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ADAPTATION STRATEGIES OF SALT FARMING FAMILIES IN MEETING THE NEEDS OF LIFE AFTER THE EARTHQUAKE AND TSUNAMI IN TALISE VILLAGE, MANTIKULORE DISTRICT, PALU CITY

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Abstract: This study aims to determine the socio-economic conditions of Talise salt farmers before and after the earthquake and tsunami as well as to examine the adaptation strategies applied by salt farmers in meeting the needs of their families. This research method uses a qualitative approach with data collection techniques through in-depth interviews, documentation studies, and observations. To complete the writing and take informants *purposively*, so that theoretically they can be held accountable. The location of the research is located in Talise Village, Mantikulore District, Palu City. The number of informants in this study amounted to 5 Talise salt farmers. The results of the study show that the earthquake and tsunami that occurred resulted in the destruction of salination facilities and infrastructure which ultimately also affected the social and economic life of the salt farming community. The destruction of salt ponds has made salt production decrease, so that the income of salt farmers has also decreased. To meet the living needs of their families, Talise salt farmers carry out several adaptation strategies, including ecological adaptation, economic adaptation, and social adaptation. In addition, there are several strategies that salt farmers carry out in surviving after the earthquake and tsunami, including income diversification strategies, family consolidation strategies, savings strategies, network strategies, and technology utilization strategies. By implementing some of these strategies, salt farmers have succeeded in facing the post-disaster crisis and also improving the social and economic conditions of the community so that they are able to meet the living needs of salt farmers' families.

Keywords: Socio-Economic Changes, Adaptation Strategies

1. Introduction

Central Sulawesi Province, with its marine wealth, is an area with significant economic potential. One of the valuable assets of this marine potential is salt, which is an important resource for residents along the coastal area. In Palu City, Central Sulawesi Province, there is a village known as a salt producer who plays an important role in the economy of the area. Talise Village has long been a center of salt production that contributes significantly to the increase in income and production in the region. Salt has a vital role in various aspects of daily life. In addition to being a commonly used food ingredient to give flavor to food, salt is also used in the food preservation process, food processing industry, pharmaceutical industry, and more. Therefore, the existence of salt producers such as Talise Village is very important to meet local and regional needs.

The salt production process in Talise Village involves a number of salt farmers who have been engaged in this business for a long time. There are about 18 hectares of salt ponds and approximately 160 salt farmers divided into 16 groups. They traditionally collect seawater in salt ponds located along the coast. The collected seawater is then dried until salt crystals remain. This process requires knowledge and experience in regulating water flow and monitoring weather conditions, so that the quality of the salt produced remains optimal. The importance of the salt industry in the local economy is reflected in the social and economic impact it causes. Salt production provides jobs to local communities, reduces unemployment, and improves the welfare of the population. In addition, the existence of the salt industry also encourages local economic growth by increasing trade and related business activities, such as procurement of equipment and sales of salt products to local and foreign markets.

The earthquake disaster that occurred in the Palu, Sigi, and Donggala (Pasigala) areas of Central Sulawesi in 2018 amounted to 7.3 ritcher scales accompanied by liquefaction and tsunamis that destroyed life along the coastline of the region, and the land in several disaster locations had an impact on infrastructure damage, loss of assets, decreased income, and loss of life. The results of geological and anthropological research in the central Sulawesi region are in a crack position (fault). Natural disasters are natural events that cause mitigation or risk or danger to human life. The consequences caused by disasters are losses in the form of human lives and property and damage to the environment. The potential for disasters in the future is still quite large and may increase in type, such as the influence of land use change from agricultural land to residential areas, as well as the determination of inappropriate settlement locations. The disasters that have occurred have had a serious impact on the land and salt ponds, which in turn negatively impacted the lives of farmers and their crops.

As a result of the disaster, the land and salt ponds suffered significant damage and were filled with debris, creating a difficult situation for farmers to continue their salt production. Damaged and debris garbage land or ponds cause various challenges for salt farmers. First of all, damage to infrastructure such as waterways and embankments can impede the flow of water needed to irrigate salt ponds. Water polluted by mud and garbage also results in a decrease in the quality of water used in ponds. This poor water quality has a direct impact on the quality of the salt produced. Salt farmers have to deal

with dirty water that contains sediment and unwanted particles, which can lead to poor salt quality.

The decline in salt quality not only affects farmers in terms of production, but also impacts their crop yields and income. Salt produced from contaminated ponds tends to have a lower level of purity, and this can reduce its marketability. In addition, consumers who need high-quality salt may look for other alternatives if the quality of salt from the region decreases significantly. This means that salt farmers will face a decline in demand and income that impacts their overall lives. In addition, the presence of mud and garbage that pollute salt ponds can also hinder the growth and development of marine organisms that play a role in salt production. Organisms such as plankton and microalgae are the main source of nutrients for marine animals living in salt ponds. If the water is contaminated, these organisms can die or be disrupted, hampering the food chain and pond ecosystems. As a result, overall salt production can be disrupted and reduce the expected yield.

The damage to salt ponds after the earthquake and tsunami made salt farmers lose the means to interact, the loss and damage of equipment to harvest salt caused farmers to have difficulty returning to harvesting and processing salt, so the alternative was to work as laborers outside the agricultural sector, resulting in the continuity of the community's economic activities being disrupted. Changes in the function of agricultural land in some parts cause salt farmers to lose their main livelihood and experience a decrease in productivity. As a Talise salt farmer whose livelihood depends on salt productivity as the main source of income, because from there they can live and from there they can meet the needs of life, so they need to make various adaptations as the conditions that exist after the earthquake and tsunami disaster. Based on the brief description above, the researcher wants to examine more deeply the adaptation strategies of salt farmers in meeting the needs of families in Talise Village after the earthquake and tsunami.

2. Method

The design of this study uses a qualitative *descriptive* method, qualitative data is revealed in the form of sentences and problem-solving descriptions by providing an explanation (Burhan Bungin, 2013) about the study of the adaptation strategy of salt farming families in meeting the needs of life after the earthquake and tsunami in Talise Village, Mantikulore District, which will be explained descriptively according to the results of the research. Qualitative methods are methods that emphasize dynamics and processes. In line with that, Bogdan and Taylor (in Moleong, 2007:17) define qualitative research methodology as a research procedure that produces descriptive data in the form of written or spoken words from people and observable behaviors. This approach is carried out and delivered to the setting and the individual holistically (intact).

The location of the research is the coverage of the area that is the basis of the research. This research was carried out in Talise Village, Mantikulore District. The author's consideration for choosing the location was because the researcher wanted to know how the adaptation strategy of salt farmers in meeting the living needs of families in Talise Village, Mantikulore District after the earthquake and tsunami. An informant is a person who controls and understands the data, informants and facts of a research object (Bungin, 2007:18). The determination of informants in the research is carried out

by *the Purposive* technique, which means the taking of subjects that are tailored to the research objectives by selecting a number of people who can provide information relevant to the research object. In this case, 5 salt farmers were determined in Talise Village, Mantikulore District.

There are 2 types of data used in this study, namely, primary data sources and secondary data sources. Primary data sources are data obtained directly in the field, through observation, interview, and documentation stages. This research aims to collect or filter field data in accordance with the research objectives. Secondary data sources are data obtained from research objects derived from various available literature or finished data collected by other parties, either in the form of books, documents, journals and existing scientific sources related to the research title made by the author.

This study uses a semi-structured interview method, which is an interview where the interview guidelines contain the main questions to be explored by the researcher, the nature of the questions is not rigid or strict, and the delivery can be adjusted to the conditions of the research subject. Another reason for using semi-structured interview guidelines is because this method is a way to prevent data mining from coming out of what is actually being excavated so that researchers can be more free to develop questions according to the answers of the research subjects. To obtain the required data, the following data collection methods are used:

1. Literature research (Secondary data)
   This literature research is intended to explore and obtain theoretical support related to aspects of the research object. Thus, the researcher tries to study and study various literature in the form of books, documents, scientific works that have been published or unpublished related to support the study.
2. Field research (Primary data)
   Field research means research that is directly on the object Field research is research conducted at the location or object of research. In this case, the researcher directly saw the social situation based on the study by carrying out a series of activities as follows:

a. Observasi (Observation)
   According to Bungin, observation is a person's ability to use his observation through the work of the five senses of the eye as well as with other five senses. Observation techniques are direct observations of the object and location of the research to get an overview of the object to be studied. In conducting this observation, it is necessary to involve oneself directly in the field or conduct a review. This technique allows researchers to draw inferences (conclusions) about the meaning and point of view of the source, event, event, or process observed.
b. Interview
   In this study, interviews were conducted with several informants in order to dig and obtain the needed data. Interviews are carried out by the process of collecting information for research purposes by way of questions and answers and face-to-face with informants using tools used in interview guidelines and equipped with research instruments such as book recorders and stationery, so that it can make it easier for

researchers to obtain the information or data needed. To facilitate the interviews conducted, interview guidelines were prepared beforehand so that the interviews conducted were directed and on target. With such guidelines, *the interviewer* thinks about how the statement will be described concretely in the question sentence, as well as adapting the question to the actual context during the interview.

c. Documentation
Document or documentation is the retrieval of data through documents, photographs, archives or necessary papers.

3. Main Heading of the First Analysis or Discussion

3.1 The Condition of Salt Farmers in Talise Village, Mantikulore District Before and After the Palu City Earthquake and Tsunami

The earthquake disaster that occurred in Central Sulawesi accompanied by a tsunami destroyed life along the coastline of the Talise region. Disasters that have an impact on infrastructure damage, loss of assets, decreased income, and loss of life. The agricultural sector is faced with various external shocks that affect not only production, but also the availability of resources and infrastructure as well as aspects of the livelihood of salt farmers and the surrounding population in general. External disturbances, one of which originated from natural disasters in the form of earthquakes and tsunamis.

Before the earthquake and tsunami, the economic condition of salt farmers was running smoothly. The resulting salts are abundant. The sales process is also not that difficult. Most of the pond's products are used as industrial salt products for fertilizers, ice blocks, and fish. However, due to the earthquake and tsunami that devastated coastal areas, especially in the Talise area, Mantikulore District, around 85% of salt ponds were damaged. The salination land, which initially amounted to 18 hectares, was reduced to 16 hectares after the earthquake and tsunami. The disaster resulted in a subsidence in the land surface which caused the occurrence of rob or rising sea water that had submerged the salt pond area. Post-tsunami causes an increase in salinity along the coast. The salinity level is influenced by the characteristics of the mud carried by the tsunami to agricultural land and the level of soil permeability. The salts have moved into deeper layers of soil, particularly on soil with a coarser texture. This is because the mud carried by the tsunami is very fine and thick and thick. The thickness of mud from under the sea still covers almost the entire area of salt ponds up to 2 cm.

This thickness has been a cleaning process that has been carried out since the first week after the disaster. But in reality, the very smooth texture makes it difficult for salt farmers to get the condition of the land before the disaster occurs. As stated by Pak Majid (41 years old, interview results on April 15, 2023), "After the earthquake and tsunami at that time, the barrier between one plot of salt pond and another no longer exists, because it is buried in mud and a lot of material debris. In addition, the diesel engine that is usually used to suck seawater into the reservoir and the paralon pipe, disappeared out of nowhere."

The source of livelihood of the farming community on the coast other than fishermen is salt farmers in Talise Village, Mantikulore District, Palu City, revealing and explaining that the level of salt production after the disaster tends to decrease from its production to the selling price is unbalanced so that the economy of salt farmers is greatly disadvantaged. For salt field farmers, there are only less than 5 salt pond farmers who have returned to cultivate their salt fields. One of the salt pond farmers said that he had returned to cultivate the fields two days after the disaster. The work done was to clean the salt fields. At that time, there was still a lot of dirt due to runoff from the sea, including very thick mud around the beach. The new beach can be used to produce salt after almost two months.

The quality of the harvest from the salt is still below the standard that was usually obtained before the disaster. Currently, harvested salt is only used for fertilizer and cannot be used as an additive to foodstuffs. The same is the case with salt traders around Jalan Komodo, Talise Beach. Salt traders who usually get salt from the surrounding area currently get salt from outside the city, namely from East Java. Not only is it a matter of quality but the amount of salt harvested is not enough to be sold. The difficulty of salt pond farmers today is the thickness of the mud which greatly affects the quality of the salt to be harvested. However, efforts to eliminate it can only be done by continuing to cultivate pond land for salt fields.

After the earthquake and tsunami, it has had an impact on the economic and social changes that occurred in salt farming households in the Talise area, which of course changed the pattern of daily work activities of salt farmers with the aim of making a living to meet their daily needs. Farmers' households as owners and cultivators of salt ponds after natural disasters have turned into labor-intensive laborers or construction workers or craftsmen, raising livestock, and fishing/fishing. This happens because in farmer households whose salt ponds have decreased or even disappeared and have been the main source/livelihood that has resulted in not being able to carry out activities in their tanning business. For salt farmer households that still have salt ponds, they also do not have the capital to be used to repair or redo their farming business. Some salt farming families try to meet their daily needs by doing work activities in non-agriculture, but also remain workers in salt productivity activities, especially during the busy season in their farming activities.

The results of the study also show that in addition to working as salt farmers, salt farmers also have other businesses outside of salt land. In the morning they work in the salting land sector, while in the afternoon until evening they work outside the non-agricultural sector such as opening cafes or other small businesses around Talise Beach. This is done by salt farmers to meet their economic needs. In addition, there are also salt farmers who sell their own salt, usually family members who are in charge of selling salt, such as wives, children or other family members. This is reinforced by the results of an interview with Mr. Sahrudin (interview results of April 15, 2023) "In addition to me working on the land, I also sell salt, in the morning and evening I work in the salt factory, but in the afternoon I take care of the salt, the results of the salting we sell ourselves, if I work on the land my wife takes care of the salt".

The results of the study show that in addition to being farmers who cultivate the land, there are also farmers who sell their own salt products, while waiting for the salt harvest, these farmers take advantage of their time by selling salt, if they use it in the morning and evening to work in the salt, during the day they use it to sell salt. In addition to farmers, other family members are also involved and have a role in marketing the products of salt land production. After the salt is harvested, then the salt will be marketed by family members such as wives or children who will sell salt near the salt field, sometimes salt is also sold in traditional markets in Palu City.

Changes in prices, labor wages, and the area of salt pond land ownership are suspected to have a direct effect on the economic behavior of farmers' households to generate income (Timmer & de Vries, 2009). Family members in an agricultural household usually work together in a farming activity, just like the head of the family who works as a salt farmer or produces salt and the wife as a salt seller. This is a rational decision and consistent with the goal of increasing family income and the efficiency of using resources owned by the household.

Income has changed between before and after the earthquake and tsunami disaster, this is shown by the change in average income based on the area of land cultivated by Talise salt farmers. For farmer families affected by disasters with a level of severe damage, after the disaster they tend not to carry out farming activities anymore because salt pond land and production facilities are damaged. As conveyed by Mr. Sahrudin (the results of an interview on April 15, 2023) "How can we not be confused, salt is our main source of income. Once the land disappears, our source of livelihood is gone, everything comes to a halt."

The same thing was also conveyed by Mr. Majid (the results of an interview on April 15, 2023), "Before the earthquake and tsunami, the three salt pond plots with a total area of about 2,400 square meters could bring decent results. A month with a harvest period of five times, we can make 8 million to 9 million rupiah. You can imagine how when production activities stopped, the family economy became shaky." This will certainly reduce the income of salt farming families. When viewed from the change in income in the Talise area, it shows that before the earthquake, in general, the average income received by respondents in the salt farming business during one season was Rp2,000,000.00/farmer or Rp1,000,000.00/ha. However, after the disaster, salt farmers did not carry out salt farming activities, this is suspected to be due to damage to salt pond land, and the lack of adequate equipment in producing salt.

The salt produced by farmers on Talise beach can be used for various purposes. For good quality salt characterized by large crystal grains and clean white it is used for cooking consumption. This type of salt is the highest price sold at a price of Rp. 300,000.00 for one sack with a size of 60 Kg. For the second quality salt which is softer in shape and slightly mixed with the soil, 1 sack can be sold for Rp. 280,000.00. This type of salt is used for fertilizer mixtures. Agricultural land in Palu, on average, uses a mixture of salt. Therefore, the demand for salt in Palu is quite high.

4. Forms of Adaptation Strategies for Salt Farmers in Talise Village, Mantikulore District

Earthquakes and tsunamis are natural events that occur naturally and no one can block them except the power of Allah SWT, with this kind of event greatly changes people's behavior in carrying out their lives, one of which is in their economic state. Before the natural disaster, the livelihood conditions of Talise salt farmers were very favorable because of the large amount of salt that could be harvested and successfully sold.

However, the earthquake and tsunami that hit the area changed the situation dramatically. The impact of the disaster had a negative impact on the livelihood of salt farmers in Talise. Land or salt ponds that were once fertile and productive were damaged by the incident. Debris and materials carried by tsunami waves cause salt ponds to become contaminated and polluted. The water used to irrigate the pond becomes dirty, resulting in a decrease in the quality of the salt produced.

As a result, salt farmers in Talise experienced a significant decline in crop yields, which had a direct impact on their incomes. Previously, they could easily sell their salt due to the abundant supply. However, after natural disasters, the supply of salt decreased and its quality also declined. This makes it difficult for farmers to sell their salt at a favorable price. In addition, consumers who need high-quality salt may look for other sources, reducing the demand for salt from Talise.

The dramatic change in the economic conditions of the Talise salt farmers caused them to have to find a solution to survive. They may need to adapt new methods of salt cultivation, clean and repair damaged ponds, as well as find alternative markets to sell their products. In the face of post-disaster economic challenges, it is important for Talise salt farmers to seek sustainable and innovative approaches. They can consider modern technologies in pond management, build a network of cooperation with related parties, and expand their market through effective promotion and marketing. With collaborative efforts and the right strategies, salt farmers in Talise can restore their economies and rebuild a better life after devastating natural disasters.

To meet the needs of their families, Talise salt farmers do not want to be too dissolved in grief due to the earthquake and tsunami disaster that occurred. Several salt farmers tried to rise up to meet their family lives, as done by Mr. Sahrudin (interview results on April 15, 2023), "Indeed, at that time the atmosphere of Palu was very sad. Just imagine, thousands of people became victims. Our house was destroyed, so we had to live in an evacuation camp. However, I have to get up immediately because my family needs to live".

Some salt farmers try to clean the salt pond land from rubbish or buildings carried away by the tsunami, find a boundary line between one land and another, and hoe to make plots of land and then re-layer the land with boards and logs after which the soil begins to compact and the map is ready to be filled with seawater. In addition to repairing mediation sites or salt processing sites, farmers also repair sea sluice channels and shelters. However, the steps of salt farmers to repair this salt land were hit by funds, because many facilities and infrastructure were lost due to the disaster, besides that

the economic condition of the salt farming community has not recovered. To make a plot of land, it takes a lot of money. On the other hand, salt farmers no longer have savings and property because they disappeared in the disaster. As conveyed by Mr. Majid (interview results of April 15, 2023). "To make new land, you have to make puddles as big as the land you have. After that, you need a diesel vacuum cleaner, boards, paralon hoses and many more. Making it requires millions of rupiah. We as small farmers are certainly difficult, especially since we are also in a position to be hit by disasters".

The way for the community to meet their needs to survive is to expect assistance from the government and from outside the Palu City area itself, but in conditions like this, people are starting to think so that they do not always depend on help from the government or outside, because this can cause them to only be dependent on others. The way they do it to continue their lives is by switching professions in other sectors and opening small businesses that can support their daily lives. As Mrs. Nasiria did in her interview she revealed (the results of the interview on April 15, 2023), "Currently I sell fried foods and pop ice to improve land, it has been 2 weeks now that I have started to actively repair the salt land and also sell salt, there is salt from outside, that's what I sell, the term is to take advantage of the situation, if I go to salt in the afternoon to continue to improve the land"

And because there is an economic need so that the form of social activities that occur among the community such as trying to help people around them, the contribution given, namely from the income they get, is sufficient for the needs of life. The results show that there is a lot of temporary work that salt farmers do after the earthquake and tsunami to raise money that will be used to improve salt land. Repairing salt land requires a large enough capital to buy boards, shovel wood, meters, and other equipment. This shows that even though their salt fields were destroyed, the salt farmers still hoped to fix it.

In addition to farmers who try to raise capital to improve their salt land, there are also farmers who directly work on their salt land, this is done because this salt is the only hope to support the family economy. Not a few salt farmers also choose to rest due to trauma due to earthquakes and tsunamis, of course there is a fundamental reason why these salt farmers are still fighting for their salt land. From the results of the interview conducted by the researcher, there is a fundamental value that salt farmers still survive as farmers as expressed by Pak Majid (the results of the interview on April 15, 2023), "It has been for generations, our parents lived from here and were also raised with this, so we cannot leave. This salting is not quite good, in fish it depends on the weather too, if it is hot we don't have time to sell salt because we take care of it in the salting, if it rains we sell salt again".

Apart from inheritance, there are other factors as revealed by Mr. Sahrudin (the results of an interview on April 15, 2023), "Because making money in this salt is easy, the results are good, there are no other jobs, that's why we keep it, I used to be a craftsman, but because this kind of work is good, the results are now the main thing, that's why I maintain this". The results of the study show that apart from hereditary or inheritance,

economic value is also the main factor for farmers to cultivate their salt land. Before the aftermath of the earthquake and tsunami, it was easier to earn money by working on salt land, so that in terms of economic needs, farmers felt fulfilled. Another factor is the existence of other farmers, the intense interaction between salt farmers before the earthquake and tsunami makes the emotional relationship between salt farmers closer. Seeing that there are farmers who are still struggling, this motivates other farmers to rise together.

After the earthquake and tsunami of 159 salt farmers, who have worked on their land, there are 120 salt farmers who have actively returned to cultivate their land. The salt land that is directly cultivated by salt farmers has changed both in quantity and quality, before the earthquake and tsunami, the salt land cultivated by farmers who used to be 1 plot of mediation could produce 4-5 sacks, but now it can only produce 2-3 sacks, this makes the quality of salt experience a decrease in productivity levels, this is strengthened by the results of an interview with Mrs. Nasiria (the results of an interview on April 15, 2023), "After this earthquake, salt production decreased, this land was buried for a long time, so the land is cold and the heat from below is less, if the land is hot in the lower layer and the top is also hot, it is balanced, so a lot of salt can appear, so the process can be fast."

A similar statement was also made by Mr. Sahrudin (interview results on April 15, 2023) "The production results are not the same, because they have just been reprocessed, so it's like going back from the beginning, first the salt becomes black, the result is when harvested for the first time, if it was in a good place before the earthquake, it was already solid, it was clean, this will be remade, make it again from scratch, So there are still many who follow the land". Some of the adaptation strategies carried out by Talise salt farmers after the Palu City earthquake and tsunami include ecological adaptation strategies carried out by salt farmers by utilizing the availability of available natural resources. Ecological adaptation that is widely carried out includes adjusting the existing land by making land plots and pumping water through pipes that are available and can still be used.

For farmers who still have land and capital, they still try to become salt farmers or pond farmers to generate income. Salt farmers on Talise Beach have started cleaning and repairing salt fields after two weeks in the refugee camp. "So when there was already equipment assistance, at that time there were only three of us who wanted to return to work on the pond. We work together to repair water channels to be used for farming and repairing their respective ponds. Maybe because there are already signs of life in salt pond land, the number of farmers who want to return to work is increasing" (interview results with Mr. Sahrudin, April 15, 2023). Economic adaptation carried out by farmers in the event of a crisis includes selling previous crops, selling livestock, selling gold or jewelry, disbursing savings, transfers from families and diversifying their livelihoods. Most households today do not depend solely on the source of income from the salt farming sector. Many households in the coastal area of Talise currently have a dual livelihood both in the agricultural sector, such as being farm laborers or other farming businesses, or working in the non-agricultural sector.

The dominant social adaptation carried out by farmer households is by utilizing social networks, such as borrowing money from relatives, neighbors or pond owners and utilizing assistance from the government. Respondents prefer to carry out social adaptation strategies based on mutual trust. Most of the respondents of salt farming families had borrowed money either from relatives or other parties individually, while the salt farmer group did not provide cash lending assistance.

Salt farmer groups only help in the procurement of salt making facilities. Most of the farming households in the two villages take advantage of assistance from the government in the form of food needs, this assistance is very helpful, especially for low-income households. Every salt farming household has an adaptation pattern in dealing with vulnerabilities due to the impact of earthquakes and tsunamis. Farmer households combine these three adaptation patterns to increase resilience.

As obtained from the results of research and interviews conducted from several informants, some of them carried out strategies by opening small businesses to survive as done by Mrs. Safitri (interview results on April 15, 2023). "I was in the evacuation camp and thought that it was impossible for me and my family to survive for long in conditions like this. While in the past, the family's main income was from working on ponds and selling salt, but the condition of the land is still damaged and under repair. At this time, it is certain that my family has no income at all, so I thought to try to open this small shop, even though the income is not as much as when selling salt, at least there is income that can be used for food and daily needs".

From the above statement, it can be seen that the family economic adaptation strategy carried out is by opening a business selling food and beverages. With minimal capital and utilizing existing resources, salt farmers can open a business to meet their family life. In addition, by taking advantage of the assistance received from the government or family, and also saving salt farmers, they can survive as done by Mrs. Erni (interview results on April 15, 2023). "I opened this business in the yard of the house and used things that could still be used. If I get my selling capital from government disaster assistance in the form of foodstuffs and beverages such as rice, noodles, tea, syrup, etc. Then Alhamdulillah, I also get financial assistance from my family in Makassar, I use this to buy food and beverages for sale and the rest I save for daily needs. Because the sales are only small, so I save money to buy, after this disaster everything is limited, so we eat only potluck, clothes and what is left".

To meet daily economic needs, salt farmers built survival strategies after earthquakes and tsunamis. Broadly speaking, the livelihood strategies carried out by salt farmers can be grouped into three types, namely: survival strategies, consolidation and accumulation. The most widely carried out livelihood strategy is a survival strategy, which is in the form of coping efforts, such as working as casual laborers (buildings, transporting goods, washing clothes, farm laborers), selling food, finding and selling iron from building ruins. Meanwhile, the consolidation strategy is an effort to work with the aim of getting a more stable income, such as becoming a trader who sells food/beverages or basic necessities in stalls/tents, and household industry businesses (salted fish/dried fish processors, and weavers of fabrics/clothing materials), making and selling ice wrappers or yellow rice/cakes, repairing and reactivating the salt

business. In addition, some salt farmers have begun to implement accumulation strategies in the form of utilizing capital and all available resources, such as building stalls and renting out their land that is not affected by disasters for agricultural activities.

The form of survival strategy carried out by salt farmers can be categorized into active strategies, passive strategies, and network strategies. Active strategies carried out by salt farmers include doing:

1. Income Diversification
   It is done by utilizing salt pond land to be converted into fish farming land that has a high selling price, such as; milkfish, shrimp and crab. Go to sea to catch shrimp, crabs, anchovies and other types of fish by netting using a boat.
2. Family Consolidation
   There is the involvement of family members to increase income, from selling salt and fish caught in ponds or the sea to people's homes and to markets. In addition, they also sell traditional specialties that are cheap and easy to get, some are also daily coolies.
3. Technology Utilization Strategy
   This strategy is the use of a biomembrane technology system or polybag system in producing salt. This is mostly done by farmers to increase the amount of their salt production rather than using soil salt production techniques, as evidenced by the use of the polybag system salt production increased by 60% and salt content also increased to 99%.

Membrane technology is one of the pollution prevention techniques that is considered to have an effect on the salt produced later. Where the cleaner the water that is processed into salt, the better the salt will be produced. The use of this membrane technology has the most influence on the economic condition of salt farmers, as conveyed by Mr. Majid (the results of an interview on April 15, 2023), "Before installing this membrane, we usually produce about 200 kilos of salt with a harvest period per 4 days from a pond area of about 10x8 meters. After installing the membrane, it can produce 400 kilos to 600 kilos with the same period and area of pond land as before. The ratio can be more than doubled".

In terms of quality, farmers believe that the results of salt production using the biomembrane method are much better than using conventional methods, as conveyed by Mr. Majid (interview results on April 15, 2023), "In terms of quality, compared to using traditional methods, using this membrane the salt produced is much better. In the past, we did not use a base for salt crystals, now we give a base so that the harvest does not mix into the soil. Our salt yield is now much whiter, the salt crystallization process is also faster." The quality of salt is better and also faster production, making Talise salt much sought after and also able to compete with other salt-producing regions.

The passive strategy carried out by salt farmers is to make savings. The saving strategy carried out is by minimizing expenses and regulating basic needs, the action that is often taken by salt farmers is not to sell the full salt harvest as a deposit (hoarding). In addition, salt farmers also often convert liquid capital in the form of money into high-

value goods, as well as by catching fish in ponds and the sea to reduce the purchase of side dishes. The last form of strategy carried out by salt farmers is the network strategy. This strategy is a social capital for salt farmers as a means to exchange information about job diversification and debt and receivables activities.

Based on Scott's theory of Survival Mechanism, the strategies carried out by salt farmers are included in the *survival* strategy. The savings strategy carried out by salt farmers is one of the ways for salt farmers to survive after the earthquake. They try to regulate their diet so that their spending allowance for meals does not swell. This is justified by the five informants, where with income that is still unstable after the disaster is still not enough to meet their daily needs, the five informants have the same answer, namely trying to live frugally by reducing their expenses. Some informants who are still living in the refugee camps are trying to maximize their income by dividing their monthly expenses, so that they eat a modest meal for food.

The same way is done by salt farmers as proposed by Scott, by using alternative subsystems such as selling small or migrating to find work. As done by Mrs. Safitri who does side work by opening a shop business to meet the needs of her family. Another attempt made by salt farmers to survive is by going into debt or borrowing money. When the efforts of salt farmers to maximize their income for daily needs are still lacking, then the salt farmer is forced to owe both to his colleagues and relatives. Three out of five informants admitted that they were forced to go into debt if their expenses exceeded the income they earned.

5. Conclusion

So, the conclusion of the results of this study is that some of the people of Talise Village are people who use raw materials for salt procurement (salt farmers) as a livelihood that is able to improve socio-economic life. Most salt farmers have been engaged in their work since childhood or for generations. The profession as a salt farmer in Talise Village is a generational professional heritage. Reality shows that economic conditions are paralysed or the income of salt farmers has decreased as a result of natural disasters because all economic activities have been paralyzed, and there is no production process running, which results in some salt farmers losing their wealth and damage to their salt land. After the earthquake and tsunami, the social group of the salt farming community also had a positive impact on salt farmers, namely the increasingly solid relationship between individuals in the group, as well as the culture of mutual cooperation between groups to improve salt land and waterways used to meet the living needs of salt farmers. The adaptation strategies carried out by salt farmers after the earthquake and tsunami are ecological adaptation by improving agricultural land by utilizing existing resources, economic adaptation by selling crops and doing additional work outside the salt farming sector, and social adaptation by utilizing the social network of salt farmers. Some forms of survival strategies carried out by salt farmers include active strategies, namely by diversifying income, consolidating families, and utilizing technology, passive strategies by making savings, and finally network strategies. The use of technology is one of the adaptation strategies that can be said to have the most influence on economic changes for salt farming families. Because by utilizing membrane technology, salt income or salt farmers' income increased two or three times before the earthquake and tsunami. In

addition, the salt produced is also of better quality than before, to produce salt also takes a shorter time than using traditional methods. The survival strategy carried out by salt farmers is in accordance with the theory of survival mechanism by J.C Scott.

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