business

Seasonal livelihoods carried out by salt farmers force them to have other alternative sources of income. Unpredictable rainfall and decreasing carrying capacity of the salt land force them to adapt by having non-farm businesses. For fulfilling their daily needs, some farmers have alternative businesses, such as opening a kiosk or stall at home.

In addition to domestic activities, the salt farmer's wife helps in the family economy by making a side business. Some salt farmer's wife open small stall that provide daily needs, such as groceries and snacks.

The family of salt farmers has another alternative business, such as opening a small stall in front of his house.

A woman who sells vegetables around to make ends meet. In this case, women have a role in the family economy

Fig. 1. Salt Porters

3.6.2. Social Adaptation

A. Planting Mangrove

Some plots of land that have been lost affect the income of salt farmers. Other problems that exist in the salt ponds are decreasing the carrying capacity of ponds due to sand entering the pond area near the coast. When the tide is running, some ponds are also submerged by rob.

The efforts taken by salt farmers to overcome this problem are to plant mangroves around the salt ponds to protect the ponds. Mangrove planting is carried out by land owners and pond workers who are members of a group of salt farmers. The pond group which was originally formed by Perhutani was intended to encourage farmers to participate in the mangrove planting program. The Government's mangrove planting program has been started since 2002 and last in 2008. There is no specific program for mangrove care itself, but salt farmers keep

preserving it.

Planting is carried out by the each salt groups. The following is respondent's statement regarding effort to protect the salt pond from the interview results:

"Government programs to overcome abrasion are taken by planting mangroves. Residents are involved, also with farmer groups. Every member of the group is included, and there is always discussion before. The mangroves are planted by salt farmers. However, most mangroves near the sea are mostly destroyed, hit by waves, but the mangroves in the ponds are still growing" (Mr. Sokhib)

From the respondent's statement, it can be concluded that the participation of salt farmers in an effort to protect their area from abrasion is quite high. Although some mangroves near the shoreline have been destroyed, the mangroves in the ponds are still growing.

In 2008, the government has promoted a mangrove planting program that is usually held by the Forestry Service, the Agriculture Service, and the Fisheries and Marine Service. However, some farmers think that mangroves that are located near the ponds interfere with the process of making salt. This is because the mangroves can disrupt the work of windmills in ponds. This was revealed by a respondent who become the chairman of the salt farmers group.

"It is true that mangrove plants do have a function as an abrasion deterrent. On the other hand, some salt farmers complain of mangroves in the pond area, making windmills unable to spin "(Mr. Ali N)

"Actually, if mangroves are planted in the whole area, the farm will be safe from abrasion and flooding. However, not all farmers want to plant their ponds with these mangroves "(Mr. Ali N)

In addition to reducing land area, it also reduces acceleration in the process of making salt. Therefore not all salt farmers want and allow their farms to be planted with mangroves. Many benefits that Through mangroves have a lot of benefits. Like to the occupancy of fish and shrimp, it also impacts on the temperature of the environment. If this mangrove forest is developed and maintained properly, it will also be a potential tourist attraction. The following is a map of mangroves distribution in Panggung Village.

Mangrove plants are planted around the salt ponds owned by residents. This is a form of physical adaptation implemented by a group of salt farmers facing disasters that can occur at any time

Fig. 2. Analysis of Mangrove Existence

In addition, another form of adaptation is taken by moving to rent farm land. The period for renting land is 2 years on average. If the farm's land is damaged by abrasion while the rental period runs out, salt farmer will move to a safer place. This is done mainly by salt farmers who have leased land status. Following is the statement of respondents who first they're the farm land is on the embankment before being moved to a farm in the Panggung Village:

"We move, the pond cannot be used, while the rent is up"

The following is another statement from the head of salt farmer if the land is affected by abrasion:

"The land is reduced and sand enters the pond area. Those whose land was eroded moved to rent another pond" (Mr. Sokhib)

From the statement given, it's clear that if the land is no longer possible to cultivate, due to the presence of sand that enters the pond area, then the tenant usually moves to another farm.

Some of the ponds that have been eroded are located on the coast and the border between Panggung and Bulak beaches. Finally the salt laborers moved to another pond far from the sea. Movements in land transfer are generally shown on the following map:

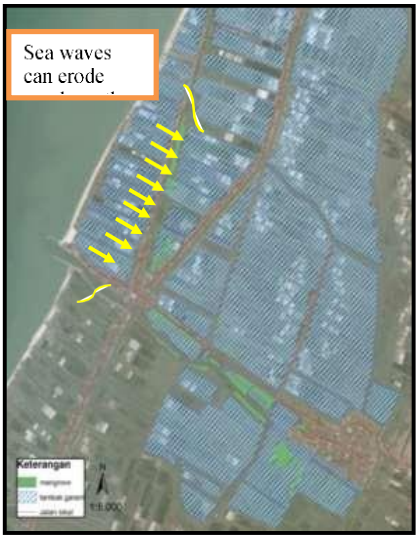

Fig. 1. Map of Pond Farm

B. Social Adaptation

Social adaptation is correlated to social relations in terms of adjusting social characteristics. Social security is defined at the community level rather than the individual level. In order to protect the coastal areas from the threat of abrasion, the families of salt farmers are actively participating in government programs such as planting mangroves. The existence of salt farmer organizations or groups also contributes to the management of coastal environment. The concern of the government and the community in overcoming the vulnerability of people whose livelihoods are lost is by providing assistance in the form of a *jetty* building. Other assistance is by providing salt-making equipment so that salt production can proceed properly. This can reduce the salt farmer's burden to increase adaptation to environmental problems on the coastal area.

Table 1. Table of Salt Farmers Working System based on Gender

No.	Working System	Men	Women
1.	***Land Preparation*** The embankment land is prepared by flattening its base. This preparation stage takes about 1 week. Then the water is drained, it takes about 10 days.	√	Women do not participate in this stage
2.	***Compaction*** The prepared land was compacted using a calendar, then a geoisolator (a kind of black plastic) is spread while flowing with water. This stage takes approximately 15 days. ***Crystallization*** Water from the evaporation plot then is treated so that the Be level reaches 22. Then it put into the crystallization table.	√	Women do not participate in this stage

3.	***Production*** After the salt is formed, put it in *tombong* or large container then transported it to the land to be placed in warehouse or purchased by collectors / buyers. Whereas the remaining salts that have not been sold are stored in the warehouse.	Men do not participating in this stage	√

Table 2. GAP Analysis Table

Adaptati on	Women							
	Mother							Children
	A	P	K	M	A	P	K	M
Physical	X	In physical adaptation, some women are participating in the cultivation of mangroves	In physical adaptation, women in the neighborhood have control to determine the elevation of the house floor	Women get benefits from raising homes so that the tidal flood does not enter the house.	X	X	X	XX
Social	Women have access to form or join groups of fishermen wives and PKK groups	Some women do not follow the group (passive)	X	Women get benefits in the social field, that is strengthening harmony	X	X	X	
Economic	Women have access to economic adaptation that is by doing side businesses such as opening stalls or kiosks	X	Women have full control in using working capital; regarding physical adaptation in the neighborhood, they have control to determine the elevation of the house floor (household finances)	Women get economic benefits i.e increasing family income	X	X	X	X

Description : A : Access K: Control
P: Participation M: Benefit

4. Conclusions

1. Characteristics of salt farmers are identified from the status of land, i.e. Property rights, tenants rent, and profit sharing. Salt farmers who have profit sharing status have a higher vulnerability than others.
2. Community adaptations include physical, social, and economic adaptation where the adaptation has been able to neutralize abrasion and rob disasters.
3. Forms of adaptation implemented by salt farmers when abrasion and tidal floods come are diverting salt land into fishponds, planting mangroves and preserving them, raising embankments in ponds, making double living patterns by going to the sea, making alternative business by fishing or trading.
4. The men's role in disaster adaptation is stronger or dominant in social and family organizations. Compared to women, women's role dealing with adaptation to the abrasion and rob disaster. Women in the family of salt farmers are less involved in socializing the mangroves planting to prevent abrasion.
5. Gender-based adaptation in Panggung Village is also influenced by the patriarchal culture inherent in Indonesia. Patriarchal culture itself is a culture that places men as the main control authority in a social organization.

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