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# Facing Climate Change: Coastal Communities' Experiences in Adapting and Seeking Sustainable Solutions

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**ABSTRACT**

Climate change significantly impacts coastal communities, threatening their livelihoods and social well-being. Coastal communities face complex adaptation challenges; however, their subjective experiences in coping with these changes remain underexplored. There is a lack of understanding of how coastal communities develop adaptation strategies and sustainable solutions based on their subjective experiences. This study explores the experiences of coastal communities in facing climate change and the locally-driven adaptation strategies they develop. The findings reveal that adaptation strategies rooted in local traditions and social solidarity are key strengths in confronting the impacts of climate change. However, limited access to information and policy support hinders the sustainability of these adaptation efforts. These findings highlight the importance of locally-based adaptation approaches that consider the subjective experiences of coastal communities in formulating climate adaptation policies.



## INTRODUCTION

Climate change has emerged as one of the most significant global challenges of the 21st century, with far-reaching consequences for ecosystems, economies, and societies (Amone-Mabuto dkk., 2023). In particular, coastal communities, which are highly dependent on natural resources for their livelihoods, face disproportionate risks from the effects of climate change, such as rising sea levels, extreme weather events, and the degradation of local ecosystems (Ciccarino & Fernandes, 2024). The increasing frequency and intensity of storms, flooding, and coastal erosion threaten the social and economic stability of these communities, especially those whose way of life is deeply intertwined with fishing, agriculture, and other environment-dependent activities.

The concept of "adaptation" to climate change has become a central theme in environmental research, with a particular focus on developing sustainable solutions to mitigate the adverse effects of environmental shifts (Datta & Kairy, 2024). Adaptation strategies in coastal communities often rely on both technological innovations and traditional ecological knowledge. For example, the restoration of mangroves and the construction of natural barriers have become key practices in enhancing resilience against rising sea levels and erosion (Daxayani dkk., 2024). At the same time, these efforts must also take into account the social dynamics and local perceptions of sustainability, as the effectiveness of these strategies depends not only on environmental factors but also on community engagement and social cohesion.

Despite the growing body of research on climate change adaptation, much of the existing literature tends to focus on the technical aspects of climate change, such as the environmental processes or the economic costs of adaptation measures (Dubois dkk., 2024). However, there is a growing recognition of the importance of understanding the subjective experiences and social dimensions of adaptation. Phenomenological approaches, which focus on exploring the lived experiences and meanings that individuals assign to their interactions with the world around them, offer valuable insights

into how local communities perceive and respond to climate change. These insights are crucial for informing more contextually appropriate and sustainable adaptation strategies that resonate with the local social fabric and community values.

Given this context, the goal of this research is to explore the lived experiences of coastal communities in adapting to climate change, with an emphasis on the social and emotional dimensions of these experiences (Ferrari dkk., 2021). By focusing on the subjective meanings that individuals attach to their environmental challenges and adaptation efforts, this study aims to deepen our understanding of the human experience of climate change, providing a richer, more nuanced perspective that can inform future policy and community-based resilience initiatives.

Research on the lived experiences of individuals in relation to climate change has emerged as a crucial field of study, particularly in understanding how local communities perceive and adapt to environmental challenges (Gerundo & La Rosa, 2020). While there is an extensive body of literature examining the technical, economic, and policy dimensions of climate adaptation, less attention has been given to the subjective, personal experiences of those most affected by these changes. Phenomenological research offers a valuable lens for exploring these experiences, as it focuses on understanding how individuals interpret and make sense of their lived realities. In the case of coastal communities, this means capturing the ways in which they experience environmental shifts, interpret the impacts on their daily lives, and navigate the complexities of adaptation strategies within the context of their social and cultural settings.

However, examining the deep, subjective meanings behind these experiences presents several methodological challenges. Traditional quantitative approaches, which often rely on surveys or statistical analysis, are limited in their ability to capture the nuanced, emotional, and context-specific aspects of human experience. While they can provide valuable data on the frequency and scope of climate impacts, they fall short in revealing how individuals perceive these events, how they emotionally process them, and what significance they attribute to their struggles and adaptations (Hamza dkk., 2024). This gap in capturing the subjective dimension of climate change adaptation has led many scholars to call for more qualitative, phenomenological approaches that delve into the lived realities of affected communities.

Yet, the use of phenomenology in environmental research also brings its own set of challenges. Given the complexity of human experiences and the diversity of community responses to climate change, it is often difficult to isolate and describe the essential elements of these experiences in a way that is both coherent and comprehensive (Islam dkk., 2021). There is also the challenge of ensuring that the voices of the most marginalized and vulnerable groups are fully represented, as their experiences may differ significantly from those of more prominent community members. This underscores the need for methodological approaches that can capture the full depth and variety of individual experiences, and phenomenology provides a unique way to engage with these complexities, offering insights that are both rich and transformative.

The limitations of previous approaches highlight the need for a more nuanced exploration of the human dimension of climate change. The focus of this research is therefore on providing a deeper understanding of the subjective experiences of coastal communities, shedding light on the meaning they ascribe to their adaptation efforts, and exploring how their social, economic, and cultural contexts shape their responses to environmental changes.

While existing research on climate change adaptation in coastal communities has made significant strides in identifying practical solutions, such as technological innovations and policy frameworks, these approaches often fall short in capturing the deep, subjective experiences of the individuals directly affected by these changes. Current solutions typically focus on technical, economic, or policy-driven responses to environmental issues, providing valuable data on adaptation strategies and their effectiveness. However, these approaches tend to overlook the emotional, social, and cultural dimensions of adaptation, which are crucial for understanding the full impact of climate change on individuals and communities. As a result, the richness and complexity of human experience in the face of climate change remain underexplored, and the solutions developed may not fully align with the lived realities of affected populations.

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The practical approaches that dominate the current discourse in climate adaptation often rely on quantitative methods or standardized models, which are well-suited for assessing the scale of the problem or the effectiveness of specific interventions. However, they are limited in their ability to address questions of meaning and personal experience. These methods provide valuable insights into how widespread or severe climate impacts are, but they do not engage with the deeper questions of how individuals interpret, emotionally process, or make sense of these changes. Consequently, there is a gap in the literature regarding a holistic understanding of how communities perceive and respond to climate change on a personal level. This gap is especially evident in studies of coastal communities, where the stakes of climate change are most immediate and where adaptation efforts are often deeply tied to cultural and social practices.

Adopting a phenomenological approach offers a promising alternative to address this gap by enabling an exploration of the essence of the phenomenon. Phenomenology focuses on uncovering the lived experiences and meanings that individuals attach to their interactions with the world, providing a richer, more nuanced perspective on how people respond to environmental change. By centering on the subjective experiences of community members, this approach allows for a more comprehensive understanding of their perceptions, struggles, and adaptations, which are essential for designing effective and sustainable climate change responses. Thus, a phenomenological approach offers a more holistic view of the phenomenon, capturing not only the objective reality of climate impacts but also the emotional, social, and cultural dimensions that shape community resilience.

This study, therefore, seeks to bridge the existing gap in the literature by focusing on the lived experiences of coastal communities, exploring how they make sense of the challenges posed by climate change and what meaning they ascribe to their adaptation efforts. By adopting a phenomenological framework, the research aims to uncover the deeper dimensions of adaptation, providing insights that are crucial for informing more effective, context-sensitive climate change policies and interventions.

Research on the experiences of individuals facing climate change has been growing, especially in the context of coastal communities. Several studies have explored the practical adaptation strategies these communities use, such as the restoration of natural barriers like mangroves or the implementation of sustainable farming techniques. However, these studies often focus more on the effectiveness of these strategies rather than the personal experiences and meaning-making processes of the individuals involved. Theories of social resilience and sustainability have provided useful frameworks for understanding community-level adaptation, but they tend to overlook the emotional and subjective aspects of the experience. This research builds on these theories, seeking to delve deeper into the personal and collective meanings that emerge in response to climate-related challenges.

The study employs a phenomenological approach, which is particularly well-suited for exploring how individuals make sense of and assign meaning to their lived experiences. Unlike traditional quantitative methods, phenomenology allows for a rich, in-depth exploration of the personal narratives that shape how people experience environmental changes. By focusing on the subjective perspectives of coastal community members, this study seeks to address the gap identified earlier—capturing not only the practical adaptations but also the emotional and social dimensions of these experiences. Phenomenology offers the tools to uncover the essence of these experiences, providing a deeper understanding of how communities perceive, process, and respond to the impacts of climate change.

The article is structured to guide readers through the entire research process, starting with an introduction that outlines the broader context of climate change in coastal areas. Following this, the methodology section details the phenomenological approach used to collect and analyze data, focusing on how in-depth interviews and thematic analysis reveal the lived experiences of the participants. The results are then discussed in relation to the theoretical frameworks, followed by an exploration of the implications of these findings for both policy and community adaptation strategies. Finally, the article concludes with a summary of the study's main contributions and suggests avenues for further research.

## RESEARCH METHODS

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## Study Design

This study adopted a phenomenological approach to explore the lived experiences of local communities in coastal areas in response to climate change (Jeremic & Marchi, 2025). Phenomenology is particularly suited for this research as it focuses on understanding how individuals perceive and make sense of their experiences, providing rich, detailed insights into the meaning they attach to these phenomena. The approach allows for an in-depth exploration of the subjective experiences of individuals, particularly in relation to their personal and collective responses to the environmental challenges posed by climate change. In this study, an interpretative phenomenological approach was employed, which emphasizes the understanding of how participants interpret their lived experiences and the meanings they assign to those experiences within their specific social and environmental context.

## Participants

Participants were selected using purposive sampling to ensure that they had relevant lived experiences that would provide meaningful insights into the research questions. The study included a total of 20 participants, consisting of local community members from coastal areas who had direct experience with the impacts of climate change. The sample included 12 fishermen, 6 farmers, and 2 local leaders involved in community resilience efforts. All participants were over the age of 18 and had lived in the coastal areas for a minimum of five years, ensuring that their experiences were grounded in long-term exposure to environmental changes.

Inclusion criteria included individuals who: (1) reside in coastal communities affected by climate change, (2) have experienced or witnessed significant environmental impacts such as rising sea levels, flooding, or changes in weather patterns, and (3) are engaged in adaptive practices or community-based climate resilience efforts. Exclusion criteria consisted of individuals without direct experience of climate change impacts or involvement in adaptation efforts. The participants' demographic characteristics, including gender, age, and occupation, varied to reflect the diversity of perspectives within the community.

## Data Collection

Data were collected through in-depth, semi-structured interviews and participant observation. Interviews were conducted face-to-face, allowing for a personal connection and a deeper exploration of the participants' experiences (Naheed, 2024). The interview guide was designed to explore participants' personal experiences with climate change, adaptation strategies they had adopted, and their perceptions of sustainability and community resilience. The interviews ranged from 45 to 90 minutes in length, depending on the depth of the discussion and the individual’s willingness to share their experiences.

The interviews were conducted in participants' local communities, in locations that were familiar and comfortable for them, such as their homes or local gathering spaces, to ensure a relaxed and open atmosphere. In addition to interviews, observations were made during community meetings and local environmental activities, such as mangrove planting initiatives and coastal restoration projects. These observations helped to contextualize the interview data and provided a richer understanding of the social dynamics and collective actions in response to climate change.

## Data Analysis

The data were analyzed using thematic analysis, a widely used technique in phenomenological research that identifies, analyzes, and reports patterns or themes within the data. The analysis was carried out in several stages, starting with the transcription of the interviews and field notes. These transcripts were then coded to identify key themes related to participants' experiences, adaptation strategies, and perceptions of sustainability. The codes were grouped into broader categories, and the central themes were developed based on recurring ideas across the data.

The analysis was iterative and involved constant comparison between the different data sources, including interviews and observations, to refine the themes and ensure the accuracy of the findings. NVivo software was used to assist in organizing and managing the data, though the focus remained on the qualitative analysis of meaning. Each theme was explored in relation to the broader social and

environmental context, providing a nuanced understanding of the participants' lived experiences. The findings were validated through member checking, where participants were asked to review key themes and interpretations to ensure that their experiences were accurately represented.

### Ethics

Ethical approval for the study was obtained from the relevant research ethics committee. Informed consent was obtained from all participants, who were fully informed about the purpose of the study, the voluntary nature of participation, and their right to confidentiality. Participants were assured that their identities would remain anonymous, and all data collected would be kept confidential, stored securely, and used solely for the purposes of the research. Written consent was obtained from each participant prior to the interviews. The study adhered to international ethical guidelines for research involving human subjects, ensuring that participants' rights and well-being were protected throughout the research process.

## RESULTS

### Experiences of Climate Change Impacts in Coastal Communities

The interviews revealed deep and varied experiences among the local community members in coastal areas regarding the impacts of climate change. For many participants, the rising sea levels were seen as a direct threat to their livelihoods. One fisherman shared, “The water has been rising every year. The shorelines we depended on for years are disappearing, and the fish are becoming scarce.” Similarly, a farmer described the changing weather patterns, saying, “I’ve had to change the way I plant crops. The seasons are not the same anymore—sometimes we get rain when we expect drought.” The disruption of natural resources was particularly alarming for those dependent on the environment for their economic survival. The changes in the marine ecosystem, including rising temperatures and altered fish migration patterns, were also perceived as indicators of broader environmental instability.

The sense of uncertainty and frustration was palpable among participants. As one fisherman expressed, “It’s not just about losing my job. It’s about losing a way of life that’s been passed down through generations.” The local community’s experiences of climate change were not just environmental but were deeply tied to their social and economic fabric. The loss of resources and livelihood created a sense of vulnerability and fear about the future, exacerbating the already existing challenges in these coastal communities.

### Adaptation Strategies in Response to Climate Change

In response to the challenges posed by climate change, participants shared various adaptation strategies that they had developed over time. One of the most common strategies involved the restoration of natural barriers to protect against coastal erosion. A local leader mentioned, “We’ve started planting mangroves again. They protect the coastline from erosion and help with fish stock replenishment.” Another participant, a farmer, explained the shift towards sustainable farming techniques: “I’ve started using organic fertilizers and crop rotation to adjust to the changes in weather. It’s more difficult, but it’s the only way to survive.”

These strategies, often based on traditional knowledge, were seen as essential in mitigating the immediate effects of climate change. The community emphasized a collective effort in implementing these solutions. One participant noted, “We all help each other with the mangrove planting. It’s a community effort. Without cooperation, it’s impossible to face this.” In some instances, adaptation strategies also included engaging younger generations in climate awareness and action. A leader from the youth group stated, “We teach the younger generation about climate change, so they’re prepared for what’s coming.” These community-driven initiatives were seen as crucial not only for adaptation but for fostering social resilience in the face of environmental threats.

### Perceptions of Sustainability and Long-Term Solutions

Participants shared their views on the importance of sustainability in addressing climate change impacts. For many, sustainability was not just a theoretical concept but a practical necessity. A

fisherman highlighted, “We’ve seen that the old ways don’t work anymore. The fish aren’t the same, the land isn’t the same, and we need new solutions.” Another farmer reflected on the need for long-term planning: “If we don’t think about the future, the younger generation will have nothing left.” This understanding of sustainability was often tied to the belief that the environment must be cared for in a way that ensures its availability for future generations, as one participant explained, “We take care of the mangroves now, because we know they will take care of us in the future.”

However, the implementation of sustainable solutions was not without challenges. Many participants pointed out that while the community had initiated some local sustainability efforts, they faced significant barriers such as limited resources, lack of governmental support, and the increasing severity of climate impacts. One fisherman said, “We can plant mangroves, but if the sea keeps rising, it’s all for nothing.” The gap between local efforts and broader, systemic change was evident, with many participants calling for stronger governmental policies and international cooperation to support local initiatives. As one participant put it, “We need help from the government and the international community. We can’t do this alone.”

The experiences of coastal communities in facing the impacts of climate change are marked by significant adaptation efforts and a growing recognition of the need for sustainable solutions. While the community has developed various strategies for resilience, such as planting mangroves and shifting agricultural practices, the ongoing challenges highlight the urgent need for external support and long-term, collaborative solutions. The perceptions of sustainability were deeply tied to both the immediate and future wellbeing of the community, with an understanding that adaptation alone is insufficient without systemic change and broad support.

## DISCUSSION

The main findings of this study reveal that coastal communities' experiences of climate change are deeply shaped by both their environmental context and their socio-cultural backgrounds (Nanni dkk., 2021). The community members' adaptation strategies were not solely dictated by external factors, but were also profoundly influenced by the personal and collective meanings they attributed to climate-related challenges. These findings address the core research question by offering a rich, nuanced understanding of how local populations perceive, respond to, and emotionally process climate impacts in their daily lives. This study highlights the importance of considering these subjective experiences when designing climate change adaptation strategies.

The research contributes to the field by offering new insights into the lived experiences of coastal communities facing climate change, particularly regarding their emotional, social, and cultural responses to environmental stressors (Obame-Nkoghe dkk., 2024). The study emphasizes that adaptation is not merely a technical or economic challenge, but a deeply personal process influenced by cultural values, community relationships, and individual perceptions. Participants in the study reported a wide range of adaptive practices, from rebuilding natural barriers like mangrove forests to shifting agricultural practices. However, these actions were not solely motivated by a need to combat environmental threats; they were also linked to the community's sense of identity and resilience (Orr dkk., 2022). This finding underscores the importance of understanding adaptation as a multifaceted process that goes beyond pragmatic solutions and involves the meaning-making process that individuals and communities engage in as they navigate change.

The findings align with and expand upon existing literature in the field of environmental sociology and climate adaptation (Othoche, 2021). Previous studies have highlighted the importance of social resilience and collective action in coping with climate impacts, suggesting that community cohesion can enhance adaptive capacity (Adger, 2003; Füssel, 2007). However, this study adds a crucial layer to these theories by focusing specifically on how individual and collective experiences shape adaptation strategies. The participants' narratives echoed similar themes found in the work of scholars such as Berkes et al. (2003), who emphasize the role of indigenous knowledge and local practices in adaptation. Additionally, the findings challenge more traditional, top-down models of adaptation by showing how local knowledge and personal experiences can drive innovative, sustainable solutions that are often more in tune with the local context than externally imposed strategies. Thus, the study

contributes to a more holistic understanding of climate change adaptation by emphasizing the subjective experiences that underpin collective actions.

**Implications of Findings**

The findings of this research have significant implications from both scientific and practical perspectives. From a scientific standpoint, these findings enrich the literature on climate change adaptation by emphasizing the importance of subjective experience in formulating responses to environmental disasters. More than just technical solutions, climate change adaptation needs to be understood as a process influenced by the social, cultural, and psychological context of communities (Rai & Dhyani, 2023). From a practical perspective, these findings suggest that more effective adaptation policies or programs must consider the social and cultural dimensions that influence community decision-making. Therefore, adaptation programs that involve active community participation and value local knowledge are more likely to succeed. The emphasis on collaboration between local communities, governments, and international organizations in implementing nature-based solutions is also critical, as this study shows that sustainability and social resilience heavily depend on the understanding and experiences of the community.

**Study Limitations**

However, this study has several limitations that should be noted. First, the limited number of participants, drawn only from several coastal areas, may restrict the ability to generalize these findings to a broader population or to different geographical contexts (Ramazanu dkk., 2023). Additionally, while the phenomenological approach provides deep insights into individual experiences, it cannot comprehensively capture socio-economic differences or broader patterns that may exist in a larger population. This method also heavily depends on the availability of participants willing to share their experiences, which may influence the depth or richness of the data obtained. Therefore, further studies involving a larger and more diverse sample, as well as the application of quantitative methods to confirm these phenomenological findings, would be highly beneficial.

**Prospective Statement for Future Research**

This research opens opportunities for further exploration in the field of community-based climate change adaptation, particularly with a broader phenomenological approach (Sarkar dkk., 2019). For example, future research could examine the role of younger generations in shaping adaptation patterns or investigate the psychological impacts of climate change on vulnerable groups such as women and marginalized communities. Additionally, further research could assess differences in adaptation experiences between various types of coastal communities, such as those more reliant on tourism compared to those dependent on fisheries or agriculture. In this way, these findings could enrich the development of more inclusive and locally sensitive adaptation policies and help strengthen the social resilience of communities to the future impacts of climate change.

## CONCLUSION

This study explored the lived experiences of local communities in coastal areas facing the impacts of climate change, with a focus on adaptation strategies and sustainable solutions. The findings reveal that local communities, particularly fishermen and farmers, have developed various adaptation strategies, such as mangrove restoration and sustainable agricultural practices, to cope with changing environmental conditions. These findings highlight the importance of understanding the social and cultural dimensions of climate change adaptation, which are often overlooked in previous research. By using a phenomenological approach, this study provides a deeper understanding of how communities perceive and react to climate change, offering valuable insights for future policy development. The research also emphasizes the need for greater collaboration between local communities, governments, and international organizations to enhance adaptation efforts. Future studies could expand on this work by exploring the experiences of other vulnerable populations or integrating additional methodological approaches to enrich the understanding of climate change adaptation across different contexts.

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## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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