

## Livelihood Strategies of Salt Farmer Communities in Facing Climate Variability

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**Abstract.** Salt farming requires stable climate conditions to be able to produce salt sustainably. However, currently, the negative impact of climate variability on salt farming areas is very significant. This affects the sustainability of the salt farming efforts of farmers at the research location. The purpose of this research is to describe the impact of climate variability on the salt farmer community and the livelihood strategies of salt farmers in facing climate variability in Gampong Ara, Kembang Tanjong District, Pidie Regency. This research uses the Livelihood Strategy theory. The method used in this research is descriptive qualitative with a case study approach. Data were collected through observation, interviews, and documentation. The determination of informants in this study are salt farmers who have worked as farmers for at least 10 years. After the data is collected, a data analysis technique is performed, which includes data reduction, data presentation, and conclusion drawing. The results of this study show that the salt farmer community is facing a very difficult situation due to climate variability. The impacts caused include: 1. High rainfall, 2. Difficulty in producing salt during strong winds, 3. Full moon tides, and 4. Flooding of land during the rainy season. Therefore, farmers developed adaptation strategies in the form of livelihood strategies at the research location, namely: land intensification and extensification, as well as livelihood diversification. Intensification of capital addition for salt farmers, such as firewood, and extensification for farmers to increase labor, and diversification carried out by salt farmers to seek other jobs besides agriculture to temporarily replace their main work. The support of policymakers is greatly needed by the salt farmer community to bolster the resilience of farmers in maintaining their sustainability.

**Keywords:** Community, Livelihood, Salt Farmers, Strategies.

### 1. INTRODUCTION

Indonesia is known as a country that has abundant natural resources, both on land and at sea. According to (Pahlawan et al, 2020) Indonesia's coastal areas have very abundant resource potential. According to (Wijaya et al., 2024) In the context of Indonesia, coastal areas are actually strategic growth areas, both for the development of social, cultural and economic aspects. One that can be utilized is the salt production business. As a basic need, salt has an important role in people's lives, including in Aceh Province (Arfah, 2021) . However, this potential faces various challenges due to climate variability which has an increasingly real impact. The world is currently facing a climate transition, where climate and ecosystem behavior have changed slowly, in a direction that has never been recognized before (Irid, 2024) . Most traditional salt farming communities live in poor conditions (Nurdin, Fatia, et al., 2023) . According to (Nurdin, Khairulyadi, et al., 2023) One of the quite serious problems is climate variability. This is because the salt farming community needs enough sunlight to run its production efforts (drying raw materials), so that uncertain and unpredictable rainfall causes the production process to be hampered or even fail. Conditions of climate variability tend to continue to occur in the future (Nurdin, 2024) .

According to (Agustya, 2024) climate variability that occurs in salt fields has an impact on decreasing crop yields due to the rainy season and the percentage of tidal flooding during the rainy season. Climate variability has a broad impact felt by coastal communities, especially in Kembang Tanjong District, Pidie Regency. Phenomena such as tidal flooding, rising temperatures, and changes in rainfall have disrupted the salt production process. According to (Maurizka & Soeryo Adiwibowo, 2021) this prolonged tidal flood has a broad impact on various aspects, for example social and ecological aspects. This condition makes traditional salt farmers face major challenges in maintaining the sustainability of their businesses. In addition, the limited area of production land, which only reaches a total of 1.29 hectares from six farmer groups, further exacerbates their vulnerability to the impacts of climate variability.

A number of adverse effects that are expected to be the impact of climate variability have begun to occur in Aceh province, including declining harvest quality, increasing temperatures, drought, and natural disasters. The impact of climate variability will result in a shift in the dry and rainy seasons in Aceh, which have shifted, no longer like before, where the rainy season occurred in September-December. Now, it is already raining in May (Zulkarnaini, 2022) . Furthermore, the impact of climate variability among coastal communities can also be seen from the presence of extreme winds, a natural phenomenon that occurs abnormally and is marked by rainfall, usually these extreme winds occur in August-October. So from August until the extreme winds occur. Therefore, traditional salt farmers find it difficult to produce salt, seen from changes in the weather, people will store stocks of sandy soil so that salt production is not hampered (Manu, 2023) . Extreme climate variability has made coastal communities develop various adaptation strategies. One of them is in the traditional salt farmer community. The negative impact on climate variability has threatened the sustainability of the salt farmer community. Therefore, an adaptation strategy is needed so that salt farmers can maintain their sustainability. One form of this strategy is a livelihood strategy. According to Scoones 1998 in (Bari & Nurdin, 2024) , livelihood strategies are divided into three, namely: 1) Intensification, namely the addition of capital and extensification, namely the addition of labor; 2) Diversification, namely between active choices to invest in diversification through accumulation and reinvestment. Diversification is intended to overcome temporary difficulties or more permanent adaptation of livelihood activities, when other options fail to provide a livelihood. This is as stated by (Napitupulu et al., 2025) diversification is needed to minimize the risk of crop failure due to climate change. 3) Migration. Therefore, this study aims to analyze the form of adaptation strategy of the salt farmer community in dealing with climate variability.

## 2. METHOD

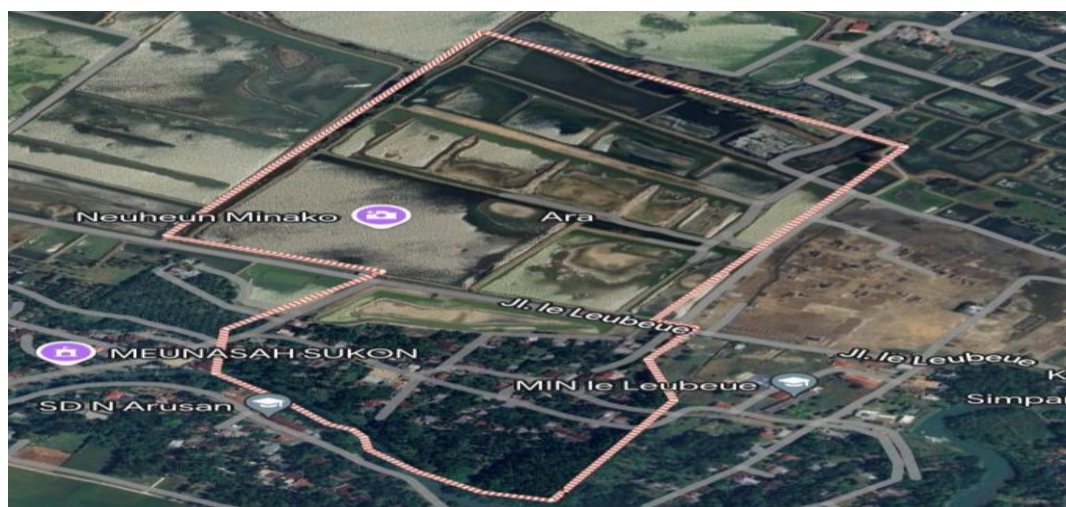
This study is the result of field research conducted on a group of salt farmers in Gampong Ara, Kembang Tanjong District, Pidie Regency, which is the main location for traditional salt production using the boiling method. This study uses a qualitative approach with a case study approach and the data obtained is through field observations and in-depth interviews. The observations made are focused on observations related to the process of climate variability in the salt farmer community in Gampong Ara. Not only that, observations related to the form, impact and livelihood strategies of the salt farmer community were also carried out. Then the results were strengthened by interviews. In-depth interviews were conducted with 6 informants consisting of members of the salt farmer community and middlemen (mugee). The selection of this criterion considers that they have been victims of exposure to climate variability. The selection of this informant was carried out using a purposive sampling technique, namely with the criteria of salt farmers who have been producing salt for at least 10 years. In addition, salt farmers who sell salt to mugee. Data analysis techniques are carried out in 3 stages, namely: 1. Data reduction, namely sorting data that is appropriate to be systematically arranged into an article, 2. Data presentation, namely presenting data that has been previously reduced. Data presentation includes the presentation of graphs and data that are considered relevant. and 3. Drawing conclusions, namely after the data and information have been summarized, a meeting point is taken to be presented comprehensively.

## 3. RESULTS AND DISSCUSION

### Overview of Research Location

According to (Bintarto, 1983) in (Edi Rismanto et al., 2024) Geographically, a 'village' can be interpreted as a result of a combination or interaction of various activities of a group of people with their environment. This form of diversity includes several important elements such as physiography, social, economic, political, and cultural elements that interact with each other in relation to other regions. Gampong Ara, located in Kembang Tanjong District, Pidie Regency, is a village located on the coast with the majority of the population working as salt farmers. With a salt production area of around 1.29 hectares, the people of Gampong Ara use traditional methods in salt production, such as boiling and drying. This production is the main source of economic income for the community, although they also face various challenges, especially due to climate variability. Most of the population has a low level of education, with the majority only completing education up to Junior High School (SMP). The low education profile affects innovation and adaptation in managing the salt production sector. The area is

approximately 2.15 Ha covering two hamlets. The population of Gampong Ara is 212 men and 127 women. The population of Gampong Ara consists of 80% natives and 20% immigrants.



**Figure 1.** Map of Ara Village

### **Socio-Economic**

The economic situation in Gampong Ara is still relatively low with the majority of the population still classified as underprivileged. The results of the study showed that out of 177 families in Gampong Ara, only 6 families were classified as well off. While the others were classified as underprivileged and sufficient (Data from Kembang Tanjong District 2024). In addition to the agricultural sector, there are several people in Gampong Ara who work as fishermen, melinjo chip craftsmen, salt farmers, and construction workers. In addition, there are also people who run small businesses such as grocery stores, traders at the morning market, so they can help people in the area to meet their daily needs. The people of Gampong Ara are still recipients of PKH (Family Hope Program), BLT (Direct Cash Assistance), and Basic Food Assistance. With this assistance from the government, the people of Gampong Ara are greatly helped. The work as salt farmers carried out by several people to improve the economy and daily needs of the people of Gampong Ara.

### **Social Religious**

The majority of people in Pidie Regency are Muslim. However, other religions such as Christianity, Hinduism, and Buddhism also develop and live side by side with Muslims. In Pidie Regency, the majority of the population is Muslim, which is 377,453 people with a percentage of 99.56%. The population of Gampong Ara is 100% Muslim. The presence of the meunasah in the midst of the community functions to help them in terms of worship. Of course, such as congregational prayers carried out by the people of Gampong Ara. In addition, there

are routine religious studies held every Friday night for adults and every day for children. Islamic teachings teach the people of Gampong Ara to respect each other.

### **Socio-cultural**

The majority of the people of Gampong Ara are of Acehnese ethnicity. Various traditional beliefs that have been passed down from generation to generation are still adhered to by the people of Gampong Ara, such as peusijek, which is the traditional process of the Acehnese people carried out in various specific activities, such as peusijek for marriage, for departure to the holy land (pilgrimage), and others. This is because the community still cares about the existence of customs so that the community continues to preserve them from generation to generation to the next. In addition, local wisdom that is still preserved by the residents of Gampong Ara is the implementation of the Prophet's birthday, teut apam. Apart from customs, Gampong Ara also socializes with routine activities once a month by carrying out community activities that will carry out mutual cooperation together.

### **Salt Farmer Profile**

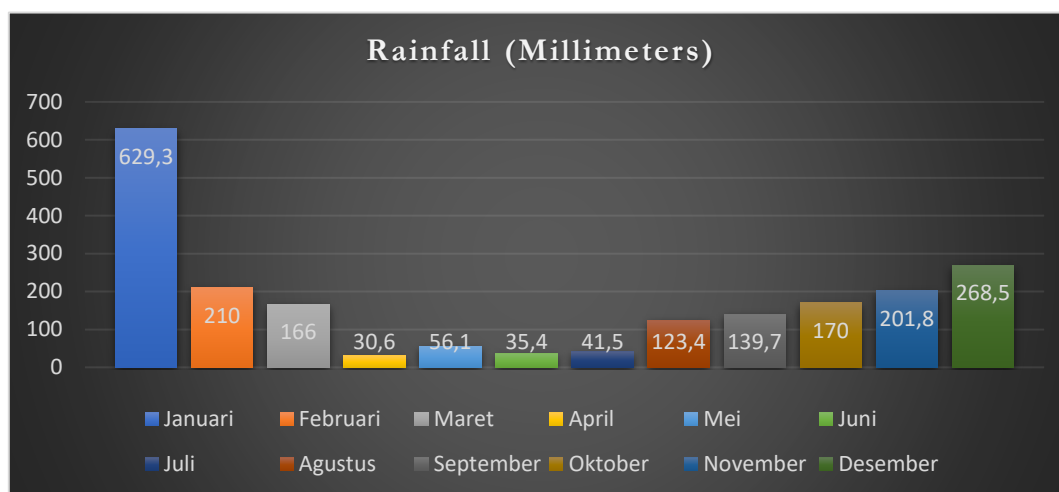
The traditional salt production business is one of the driving forces of the community's economy in Gampong Ara, one of the villages that has a fairly wide coastline and can be used as a business to increase economic income, especially for salt farmers. Gampong Ara has a salt production business with a production volume of 668.61 tons/month. There are several techniques used in the salt production process, namely using membrane technology and traditional techniques. However, the salt production process in the salt making business group in Gampong Ara still uses traditional techniques. In general, the traditional salt making process is divided into two methods, namely the boiling method and the drying method. The boiling method usually produces finer salt than the drying method. For salt making using the evaporation method, the salt produced has a saltier taste because it is harvested from evaporated water. When viewed from gender, women also contribute as salt farmers. The role of women in the salt business is not limited to certain types of work. They handle every job in every stage of salt making. Generally, women involved in the salt making business are elderly, most of them are over 45 years old and some are even in their 70s. One of them, as informed by A, 63 years old:

"I have been producing salt since I was little, because this is a job that is done from generation to generation. As a housewife and a wife, I can help with every process of making salt so that it can increase income for the family."

## Exposure to Climate Variability in Salt Farming Communities

### High Rainfall

High and unpredictable rainfall has a significant impact on salt production in Gampong Ara. One of the main processes in salt production is drying sandy soil to prepare raw materials, which requires dry land and sunny weather. High rainfall causes waterlogging in the ponds, disrupting the drying process. This causes salt production to stop and delays farmers' activities for up to two weeks. The impact is not only in the form of material losses due to suboptimal production, but also causes farmers to face economic difficulties in meeting their daily needs. Rainfall fluctuates and tends to increase. The increase in rainfall is seen from April (41.5 millimeters) to January which amounted to 629.3 millimeters. Indirectly, this condition illustrates that the salt farmer community has struggled to work for the past 7-8 months. Of course this worsens the condition of salt farmers .

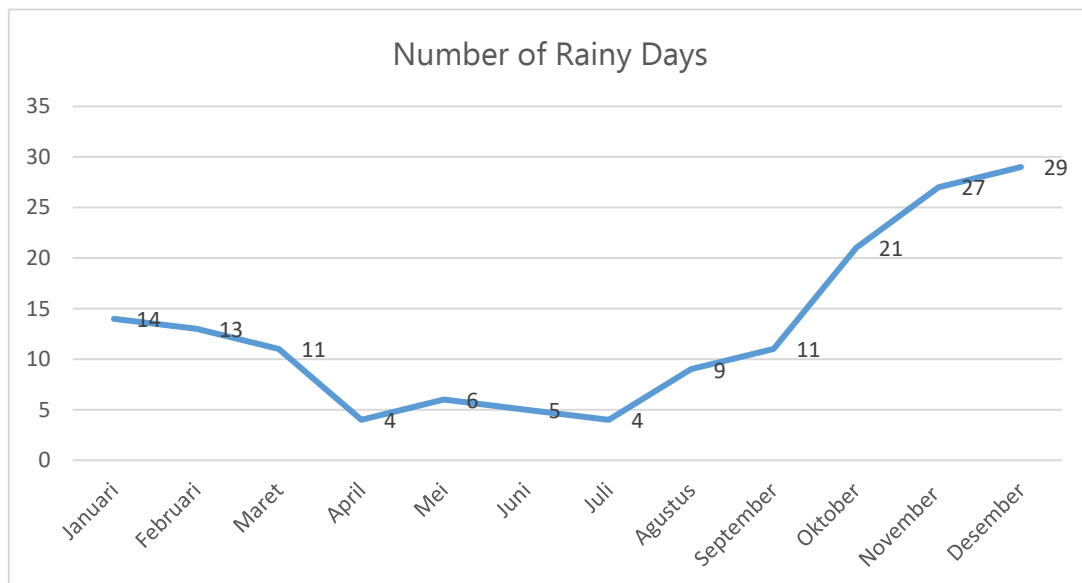


**Graph 1.** Rainfall by Month in Pidie Regency (BPS, 2024)

Based on the data , it appears that unfavorable conditions have an impact on the salting business. In addition, high rainfall causes the firewood used to cook salt to become wet and requires 2-3 days to dry again. If the rain continues, the firewood that has been dried will become damp again, thus having an impact on extending the time needed to start salt production. This directly results in farmers losing income during this period. In addition, the quality of salt produced is low due to the influence of high rainfall. This decrease in quality is caused by the disruption of the drying process and changes in the salt content. The change in salt color to yellowish also has an impact on the selling price, which has dropped significantly from IDR 8,000.00 to IDR 5,000.00 per kilogram. Losses to salt production due to rainfall were conveyed by informant NI (43 years old), namely:

"Yes, that's right, the difficult time for us salt farmers is the unpredictable rainy season, like last year, we experienced high rainfall in November and December."

High rainfall is the impact of increased rainfall intensity that occurs throughout the year. The increase in the intensity of rainy days is seen from July to December. The most frequent rainy days are in October (21 days), November (27 days), and December (29 days). So that in October to December salt farmers cannot produce salt because of the rain that hits them. The difficulties of salt farmers when it rains often occur, namely not being able to dry the soil as a potential raw material for salt, the land for drying salt and firewood in wet conditions. Farmers need 2 weeks to prepare the necessary tools and maximum land. For example, wet firewood will be dried for 2-3 days. Therefore, the impacts seen earlier cause great losses for salt farmers. The high number of rainy days shows that the salt farmer community is exposed to serious climate variability. Uncertainty about rainy days also harms salt farmers in preparing their needs (raw materials for salt), unpredictable weather results in the land being cultivated not being able to be used as raw material for salt (sunlight exposure is not perfect). Data related to the number of rainy days can be seen in the graph below:



**Graph 2.** Number of Rainy Days by Month in Pidie Regency (BPS, 2024)

### Strong winds

Strong winds are one of the significant challenges faced by salt production huts located in coastal areas. According to (Nurdin et al., 2016) Salt huts located on the coast are often faced with extreme sea winds. This strong wind phenomenon usually occurs in the afternoon and evening. The strong wind phenomenon occurs when entering the months of August to

November which has a very negative impact on the salt farming community. Therefore, salt farmers when strong winds occur cannot produce salt, because strong winds have an impact on the firewood fire not burning optimally. In addition to the destroyed salt huts, residential houses Salt farmers are also vulnerable to strong winds. Strong winds can harm the farmers. salt production business actors. The losses experienced by farmers when strong winds hit are damage to farmer tools and facilities such as damage to salt huts, damage to salt fields, and suboptimal drying. If strong winds occur, salt production cannot be carried out . This is as conveyed by NI (43 years old):

"If strong winds occur, we salt farmers cannot produce salt, because the wind is very strong, so when the salt is cooked it cannot be cooked, because the fire will not light and is irregular so that we salt producers will have difficulty."

### **Spring tide**

Salt fields located on the coast of the village are often faced with a classic problem, namely spring tides. This phenomenon occurs when the sun, earth, and moon are aligned or form an angle of 180 c. The phenomenon of spring tides or spring tides is characterized by the occurrence of very high tides. Therefore, when the spring tide occurs, salt farmers cannot produce salt. Because the location of their business land is inundated by the spring tide in the area. The disadvantage during spring tides is the entry of water into the salt pond land so that the sandy soil used to produce salt is gone. In addition, the white mud on the salt farmers' land takes up more time for the salt farmers to clean the land.

### **Flood**

The increasing rainfall causes flooding so that the condition of the salt farmers' ponds is in an unfavorable condition. Rainwater that inundates the salt ponds has an impact on changing the color of the soil, soil texture and leaving dirt (moss) on the soil. In general, the impact of flooding can occur directly or indirectly. Direct impacts are relatively easier to predict than indirect impacts. However, now salt farmers in Gampong Ara often cannot predict when flooding will occur. The salt farming area located on the coast of farmer settlements is vulnerable. Currently, flooding in Gampong Ara cannot be predicted. Floods can occur during the day or at night. When flooding occurs, there is nothing that Gampong Ara salt farmers can do except stay silent and mourn their lands that have been swept away by the flood. The uncertainty of rain is detrimental to salt farmers in preparing their farming needs. In addition,



unpredictable weather results in the land that has been cultivated not being able to be used as raw materials. Therefore, the majority of farmers in producing salt prefer to wait for the end of the rainy season, rather than clearing salt fields during the rainy season. The salt that had been painstakingly processed and the milkfish ponds that had been maintained were lost due to flooding.

## **Livelihood Strategy of Salt Farmer Community in Facing Climate Variability**

### **Land Intensification and Extensification**

When there is climate variability such as erratic rainfall, strong winds, and full moon tides. Farmers will collect sand soil stock in storage warehouses. This is done when salt farmers cannot collect sand soil in the fields during erratic rainfall and full moon tides. Meanwhile, when the weather in a few days has started to stabilize and is not extreme, salt farmers will emphasize efforts to increase production results. This is what makes salt farmers store sand soil stock in storage warehouses. The control of natural capital by salt farmers comes from land, water and other conveniences in accessing natural capital, so that it can support family economic income sources. The availability of natural capital owned by salt farmers with a salt pond area of 1.29 Ha. The intensification carried out by salt farmers in Gampong Ara increases salt production to get a large amount of results, namely by adding capital. The additional capital in question is adding equipment to produce salt. Such as buying a lot of firewood. So farmers must add capital to buy firewood, so that the capital needed is IDR 500,000 to IDR. 600,000 to buy firewood stock and so on. extensification carried out by salt farmers by increasing the workforce in carrying out salt production. In the salt production process, it is carried out independently and relies on workers from the nuclear family such as husbands, their children who have finished high school (Senior High School). This is done to maximize better salt production results and can increase the sense of family during salt production. However, this also burdens farmers because additional costs are needed to provide workers' wages. This is in line with (Siwi et al., 2025) who stated that economic factors make farmers unable to meet their living needs because the results of product sales are not significant.

### **Diversification of Livelihood**

Diversification (dual livelihood pattern) is a livelihood pattern carried out by looking for other alternatives from fishing activities as a means of meeting life needs when previous livelihoods were not possible (Bari & Nurdin, 2024) . Diversification (dual livelihood pattern) carried out by salt farmers is by looking for other jobs besides farming to increase income. This

is done to get income. One example is a salt farmer who uses the sea as a natural resource to become a fisherman, melinjo chip craftsman, and so on. Diversification can also be done by directing, namely husband/wife and children to be able to participate in working other than salt farmers and generate income for daily needs. Each family member must have a sense of concern for the family's economic condition so that the household that is built can continue to survive. Therefore, there is the involvement of the role of the wife and children in helping to earn a living.

The economic limitations of families as salt farmers to do side jobs are due to socio-cultural factors, namely the attachment to working as salt farmers. The existence of uncertain climate variability makes the salt farmer community have to adapt and utilize their abilities in managing natural resources in their environment. So salt farmers need side jobs to continue their lives to meet their daily needs. Women play a dual livelihood pattern in the household, the dual livelihood pattern strategy is applied to salt farmers who focus on income from the agricultural sector in a broad sense, salt income cannot generate a fixed income so that women work outside the agricultural sector. The choice to do side jobs as melinjo chip craftsmen, looking for oysters, mussels in the area is an effort and life choice for salt farmers. In addition to the salt production strategy, farmers in Gampong Ara also diversify their livelihoods as an effort to increase family income. They do not only depend on salt production, but also look for side jobs such as looking for oysters, mussels in ponds, and becoming melinjo chip craftsmen. This is as conveyed by Mrs. Dharmawati (40 years old):

" In addition to making salt, I also sell at school, sometimes I also look for oysters but not often. My income, for example, when it's busy, can reach Rp. 100,000, sometimes when it's quiet, it's Rp. 80,000, up to Rp. 50,000 .

Furthermore, an interview with Mrs. Jurida M. Isa also stated something similar, namely:

"Yes, it's true that besides making salt, we also work part-time. Like me who works as a melinjo chip craftsman, to meet our daily needs."

This diversification not only involves the head of the family, but also the wife and children who contribute to earning additional income. This allows them to create more income and meet their daily needs, although their dependence on nature remains high. Although there are constraints related to time and work culture that are already tied to activities as salt farmers,

this effort to diversify their livelihoods provides an important alternative for their survival. To support the sustainability and welfare of salt farmers, assistance is expected from the government and cooperatives in the form of business capital, improvements to pond infrastructure, and the provision of adequate salt production equipment.

#### 4. CONCLUSION

Based on the results of the study, the author concludes that the lives of salt farmers in Gampong Ara, Kembang Tanjong District, Pidie Regency are faced with the challenge of climate variability that does not support salt production. The dependence of the salt farming community on nature is very large. This has an impact on the reduction and cessation of salt production when there is unpredictable rain. This impact affects the income of farmers' economies. Therefore, farmers develop resilience, the ability to overcome and adapt to climate variability that threatens the salt farming business. For example, damage to salt hut buildings due to extreme winds, land flooding, also affects the economy of farmers. Because it requires costs to repair high hut buildings. Climate variability in Gampong Ara has several impacts that affect salt production, namely: 1). high rainfall, 2). flooding during the rainy season, 3). extreme winds, and 4). full moon tides. This affects the economy of farmers in carrying out their daily lives. In the context of livelihoods, there are two livelihood strategies that occur at the research location, namely: a. Land Intensification and Extensification, b. Diversification of livelihoods. Intensification and extensification are quite good, and livelihood diversification is also going well. So that salt farmers are still able to survive even though they are not in ideal conditions. Limitations in developing livelihood strategies in the salt farmer community need to be given attention. In this case, policy makers should be able to pay more attention to salt farmers in the form of improving infrastructure, providing capital and training in anticipating climate variability. In addition, it is hoped that researchers who are interested in studying the problems of salt farmers in the future can conduct studies on the resilience of female salt farmers to climate variability.

#### REFERENCES

- Agustya, N. (2024). Vulnerability of People's Salt Farming in Bungko Lor Village, Cirebon Regency. *Indonesian Journal of Agricultural, Resource and Environmental Economics* , 3 (2), 116–127.
- Arfah, R. (2021). *Dilemma of Women Salt Farmers Group in Marketing Production Results in Mukim Lampanah, Seulimum District, Aceh Besar Regency* . Ar-Raniry State Islamic University.

- Bari, SU, & Nurdin, IP (2024). Fishermen's Community Livelihood Strategies In Facing Climate Variability. *Jurnal Masyarakat Maritim* , 8 (2), 86–93.
- BPS. (2024). *Pidie Regency in Figures 2024* .
- Edi Rismanto et al. (2024). *Rural Sociology* (p. 212). PT. Publisher Qriset Indonesia. <https://www.neliti.com/publications/569564/sosiologi-pedesaan>
- Irid. (2024). *The Direction of Global Climate Diplomacy and Its Impact on Indonesia* . <https://irid.or.id/arrah-diplomasi-iklim-global-serta-dampaknya-bagi-indonesia/>
- Manu, L. (2021). Characteristics and Coastal Dynamics in the Jayanti Coastal Area of Cianjur: A Case Study of Coastline Changes. *Aceh Anthropological Journal*, 5(1) , 51 .
- Maurizka, IS, & Soeryo Adiwibowo. (2021). Fishermen's Adaptation Strategy in Facing the Impact of Climate Change. *Journal of Communication Science and Community Development [JSKPM]* , 5 (4), 496–508. <https://doi.org/10.29244/jskpm.v5i4.866>
- Napitupulu, NH, Ariani, D., Siregar, AA, & Dora, N. (2025). Engineering: Journal of Science and Technology Local Wisdom of the Karo Tribe in Traditional Agriculture. *Engineering: Journal of Science and Technology* , 1 (1), 1–8.
- Nurdin, IP (2024). Strengthening the Adaptive Capacity of Rural Generation Z in Facing Climate Variability. *Collaboration: Community Service Journal* , 4 (October), 391–395. <https://doi.org/10.56359/kolaborasi.v4i5.411>
- Nurdin, IP, Fatia, D., & Chairunnisak, CL (2023). Existence and Threats of Salt Farming Business in Gampong Cebrek, Pidie Regency. *Indonesian Journal of Sociology of Religion (JSAI)* , 4 (1), 76–88. <https://doi.org/10.22373/jsai.v4i1.2611>
- Nurdin, IP, Khairulyadi, Chairunnisak, CL, & Fatia, D. (2023). Livelihood Strategy of Salt Farmer Community in Facing Climate Variability in Gampong Cebrek, Pidie Regency. *Indonesian Journal of Sociology of Religion (JSAI)* , 4 (November), 313–327. <https://doi.org/10.22373/jsai.v4i3.3374>
- Nurdin, IP, Kolopaking, LM, & Saharuddin. (2016). The Dilemma of Patron-Client Relationships in Salt Farmer Communities (Case Study in Cebrek Village, Simpang Tiga District, Pidie Regency, Nanggroe Aceh Darussalam). *Journal of Development Communication* , 14 (2).
- Pahlawan et al, . (2020). ANALYSIS OF CLIMATE CHANGE IMPACT ON THE SUSTAINABILITY OF COMMUNITY SALT BUSINESS (PRODUCTION) IN COASTAL JENEPONTO DISTRICT (Analysis of Climate Change Impacts on The Business Sustainability (Production) Of Salt In Coastal Jeneponto). *Journal of Indonesian Tropical Fisheries ISSN 2655 , 4461* (2), 161–169.
- Siwi, MR, Nusuary, FM, & Nurdin, IP (2025). Empowerment of the Sugar Palm Farmers Group in Batu Delapan Hamlet, Rantau Village, Rantau Pauh District, Aceh Tamiang Regency. *Journal of Education and Social Sciences* , 3 (2), 61–70. <https://doi.org/https://doi.org/10.54066/jupendis.v3i2.3085>
- Wijaya, E., Fatharani, CA, Rahmah, S., Azahwa, S., Zulkiñi, ZS, Rachman, CI, Kesuma, D.,

Octaviani, R., & Kurniawan, YP (2024). *Policy Brief on the Policy for Fulfilling the Economic and Social Rights of Fishermen in Ciparagejaya Village, Karawang: Adaptation and Mitigation of Climate Change with a Local Wisdom Approach* (November Issue). <https://doi.org/10.13140/RG.2.2.18721.01123>

Zulkarnaini. (2022). Climate Change in Aceh Begins to Have an Impact. In *Kompas.id* (pp. 1–2). Kompas.id. [www.kompas.id](http://www.kompas.id)