

CLIMATE CHANGE AND COMMUNITY PERCEPTION: THE CASE STUDY IN MIANG ISLAND VILLAGE, EAST KUTAI

PERUBAHAN IKLIM DAN PERSEPSI MASYARAKAT: STUDI KASUS DI DESA PULAU MIANG, KUTAI TIMUR

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ABSTRACT:

The phenomenon of climate change currently occurring not only impacts the environment but also affects human life, especially vulnerable groups whose livelihoods depend on natural resources and environmental conditions, one of which is the maritime community whose life depends on the sea and weather conditions. This study aims to elucidate the complexity of perceptions regarding climate change and environmental degradation from the perspective of the Miang Island community, whose livelihoods depend on the sea, and to analyze the relationship between the community and its environment. This study uses a descriptive qualitative method with a phenomenological type and employs the New Environmental Paradigm theory to understand the relationship between the two. The research results show that community perceptions are formed due to the interaction between the community and the environment, creating an experience that indicates the occurrence of climate change phenomena and forming a traditional knowledge base for the community, assuming that these phenomena refer to the transitional seasons and environmental degradation. Based on that traditional knowledge, the community undertakes adaptation and mitigation efforts that are both physical and socio-cultural, ranging from the tradition of *tolak bala* to the formation of youth communities aimed at preserving the natural environment on Miang Island. This encourages decision-making that leads to ecological and economic sustainability, prompting the community to be more conservative in their interactions with the environment for the sake of future environmental sustainability. The results of this study can be used by the government as a basis for formulating climate change mitigation policies for island communities.

Keywords: *Climate Change, Community Perception, Environmental Sociology, New Environmental Paradigm*

ABSTRAK:

Fenomena perubahan iklim yang terjadi saat ini tak hanya berdampak pada lingkungan namun juga turut memberikan dampak pada kehidupan manusia terutama kelompok rentan yang bergantung pada sumber daya alam dan kondisi lingkungan seperti masyarakat maritim yang kehidupannya bergantung pada laut dan kondisi cuaca. Penelitian ini bertujuan untuk menguraikan bagaimana kompleksitas persepsi dari perubahan iklim dan kerusakan lingkungan dalam sudut pandang masyarakat Pulau Miang yang bergantung pada laut serta menganalisis relasi yang terjadi antara masyarakat dan lingkungannya. Penelitian ini menggunakan metode deskriptif kualitatif dan teori New Environmental Paradigm untuk mengetahui relasi diantara keduanya. Hasil penelitian menunjukkan persepsi masyarakat terbentuk akibat adanya interaksi antara masyarakat dan lingkungan yang membentuk suatu pengalaman yang mengindikasikan terjadinya fenomena perubahan iklim dan membentuk suatu pengetahuan tradisional masyarakat. Berdasarkan pengetahuan tradisional, masyarakat melakukan upaya adaptasi dan mitigasi yang bersifat fisik dan sosial budaya seperti tradisi keagamaan dan pembentukan komunitas pemuda untuk menjaga kelestarian alam di Pulau Miang. Hal ini mendorong pengambilan keputusan yang mengarah pada sustainability ekologi serta ekonomi yang membuat masyarakat lebih konservatif dalam berinteraksi dengan lingkungan demi keberlanjutan di masa mendatang. Hasil penelitian ini dapat digunakan oleh pemerintah sebagai dasar penyusunan kebijakan mitigasi perubahan iklim bagi masyarakat pulau.

Kata Kunci: *Paradigma Lingkungan Baru, Persepsi Masyarakat, Perubahan Iklim, Sosiologi Lingkungan*

Article Info

Received	:	19 July 2025
Accepted	:	02 February 2026
Published	:	04 February 2026
DOI	:	https://doi.org/10.30872/psd.v7i1.172

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1. INTRODUCTION

Climate change is currently a global issue affecting the entire world. In recent years, continuous temperature increases have been recorded across 15 cities in both developed and developing countries, impacting public health and survival (Leal Filho et al., 2022). Indonesia is one of the countries contributing to the intensification of climate change effects. According to data compiled by the Global Carbon Budget (2022), Indonesia experiences a yearly increase in carbon gas emissions. The environmental instability caused by climate change indirectly affects the fulfillment of basic human needs, particularly for vulnerable communities whose livelihoods depend on natural resources (Nurhayati et al., 2020). One group significantly impacted by climate change is coastal communities, whose lives rely heavily on weather conditions and marine natural resources. The community residing on Miang Island, in Sangkulirang District, East Kutai Regency, is also not exempt from the threats posed by climate change. Geographically, this island is situated in the midst of the Sulawesi Sea, yet administratively, it falls under the governance of East Kutai Regency.

In reality, not all members of the public are aware that the weather changes they are currently experiencing are a result of ongoing environmental degradation. Many believe that the phenomenon of climate change is an unavoidable occurrence (Leiserowitz et al., 2023). This indicates that there are still individuals who do not recognize that human activity is a significant factor contributing to pollution and environmental damage, and is even a primary driver of climate change. If awareness about the importance of environmental conservation does not promptly emerge, the adverse impacts of climate change will worsen and become increasingly difficult to remedy.

Humans and the environment share an intrinsically close and interdependent relationship, which can be described as symbiotic mutualism. This perspective is closely aligned with the New Environmental Paradigm (NEP) theory, as outlined by Dunlap (2010), which posits that humans are fundamentally a part of the environment and are interdependent with other species (ecology). Consequently, every action taken by humans inevitably affects the state of the environment. Likewise, changes in the environment impact human life, as the two are mutually dependent. This theory also emphasizes how human perceptions of their environment influence more prudent decision-making in interacting with or managing it (Dunlap et al., 2000).

Therefore, efforts are required to anticipate and adapt so that communities can remain resilient to the effects of climate change. Furthermore, not all communities share the same understanding that what they are currently experiencing is a phenomenon caused by environmental degradation resulting from human activity. The researcher also observes that the decision-making process regarding specific actions within a community is heavily influenced by their perception of the phenomenon. Hence, this study aims to elaborate further on public perceptions regarding the ongoing phenomenon of climate change. Utilizing a qualitative approach, this research explores in depth how climate change and the complexity of public perceptions and responses relate to the environmental degradation they face. It also examines the adaptation and mitigation efforts undertaken by the community in response to this phenomenon, through direct field data collection and observational analysis. Additionally, this study aims to test the validity of the environmental sociology theory proposed by Dunlap, focusing on the New Environmental Paradigm, which concerns a new human perspective toward the environment that influences decision-making to interact with it in a more conservative manner. The findings of this research will provide data that can serve as a basis for recommendations to relevant stakeholders in formulating policies and designing effective strategies to enhance public participation and awareness in mitigating the effects of climate change and environmental degradation.

2. METHOD

This research was conducted in Miang Island Village, located in Sangkulirang District, East Kutai Regency. Geographically, the island is bordered by the sea area of Sandaran District, Kaliurang District, and the Sulawesi Sea. Using a descriptive method with a phenomenological qualitative approach, the researcher will describe in depth the complexity of the global climate change effects as perceived by the community residing on Miang Island. Additionally, this research outlines the efforts undertaken by the Miang Island community to adapt to the ongoing impacts of climate change.

The data collection stage was carried out using in-depth interviews, observation, and documentation. The researcher then analyzed the data through several procedural stages. The first stage was data reduction, which involved selecting, focusing, abstracting, and transforming the raw data obtained from the field. This was followed by the data presentation stage, a process of organizing similar information into various categories and

groups. Subsequently, the stage of conclusion drawing was conducted, which entailed interpreting the data, creating categories, identifying causal relationships, and formulating suggestions to draw conclusions (Sugiyono, 2017).

The researcher performed data analysis to determine the community's perception of climate change based on several predetermined indicators. During this analysis stage, the researcher also combined interview results with direct observations of the informants' conditions and backgrounds. The instrument for analyzing community perceptions regarding climate change is presented in Table 1.

Table 1. Research Instrument

Variable	Indicator
Perception of climate change	<ol style="list-style-type: none"> 1. Awareness of temperature changes, shifts in weather patterns, and environmental degradation (experience) 2. Impact of environmental degradation on community livelihood patterns (experience) 3. Knowledge related to Global Warming 4. Knowledge about weather changes 5. Reaction to weather changes 6. Changes in activity patterns due to weather changes
Adaptation Efforts	<ol style="list-style-type: none"> 1. Behavioral changes in response to weather changes 2. Adaptation efforts to address temperature and weather pattern changes 3. Independent mitigation efforts through environmental conservation and the use of eco-friendly energy
Community Interaction with the Environment (Conservative/Exploitative)	<ol style="list-style-type: none"> 1. Local wisdom traditions for environmental preservation 2. Contribution to environmental degradation, such as the use of fossil fuels 3. The extent to which the community feels the need to protect the environment (participation)

3. RESULT AND DISCUSSION

Miang Island is one of the *Kampung Bahari Nusantara* (KBN), or National Maritime Villages, comprising 3 neighborhood units (RT) with 205 households and a total population of 734 people. The community engages in various occupations to meet their livelihood needs, such as entrepreneurship, oil palm farming, animal husbandry, and other professions. However, the majority of Miang Island's residents work as fishermen. Due to its natural beauty and richness, Miang Island is also recognized as a notable tourist destination, particularly among anglers, as it offers promising fishing spots with a diverse variety of fish. Access to the island is only possible by ferry, given that Miang Island Village is located in the middle of the sea. For moving within the residential area, most residents choose to walk on wooden bridges that connect their houses. For destinations further away, such as plantations, residents typically use motorcycles as their primary means of transportation on the island.

Most houses in Miang Island Village are stilt houses built over the waters of Miang Island near the pier. Meanwhile, on the land area of the island, there is a school building, namely SDN 004 Sangkulirang, which is the only school on Miang Island. Consequently, children on the island must migrate to other islands to continue their education to a higher level. Therefore, very few young people are seen when visiting Miang Island.



Figure 1. Learning Process at SDN 004 Sangkulirang

The land area of Miang Island is dominated by residents' plantations. However, before entering the plantation areas, one will encounter solar panels that serve as the primary electricity supply for the community in Miang Island Village. The electricity stored in these solar panel batteries is then distributed to all households, with an allocation of 800 kWh per house, and is activated at 5:00 PM. This limited availability of electricity

undoubtedly impedes the acceleration of development in Miang Island Village, as electricity access is crucial for supporting village development and expansion, especially considering that Miang Island Village is currently actively working to develop its tourism sector.



Figure 2. Solar Power System of Miang Island Village

An analysis of the community's perception of climate change on Miang Island is crucial, as it can directly or indirectly influence the decisions made by the community regarding their interaction with the environment. This perception is formed through several phases. The first phase is the natural (physical) process, which is a sensory process where humans receive stimuli from an object. Therefore, this process is strongly influenced by experience. This is followed by the physiological process, where the stimulus is transmitted to the brain, leading to the reception of information. The final phase is the psychological process, which occurs in the brain, where the individual engages in reasoning regarding the received stimulus. Consequently, this phase involves evaluation or assessment of the information received (Walgito, 2004). Thus, the perception held by the community regarding the phenomenon of climate change is undoubtedly shaped by their experiences, knowledge, and reactions to that phenomenon.

3.1. Community Perception of Climate Change

Climate change refers to a phenomenon characterized by extreme weather alterations resulting from global temperature rise. This change occurs due to the greenhouse effect, which damages the atmospheric layer. The greenhouse effect is caused by carbon gas emissions originating from various human activities, such as the use of fossil fuels, deforestation, industrial operations, waste incineration, and other activities (Leal Filho et al., 2022). The impacts of climate change in the Miang Island Village area have already been felt by a portion of the community.

3.1.1. Experiences Related to Climate Change

Focusing on the aspect of temperature changes, the research findings indicate that the majority of informants perceive the temperature in recent times to be generally hotter than before. One informant, a community leader on Miang Island, recounted that the temperature in recent years has felt hotter compared to the past. Although the community is accustomed to hot weather, the condition of feeling hotter than usual has also impacted the daily activities of the residents on Miang Island. One fisherman conveyed that this hot temperature condition tends to shorten his fishing duration compared to before, where it used to last up to 6 hours but now only lasts 3 to 4 hours. Additionally, a community member who raises cattle mentioned that this hot condition causes their livestock feed to wilt and lose freshness, forcing them to seek additional feed to meet the nutritional needs of their cattle.



Figure 3. Cattle Livestock Owned by Residents

In addition to rising temperatures, weather changes also serve as an indicator of the ongoing climate change phenomenon. To predict long-term weather, the community on Miang Island typically relies on lunar cycles and wind patterns. Meanwhile, for daily weather forecasting, residents observe clouds and their movement direction to estimate the day's conditions. This method is relatively easy to implement due to Miang Island's location in the middle of the ocean, which provides a broad and unobstructed view of the sky from various angles, making it easier to observe cloud conditions and their movements. Nevertheless, several community members noted that weather conditions in recent years have become increasingly unpredictable and inconsistent. These fluctuating weather conditions have significant impacts, particularly on public health, especially among vulnerable groups such as children and the elderly, who frequently suffer from illnesses like flu and fever.

These observations indicate that the community on Miang Island is fundamentally aware of certain changes in temperature and weather conditions based on their lived experiences. Both of these situations also have direct and indirect effects on the daily activities of Miang Island residents.

3.1.2. Knowledge Related to Climate Change

The research findings indicate that the majority of informants lack in-depth knowledge regarding climate change or global warming. The limited access to detailed information on climate change among the community is primarily due to difficulties in accessing communication media, particularly digital media, considering the restricted availability of electricity on Miang Island. Additionally, only a few locations on Miang Island have adequate cellular network coverage to access the internet. Stakeholders, whether from the private sector or government, have also never conducted any socialization efforts regarding climate change or global warming. Jannah et al. (2023) explain that most people do not understand the indicators of climate change, and there is a lack of government mitigation efforts to address this phenomenon. Furthermore, the role of media in socializing climate change issues remains insufficient, meaning that although the general public may have heard about climate change, they do not comprehend what it actually entails. The community on Miang Island has only heard about environmental degradation and climate change in general terms but has not gained a deeper understanding of what the phenomenon truly represents.

Nevertheless, the community possesses traditional knowledge based on their experiences and perceives the phenomena they experience merely as "transitional seasons." Generally, the community also believes that the climate change phenomena they encounter are a result of environmental damage caused by various human activities that disrupt the balance of nature.

3.1.3. Response to Climate Change

The occurring changes in temperature and weather have led the community on Miang Island to recognize that these are caused by environmental degradation, making weather cycles increasingly difficult to predict. The community acknowledges that the environmental conditions around them are no longer the same as before. In responding to the phenomenon of shifting temperatures and weather patterns, more than half of the informants stated that these changes are perceived as disruptive. However, the community feels that this does not automatically alter their daily activities. They continue to carry out their routine tasks as usual to meet their livelihood needs. This sentiment was also echoed by the head of the Miang Island Village Tourism Awareness

Group (Pokdarwis), who noted that despite the frequent weather fluctuations, there has been no decline in tourist interest in visiting and exploring Miang Island.

3.2. *Adaptation and Mitigation Efforts*

In addressing the occurring changes in temperature and weather patterns, the community on Miang Island does not undertake further adaptation efforts, as they feel accustomed to both hot temperatures and unpredictable weather. According to them, such conditions are typical when living on an island. On the other hand, community members who work as fishermen implement several adaptive measures, such as shortening fishing durations when weather conditions are deemed unfavorable. To cope with the perceived heat, residents often choose to rest and relax on their house verandas to experience the breeze more freely. During these activities, community members typically greet and socialize with neighbors who are also relaxing in their yards.

In addition to adaptation efforts, climate change mitigation is a necessary step in confronting climate change. One mitigation effort aimed at reducing carbon gas emissions, a key factor driving climate change, is through mangrove planting. Proper management and planting of mangroves can help lower carbon emissions by enhancing carbon absorption (Farahisah et al., 2020). This mangrove planting initiative is also undertaken by the Miang Island community, which actively participates in planting mangroves along the coastal areas of the island. The planting activities are organized directly by the government, specifically the East Kalimantan Provincial Forestry Service, starting in 2021 with a community-involved campaign to plant 1,000 mangrove trees. This mangrove planting effort is part of the government's initiative to generate positive impacts, particularly for fishermen, by potentially increasing their catch yields. Viewed more broadly, this mangrove planting initiative also indirectly contributes to enhanced carbon emission absorption, which is a primary driver of climate change.

Beyond physical adaptation and mitigation, the researcher also found that the community engages in socio-cultural adaptation and mitigation. One example is the tradition of 'mapeno-peno,' a ritual honoring ancestors and seeking protection for the entire village. However, over time and with the increasing influence of Islamic values embraced by the community, this tradition has gradually faded and transformed into a religious practice—reciting Yasin verses while walking around the village as a way of seeking divine protection for the safety of the entire village.

In addressing environmental degradation, socio-cultural mitigation is also carried out by a youth group in Miang Island Village through the formation of the 'Sea Urchin' community, which is committed to helping preserve the surrounding natural environment. This socio-cultural adaptation for environmental mitigation stems from the youth's concern about the worsening environmental conditions in the village, emphasizing the need for ongoing efforts to conserve and protect Miang Island's natural resources. The community engages in environmental conservation activities such as coral reef transplantation (Figure 4) and the conservation of 'Kima' or 'Giant Clam' shells.



Figure 4. Coral Reef Transplantation by the Sea Urchin Community

Overall, the pattern of climate change adaptation and mitigation undertaken by the Miang Island community reflects a combination of local wisdom and government program support in confronting climate change. Adaptation at both the individual and community levels, integrated with ecosystem-based mitigation efforts such as mangrove planting and the role of youth community groups, indicates that climate change management in small island coastal areas requires a synergy between adaptive community behavior and sustained policy interventions to ensure long-term socio-ecological resilience.

3.3. *Community and Environment Interaction*

In interacting with their environment, the community of Miang Island has strived to coexist with nature as harmoniously as possible without causing damage. However, certain activities such as waste burning and the use of fossil fuel-powered transportation still contribute to increased carbon emissions. These practices persist due to the lack of more environmentally friendly alternatives, such as sustainable waste management systems and eco-friendly transportation options, which could replace the currently available means of transport.

3.4. *New Environmental Paradigm*

The research findings indicate that the majority of the community believes climate change is caused by human activities. However, the community also recognizes the importance of the obligation to preserve the environment for the sustainability of nature in the future. Furthermore, the community hopes that local government will promptly act and formulate policies to safeguard the natural preservation of Miang Island moving forward. The attitudes demonstrated by the community in their interaction with the environment suggest that the people of Miang Island hold a perspective consistent with the New Environmental Paradigm theory, wherein they are aware of the vulnerability of nature's balance—or the 'Fragility of Nature's Balance'—due to environmental degradation around them. The community also recognizes that environmentally destructive actions, whether on a large scale by industries or on a small scale by individuals, can lead to an ecological crisis. This reflects an awareness of the 'Possibility of an Eco-Crisis,' which is one of the indicators of the New Environmental Paradigm theory (Dunlap et al., 2000).

Based on further observations, the researcher found that the community's perspective on environmental sustainability is also influenced by the economic value of the environment itself, which directly impacts their livelihoods, given that most occupations in the community rely heavily on the availability and condition of natural resources. Therefore, there is a strong correlation between the conservative efforts made by the community to protect their environment and their economic interests. Thus, the perspective of the Miang Island community is still somewhat influenced by the old environmental paradigm, which views nature as a tool to fulfill human needs.

4. CONCLUSION

Based on the conducted research, the community's perception of climate change is shaped by the interaction between the community and their environment. This interaction creates experiences for the residents of Miang Island, such as hotter temperatures than before, unpredictable weather conditions, and environmental degradation. These experiences form the traditional knowledge of the Miang Island community. The community assumes that the unpredictable weather is part of a transitional season and that the environmental degradation they currently face is a result of exploitative and environmentally harmful interactions. Furthermore, the community demonstrates reactions based on the knowledge derived from their experiences by undertaking various adaptation and mitigation efforts, both socio-cultural and physical. In terms of socio-cultural adaptation and mitigation, the community practices the tradition of yasinan (communal recitation of the Yasin chapter) to seek divine protection. On the other hand, the youth group, Sea Urchin, contributes to environmental mitigation efforts by conducting coral reef transplantation and clam conservation to preserve the natural ecosystem of Miang Island. The adaptation and mitigation efforts undertaken by the Miang Island community encourage decision-making that supports both ecological and economic sustainability. This fosters a more conservative interaction between the community and the environment to preserve the ecosystem for the future.

This research also finds that the Miang Island community holds an environmental perspective consistent with the New Environmental Paradigm, although it remains influenced by the economic value of the environment. This indicates that there is still some influence from the old environmental paradigm, which views nature as a tool to fulfill human needs.

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