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Adaption strategy of fisherman to climate change: A case study from Limau Sub-District, Tanggamus Regency

A Mutolib[1] , **A Rahmat**[2] , **I Listiana**[3], **H Yanfika**[3] , **R A D Widyastuti**[3] and **M Riantini**[3]

[1] Postgraduate Program, Siliwangi University, Jl. Siliwangi No.24, Kahuripan, Tawang, Tasikmalaya, West Java 46115, Indonesia
[2] Research Center for Limnology, Indonesian Institute of Sciences, Jl. Raya Bogor Jakarta, Cibinong, Bogor, Jawa Barat 16911 Indonesia
[3] Faculty of Agriculture, University of Lampung, Jl. Prof. Dr. Ir. Sumantri Brojonegoro, No: 1, Gedong Meneng, Bandar Lampung, Lampung 35141 Indonesia

Corresponding Author: amutolib24@yahoo.com and abdul.mutolib@unsil.ac.id

Abstract. Climate change is a natural phenomenon that occurs all over the world and has a negative impact on many sectors, one of which is the fishery sector. One of the communities that are most vulnerable to the impact of climate change is the fishing community in coastal areas. Fishermen depend on the availability of fish in the sea, as well as the weather and other aspects related to climate and nature. This study aims to identify the fishermen's efforts and adaptation strategies towards climate change. Data collection was carried out from July to August 2020 in Limau Sub-District, Tanggamus Regency with a total respondent number of 80 fishermen households. Respondents were determined through the approach of simple random sampling. The data collected consisted of both qualitative and quantitative data. Data collection was performed through the method of survey, Focus Group Discussion (FGD), and interviews with key informants. Data collected was analyzed using the Qualitative Descriptive approach. The results of the study show that fishermen in Limau Sub-district have made some adaptations to climate change in coastal areas through income diversification, diversification of fishing gear, migration, and social network development among fishermen

1. Introduction

Indonesia as a country possesses high fisheries potential [1]. The fishery sector is a great source of income and livelihood for fishermen on the coast. However, due to certain conditions, many of the workers are now forced to live below the poverty line. Some of the causes of poverty amongst fishermen could be due to poor education and inadequate access to the necessary knowledge and technology required [2], [3]. Apart from these two aspects, another cause of poverty involves the destruction of coastal marine resources, which are the major sources of livelihood for many fishermen [4]. The impacts of anthropogenic activities significantly damage aquatic resources which can lead to climate change.

Climate change refers to a change in global or regional climate patterns [5], [6], [7]. It can lead to changes in sea surface temperatures, which in turn lead to differences in the patterns of fish migration [8]. In addition, it leads to water column stratification which affects the upwelling process (this is

positively correlated with fish schooling), thereby making the process more difficult for the fishermen. Furthermore, it leads to changes in the fishing grounds. This migration or damage to the habitats exacerbates the conditions of the workers, leading to increased demand on both time and transport facilities

Limau Sub-District Tanggamus Regency is one of the capture fisheries centers in Lampung Province [4]. Apart from the capture fisheries center, in Limau Sub-District, there is a home industry that processes fish into processed fish products. Climate change also has an effect on the social and economic conditions of coastal communities in Limau Sub-District, whereby it encourages the workers to adapt to new techniques regarding the profession. The fishermen carry out these adaptations to maintain catches that are simultaneously decreasing due to climate change. Furthermore, this study aims to analyze the adaptation patterns of fishermen towards climate change that threatens the sustainability of fishing businesses in Limau Sub-District, Tanggamus Regency.

2. Research methods

2.1. Location and time of research
Data collection was conducted from July to August 2020 in Pekon Tegineneng, Limau Sub-District, Tanggamus Regency.   The location was chosen deliberately considering that Limau Sub-district is located on the coast of Tanggamus Regency, where the people mostly work as fishermen and fisheries processing centres.

2.2. Design and research methods
The study used a qualitative research design with a survey approach. The qualitative research format aims to describe various conditions, various situations, or various social reality phenomena and attempt to draw that reality to the surface as characteristics, characters, characteristics, models, or descriptions of certain conditions, situations, or phenomena. Alternatively, research collects and analyzes data in the form of words (spoken or written) and human actions and does not try to quantify the data obtained [9].

2.3. Research data and respondents
The types of data used in this study were primary and secondary data. The Primary data was obtained through household surveys, key informant interviews using a questionnaire, and direct observation; while the Secondary data was obtained from literature reviews and reports/documents from various agencies that were related to the research studies. The respondents in this study were fishermen in Limau Sub-District, who were from 80 different households.

2.4. Data analysis technique
In qualitative research, this analysis is carried out at any time during the research [9]. Data collection and analysis activities in this study are not separate from one another. Both take place simultaneously, and the process takes the form of a cycle [10]. Therefore, this study uses an interactive data analysis model consisting of three stages: data reduction, data display (presentation), and determination of conclusion/verification [11].

3. Results and discusion

3.1. Characteristics of respondents
The average fisherman's age is 39 years old and is said to be a productive age amongst fishermen [12], [13]. The study respondents were predominantly male, having a ratio of 61 male to 19 female. In general, as is the case with other agricultural sectors, men played a more prominent role than women [14], [15]. The average dependence of a fisherman's family was 2-3 members with a length of stay of about 27 years. Most of them were from the Sundanese ethnic group and as many as 49 respondents and junior high school graduates dominated the educational level of the workers. Furthermore, it has been studied that the ability to fish is influenced by the educational level of a worker [16]. Only a few of the

workers in the Limau Sub-district had second jobs and they include laboring (*buruh*), small-time entrepreneurship and farming. The characteristics of the research respondents are shown in Table 1

Table 1. Characteristics of respondents.

No	Characteristics	Description
1	Number of respondents	80 Fishermen
2	Average of age	39 Years old
3	Proportion of sex	Male =61, Female 19
4	Duration of living in the area (average)	27 Years
5	Number of dependents	2-3 People
6	Ethnic	Sundanese=49, Lampungese=18, Javanese=13
7	Education level	SD=21, SMP=43, SMA=14, Not graduated from SD= 2
8	Primary job of respondent	Fisherman=68, Housewife =11, Pekon (Village official)=1
9	Side Job	None=43, Farmer=15, Labor= 6, Entrepreneur=10, Boat builder =2, Driver 2, Teacher=1, Pekon (Village official) =1
10	Fishing experience (average)	19 Years
11	Type of fishing tools	Net and fishing rod.
12	Types of catch (fish)	Mackerel tuna, cutlass, selar, mackerel scad, giant trevally, Spanish mackerel, blue marlin, chub mackerel, tuna, and lobster
13	Daily fishing frequency (average)	1.55 times
14	Fishing time (average/day)	7.1 hours

The average working experience of the respondents as fishermen is 19 years. Fishermen's experience is significant to see climate change and its impact on the capture fisheries sector [17]. Fishermen in Limau Sub-District use nets and fishing rods as fishing gear. The fish caught by fishermen in Limau Sub-District is dominated by Mackerel tuna, cutlass and other types (See Table 1). The frequency or number of fishermen fishing in the Limau Coast is 1 to 2 times per day, with the length of time going to sea for about 7.1 hours per day. The frequency and duration of fishing are influenced by climatic factors and the economic capacity of fishermen. If the weather is terrible, the fishermen do not fly for several days.

3.2. Fisherman adaptation strategy to climate change

Implementing appropriate adaptation strategies in dealing with climate change needs to be prepared so that people are not vulnerable to the impact of the rate of change occurring [18]. The adaptation strategy carried out by fishermen in Limau Sub-District to climate change consists of four strategies. The four adaptation strategies include income diversification, fishing gear diversification, migration and social networks. Every fisherman carries out a strategy according to his needs and abilities. Not all fishermen apply the four adaptation strategies simultaneously.

3.2.1. Diversification of income. Many fishermen are adopting adaptive strategies to address climate change through job diversification [19], [20]. In the Limau Sub-District, the fishermen's adaptation strategy through income diversification consisted of six strategies. The overall strategy and the most widely adopted by at least 50% of the population was of having a side job outside of fishing. Another strategy widely adopted was the involvement of their families in working to increase the household income. While the least strategy adopted was in livestock rearing. This adaptation strategy is shown in Table 2.

Table 2. Fisherman adaptation strategy to climate change through income diversification.

No	Fisherman adaptation strategy	Yes	No
1	Have another job	50.0%	50.0%
2	Bring family members to work	22.5%	77.5%
3	Work as a construction worker	8.75%	91.25%
4	Cultivate garden produce	20.0%	80.0%
5	Sell seafood in other forms (cooked, canned, etc.)	12.5%	87.5%
6	Buy and raise livestock	1.25%	98.75%
7	Opened a food stall	13.75%	86.25%

3.2.2. Diversification of fishing gear. Fishing gear diversification is one strategy that many fishermen do to deal with climate change and increase catches [21]. The fishermen in Limau Sub-District periodically purchased new fishing gear, to increase the volume of their catch by at least 40 percent. In addition, this strategy was carried out by producing the fishing gears independently, and the type commonly made was the fishing net. The strategies least adopted in this case were the adding and renting of various types of fishing gear. The workers however, still made use of traditional fishing gears with a little variety. This adaptation strategy is shown in Table 3.

Table 3. Fisherman adaptation strategy to climate change through diversification of fishing gear.

No	Fisherman adaptation strategy	Yes	No
1	Renting other fishing gear	3.75%	96.25%
2	Buy other fishing gear	40.0%	60.0%
3	Making other fishing gear	32.5%	67.5%
4	Adding various types of fishing gear	7.50%	92.5%

3.2.3. Migration. This study is divided into two aspects: the Migration from fishermen to non-fishermen (including living locations) and the Migration of fishing locations. Migration was the strategy most widely and as many as 85% had expanded their fishing areas. This was to increase the number of catches, as well as their income [22], [23]. Meanwhile, the strategy least adopted was the day-to-day movement involving their entire family. This strategy can be seen in Table 4.

Table 4. Fisherman adaptation strategy to climate change through migration.

No	Fisherman adaptation strategy	Yes	No
1	Expanding fishing areas	85.0%	15.0%
2	Work to migrate and settle in the destination	20.0%	80.0%
3	Work overseas and come home every day	3.75%	96.25%
4	Migrate and settle in their destination with family	16.25%	83.75%
5	Migrate and come home every day with family	2.50%	97.5%

3.2.4. Social network. Another effort made towards dealing with climate change was through the development of social networks [24]. These networks could help the fishermen increase their knowledge and information as regards the ever changing patterns of the weather, their economic potentials and also their family networks [25]. If there was any problem encountered, as many as 77.5% of the fishermen joined in attending the village meetings on the social network platforms while the remaining percent resrted to asking family members for help. The strategy that was least adopted in handling an issue was in seeking the boss' (*tauke*) help. This adaptation strategy is shown in Table 5.

Table 5. Fisherman adaptation strategy to climate change through social network.

No	Fisherman adaptation strategy	Yes	No
1	Ask neighbors for help if there is a problem	32.5%	67.5%
2	Asking siblings for help if there is a problem	50.0%	50.0%
3	Ask village officials for help if there is a problem	23.75%	76.25%
4	Ask the boss (*tauke*) for help if there is a problem	5.0%	95.0%
5	Maintain good relations with officials at national borders	30.0%	70.0%
6	Join in attending village meetings to add to my social network	77.5%	22.5%

4. Conclusion

Fishermen on the Limau coast are implementing several adaptation strategies to deal with climate change. The adaptation strategy adopted by fishermen includes four approaches: income diversification, diversification of fishing gear, migration, and social network development among fishermen divided into 22 types of adaptation strategies more precisely. The types of adaptation most widely adopted by fishermen are expanding fishing areas (85 percent), joining in attending village meetings to add to my social network (77.50 percent), Asking siblings for help if there is a problem (50 percent), have another job (50 percent), and buy other fishing gear (40 percent). The adaptation strategy for each fisherman is different depending on the level of climate change and the socio-economic capacity of the fishermen.

References

[1]   Pursetyo K T, Tjahjaningsih W and Pramono H 2015 Perbandingan morfologi kerang darah di perairan Kenjeran dan periran Sedati *Jurnal Ilmiah Perikanan dan Kelautan*. **7** (1) pp 31-33

[2]   Ansaar 2019 Pola adaptasi nelayan terhadap perubahan iklim di Desa Bambu Kecamatan Mamuju Kabupaten Mauju Provinsi Sulawesi Barat *Pangadereng*. **5** (2) pp 349-364

[3]   Yanfika H, Rangga K K, Viantimala B, Listiana I, Mutolib A and Rahmat A 2020 Evaluation of the Success of Programs and Strategy for Sustainable Coastal Community Development in Tanggamus Regency *Journal of Physics: Conference Series*. **1467** 012026

[4]   Mutolib A, Rahmat A, Yanfika Y, Listiana I, Rudy and Haryanto Y 2021. Level of income, knowledge, and impact of climate change on fishing household in Limau Subdistrict, Tanggamus Regency *IOP Conference Series: Earth and Environmental Science*. **739** 012041

[5]   Rudy R, Yonariza Y, Yanfika H, Rahmat A, Ramadhani W S and Mutolib A 2021 Forest Cover Change and Legal Pluralism in Forest Management: A Review and Evidence from West Sumatra, Indonesia *Indonesian Journal of Science and Technology*. **6** (2) pp 299-314

[6]   Murniati K and Mutolib A 2020. The impact of climate change on the household food security of upland rice farmers in Sidomulyo, Lampung Province, Indonesia *Biodiversitas*. **21** (8) pp 3487-3493

[7]   Rangga K K,Yonariza,Yanfika H, Mutolib A 2020 Perception, attitude, and motive of local community towards forest conversion to plantation in Dharmasraya District, West Sumatra, Indonesia *Biodiversitas*. **21** (10) pp 4903-4910

[8]   Diposaptono, S., Budiman, dan F. Agung. 2009. Menyiasati Perubahan Iklim di Wilayah Pesisir dan Pulau-Pulau Kecil. Bogor: PT. Sarana Komunikasi Utama

[9]   Afrizal, 2015 *Metode Penelitian Kualitatif: Sebuah Upaya Mendukung Penggunaan Penelitian Kualitatif dalam Berbagai Disiplin Ilmu* Jakarta: Raja Grafindo Persada.

[10]   Creswell, J. W, 2014 *Research design Qualitative quantitative and mixed methods approaches (Fourth)* Thousand Oaks, California: SAGE Publications.

[11]   Miles M B and Huberman A M, 1984 *Qualitative Data Analysis: A Sourcebook of New Methods.* California: SAGE Publications.

[12] Nsilapa E S, Budiyanto and Siang R S 2017 Faktor-Faktor yang Mempengaruhi Produktivitas Nelayan Pancing Cumi di Kelurahan Petoaha Kecamatan Abeli Kota Kendari *J. Sosial Ekonomi Perikanan FPIK UHO.* **2** (1) pp 10-19

[13] Listiana I, Efendi I, Mutolib A, Rahmat A 2019 The behavior of Extension Agents in Utilizing Information and Technology to Improve the Performance of Extension Agents in Lampung Province *J Phys: Conf Ser.* **1155**, 012004.

[14] Mutolib A, Yonariza, Mahdi, Ismono H 2017 Gender Inequality and the Oppression of Women within Minangkabau Matrilineal Society: A Case Study of the Management of Ulayat Forest Land in Nagari Bonjol, Dharmasraya District, West Sumatra Province, Indonesia *Asian Women.* **32 (**3) pp 23–49

[15] Mutolib A, Yonariza, Rahmat A and Yanfika H 2019 Competition among actors and challenges of production forest management in Dharmasraya, West Sumatera *IOP Conference Series: Earth and Environmental Science.* **399** 012074.

[16] Rahim A, Hastuti D R D, Firmansyah A S 2018 Pengaruh lama melaut, kekuatan mesin tempel, dan karakteristik Responden terhadap pendapatan nelayan tangkap tradisional di Kabupaten Takalar *Jurnal Agrisocionomics.* **2** (1) pp 50-57

[17] Cintra A K A, Setyobudiandi I and Fahrudin A 2017 Analisis kerentanan perikanan tangkap akibat perubahan iklim pada skala provinsi *Marine Fisheries.* **8** (2) pp 223-233

[18] Wibowo A and Satria A 2015 Strategi adaptasi nelayan di pulau-pulau kecil terhadap dampak perubahan iklim (kasus: Desa Pulau Panjang, Kecamatan Subi, Kabupaten Natuna, Kepulauan Riau) *Sodality: Jurnal Soliologi Pedesaan.* **3** (2) pp 107-124

[19] Hasmah 2018 Stretegi adaptasi nelayan tradisional di Desa Sumare Kabupaten Mamuju Provinsi Sulawesi Barat *Walasuji.* **9** (2) pp 403-413

[20] Liando V Y, Aling D R R and Wasak M P 2020 Strategi adaptasi sosial dan ekonomi nelayanalat tangkap sero di Desa Jayakarsa Kecamatan Likupang Barat Kaupaten Minahasa Utara *AKULTURASI_Jurnal Ilmiah Agrobisnis Perikanan.* **8** (1) pp 61-66

[21] Dewiyanti S, Ma'ruf A and Indriyani L 2019 Adaptasi nelayan Bajau terhadap dampak perubahan iklim di peisisr Soropia Kabupaten Konawe Sulawesi Tenggara *Ecogreen.* **5** (1) pp 23–29

[22] Limbong I, Wiyono E S and Yusfiandayani R 2017 Factor affecing the production of purse seine unit in fishing base Sibolga Fishing Port, North Sumatera. *Albacore.* **1** (1) pp 89-97

[23] Nurmeiana D A, Wiyono E S and Riyanto M 2020 Strategi adaptasi nelayan Eretan Kulon, Indramayu terhadap kebijakan pengoperasian arad *Jurnal IPTEKS PSP.* **7** pp 136-150

[24] Vibriyanti D 2014 Kondisi sosial ekonomi dan pemberdayaan nelayan tangkap Kota Tegal, Jawa Tengah *Jurnal Kependudukan Indonesia.* **9** (1) pp 45-58

[25] Iriani 2019 Sekuritas sosial pada nelayan tradisional di Penggoli Kota Palopo *Walasuji.* **10** (1) pp 69-83

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