

**RESILIENCE OF PEATLAND FISHING
COMMUNITIES, SOUTH SUMATRA, INDONESIA**

SYAKINA BELLA

UNIVERSITI SAINS MALAYSIA

2025

**RESILIENCE OF PEATLAND FISHING
COMMUNITIES, SOUTH SUMATRA, INDONESIA**

by

SYAKINA BELLA

**Thesis submitted in fulfilment of the requirements
for the degree of
Master of Science**

June 2025

ACKNOWLEDGEMENT

The past year has been an exciting journey, dedicated partly to the last lap of my master's marathon: writing this thesis. I would like to start by expressing my gratitude to Allah SWT for giving me the opportunity and helping me endlessly in finishing my thesis whose title is *Resilience of Peatland Fishing Communities, South Sumatra, Indonesia*. I would like to express many thanks to my supervisor Dr. Radieah Mohd Nor for her constant guidance, profitable discussion, and critical reading in the preparation until the finishing of this thesis. Many thanks to the director, deputy director, and all of the Centre for Global Sustainability Studies (CGSS) staff. I would also like to thank all of those who provided great insights during this process. During my field interview phase, I met some wonderful people who taught me valuable knowledge. Their wisdom and hands-on experience with my research topic have been invaluable, ranging from rich insights to finishing my thesis. My sincere thanks to my parents, brother, and sister, and thanks also to those who helped me during this period; especially those who took care of my son while all deadlines were approaching. The most special greeting is for my beloved son, Khaleed. Thank you for being strong, smart, and adaptable to all conditions. I am sorry, but Mom should share your love with selfishness. Moreover, a very special gratitude goes out to my dearest husband for moral and material support, the best support system that always challenged my thinking and encouraged me to continue to chase my dreams even when times were difficult.

TABLE OF CONTENTS

| | |
|--|-------------|
| ACKNOWLEDGEMENT | ii |
| TABLE OF CONTENTS | iii |
| LIST OF TABLES | vi |
| LIST OF FIGURES | vii |
| LIST OF ABBREVIATIONS | viii |
| LIST OF APPENDICES | ix |
| ABSTRAK | x |
| ABSTRACT | xii |
| CHAPTER 1 INTRODUCTION | 1 |
| 1.1 Introduction | 1 |
| 1.2 Background of Study | 1 |
| 1.3 Problem Statement | 4 |
| 1.4 Research Questions | 7 |
| 1.5 Research Objectives | 7 |
| 1.6 Operational Definition | 8 |
| 1.6.1 Peatlands | 8 |
| 1.6.2 Resilience | 8 |
| 1.6.3 Community Resilience..... | 9 |
| 1.6.4 Fishing Communities | 10 |
| 1.6.5 Socioeconomic and Physical Infrastructure Conditions | 11 |
| 1.6.6 Direct and Indirect Impacts of Challenges on Peatland Fisheries .. | 11 |
| 1.7 Scope of Study | 12 |
| 1.8 The Significance of the Study | 13 |
| 1.8.1 Contribution to Policymakers | 13 |
| 1.8.2 Contribution to Local Communities | 15 |
| 1.8.3 Contribution to the Body of Knowledge..... | 15 |
| 1.8.4 Contribution to Global Sustainability Efforts | 16 |
| 1.9 Thesis Organisation..... | 17 |
| CHAPTER 2 LITERATURE REVIEW | 19 |
| 2.1 Introduction | 19 |
| 2.1.1 Community Resilience..... | 21 |
| 2.1.2 Fishing Communities in Peatland | 24 |
| 2.1.3 Peatlands and Their Challenges | 27 |
| 2.1.4 Socioeconomic and Physical Infrastructure Conditions | 31 |

| | | |
|------------------------------------|--|------------|
| 2.2 | Gaps of Knowledge..... | 34 |
| 2.3 | Theoretical Framework | 36 |
| 2.4 | Conceptual Framework | 38 |
| CHAPTER 3 METHODOLOGY | | 43 |
| 3.1 | Introduction | 43 |
| 3.2 | Research Design..... | 43 |
| 3.3 | Study Location | 44 |
| 3.4 | Population and Sample..... | 46 |
| 3.5 | Sample Size Estimation and Participant Selection..... | 48 |
| 3.6 | Data Collection Method | 50 |
| 3.7 | Research Instrument..... | 51 |
| 3.7.1 | Interview Protocol..... | 52 |
| 3.7.2 | Question Guided | 52 |
| 3.7.3 | Ethical Consideration..... | 53 |
| 3.8 | Data Collection Process | 55 |
| 3.8.1 | Pre-Interview Stage..... | 56 |
| 3.8.2 | Interview Process | 56 |
| 3.8.3 | Emergence and Data Validation | 57 |
| 3.9 | Interview Transcription..... | 60 |
| 3.10 | Data Analysis | 61 |
| CHAPTER 4 RESULT | | 65 |
| 4.1 | Introduction | 65 |
| 4.2 | Current Conditions of Fishing Communities in Peatlands..... | 65 |
| 4.2.1 | Socioeconomic Aspect..... | 68 |
| 4.2.2 | Physical Infrastructure Aspect | 75 |
| 4.3 | Major Constraints Faced by Fishing Communities in the Peatlands | 79 |
| 4.4 | The Impact of The Challenge Constraints on Future Fishing Activities | 88 |
| 4.5 | Sustaining Livelihoods and Resilience Strategies for Fishing Communities in South Sumatra’s Peatlands..... | 95 |
| CHAPTER 5 CONCLUSION | | 105 |
| 5.1 | Introduction | 105 |
| 5.2 | Main Findings | 105 |
| 5.2.1 | Objective One | 106 |
| 5.2.2 | Objective Two..... | 107 |
| 5.2.3 | Objective Three..... | 108 |
| 5.2.4 | Objective Four | 109 |
| 5.3 | Implications of The Study..... | 110 |

| | | |
|------------------------|---|------------|
| 5.3.1 | Theoretical Implications | 110 |
| 5.3.2 | Practical Implications..... | 112 |
| 5.3.3 | Upstream Solutions | 112 |
| 5.3.4 | Downstream Solutions | 113 |
| 5.4 | The strengths of the study | 113 |
| 5.5 | The limitations of the study..... | 114 |
| 5.6 | Recommendations For Future Research | 115 |
| REFERENCES..... | | 116 |

APPENDICES

LIST OF PUBLICATIONS

LIST OF TABLES

| | Page |
|-----------|--|
| Table 2.1 | Parameters For SC and PI32 |
| Table 3.1 | Inclusion and Exclusion Criteria.....47 |
| Table 3.2 | Participant Categorisation49 |
| Table 4.1 | Current Socioeconomic Conditions in The Peatland Area67 |
| Table 4.2 | Various Challenges Faced by Fishing Communities83 |
| Table 4.3 | Wild Medicine Species Harvested from Peat Swamp Forests99 |
| Table 4.4 | Strategies for Strengthening Sustainable Fisheries and Livelihoods in Peatland Communities 102 |
| Table 4.5 | Strategies for Sustainable Resource Management in Peatland Communities 103 |
| Table 4.6 | Strategies for Enhancing Peatland-Based Handicraft Industries ... 103 |
| Table 4.7 | Strategies for Sustainable Energy Management in Fishing Communities. 104 |

LIST OF FIGURES

| | Page |
|-------------|--|
| Figure 2.1 | Conceptual Framework for Conducting Research40 |
| Figure 2.2 | Connection Between Community Resilience and Research Question42 |
| Figure 3.1 | Research Location46 |
| Figure 3. 2 | Structure of Data Collection Method51 |
| Figure 4.1 | Various Community Groups in the Research Area, %70 |
| Figure 4.2 | Population Income (IDR Million per Month) Based on Community Groups71 |
| Figure 4.3 | The Relationship Between Job and Cultivated Species72 |
| Figure 4.4 | Physical conditions in peatland size, distance to the main road, and distance to market76 |
| Figure 4.5 | The Road Access in Peatlands78 |
| Figure 4.6 | Analysis Results From The Challenge Constraints Faced By The Fishing Communities81 |
| Figure 4.7 | The Main Road in The Plantation Area85 |
| Figure 4.8 | Canals Used by Large Companies for Drainage86 |
| Figure 4.9 | Direct and Indirect Impact on Future Fishing Activities89 |
| Figure 4.10 | Resilience in The Fishing Communities96 |
| Figure 4.11 | Looking for Purun in Peatlands100 |
| Figure 4.12 | Handicrafts from Purun.....100 |

LIST OF ABBREVIATIONS

| | |
|------|---|
| SD | Sustainable Development |
| SDGs | Sustainable Development Goals |
| UN | United Nations |
| PRA | Peat Restoration Agency |
| KLHK | State Ministry for Environment and Forestry |
| Mha | Million Hectares |
| BRIN | National Research and Innovation Agency |
| HTI | Industrial Plantation Forests |
| Ha | Hectare |
| Km | Kilometres |
| HPH | Forest Concession Rights |
| pH | Potential of Hydrogen |
| M | Metre |
| SD | Elementary School |
| SMP | Junior High School |
| SMA | Senior High School |

LIST OF APPENDICES

| | |
|------------|--|
| Appendix A | Result Of Participant Id's Status And Age |
| Appendix B | Result Of Participant Id's Peatland Size, Distance To The Main Road, And To The Market |
| Appendix C | Causality Parameters Between Physical And Socioeconomic Conditions |
| Appendix D | Result Of Community Resilience Causal Loop Diagram |
| Appendix E | Fishing Methods |
| Appendix F | Nvivo Case Classification Result |
| Appendix G | Hierarchy Chart Participant Id's Attribute Values |
| Appendix H | Question Guidelines For Field Interview |
| Appendix I | Interview Transcriptions |

**DAYA TAHAN MASYARAKAT PERIKANAN TANAH GAMBUT,
SUMATRA SELATAN, INDONESIA**

ABSTRAK

Tanah gambut Indonesia kaya dengan sumber semula jadi, namun pengurusannya masih tidak mencukupi, menyebabkan komuniti tempatan, terutamanya komuniti nelayan di Sumatera Selatan, berhadapan cabaran alam sekitar dan sosioekonomi tanpa cukup sokongan. Komuniti ini sangat bergantung kepada penangkapan ikan walaupun berlakunya ketidakstabilan ekosistem, kekurangan pengetahuan dan sumber yang diperlukan untuk menyesuaikan diri dengan keadaan berubah-ubah. Tanpa campur tangan berkesan, kemerosotan alam sekitar dan kesulitan ekonomi terus mengancam pendapatan mereka serta kelestarian perikanan di tanah gambut. Kajian ini bertujuan meneroka daya tahan komuniti nelayan di tanah gambut Sumatera Selatan dengan menilai keadaan sosioekonomi, mengenal pasti cabaran utama, menganalisis kesan jangka panjang, serta mencadangkan strategi meningkatkan kelestarian. Menggunakan kaedah kualitatif, kajian ini melaksanakan analisis kandungan dengan perisian NVivo, melibatkan 15 informan dipilih secara bertujuan. Hasil kajian menunjukkan komuniti nelayan tanah gambut menghadapi kekangan ekonomi dan alam sekitar. Pendapatan rendah, infrastruktur lemah, serta akses pendidikan dan pasaran terhad menjadikan mereka rentan terhadap ekonomi. Selain itu, aktiviti perikanan semakin terjejas akibat faktor persekitaran seperti keasidan air yang tinggi, kemerosotan populasi ikan, dan penukaran tanah untuk kegunaan lain. Walaupun berhadapan cabaran, banyak komuniti masih meneruskan aktiviti perikanan, meskipun analisis ekonomi menunjukkan ia tidak lagi menguntungkan. Ketahanan mereka untuk meneruskan aktiviti ini mencerminkan

perikanan bukan sekadar aktiviti ekonomi tetapi juga satu amalan budaya dan sosial yang berakar umbi dalam kehidupan mereka. Kajian ini memperluaskan Kerangka Mata Pencarian Lestari (SLF) dengan memasukkan cabaran spesifik yang dihadapi komuniti perikanan tanah gambut serta memberikan pandangan mengenai daya tahan, kapasiti adaptasi, dan pengurusan sumber bersama. Ia menekankan keperluan tadbir urus yang lebih baik, amalan perikanan lestari, dan peningkatan infrastruktur bagi menyokong komuniti ini. Cadangan praktikal termasuk program tanggungjawab sosial korporat (CSR) untuk penambahan stok ikan, bantuan kewangan, langkah kawal selia bagi menghalang kaedah perikanan yang merosakkan, dan program latihan pengurusan sumber yang mampan. Selain itu, menggalakkan akuakultur lestari, meningkatkan literasi kewangan, dan memperkukuh pemprosesan nilai tambah hasil perikanan juga penting untuk menstabilkan ekonomi komuniti nelayan. Walaupun kajian ini memberikan sumbangan signifikan, terdapat beberapa keterbatasan termasuk tumpuan komuniti nelayan hanya kepada yang telah lama menetap, tidak mengambil kira populasi baharu, serta tiada data pemerhatian jangka panjang. Kajian masa hadapan perlu meneliti kesan penukaran tanah berskala besar terhadap kelestarian tanah gambut, meningkatkan sistem tadbir urus, serta menyelidik strategi pengurusan sumber seperti peningkatan kemahiran silvikultur dan akses kredit bagi sektor perikanan. Penyebaran pengetahuan dan amalan terbaik kepada komuniti tempatan juga penting bagi memastikan pelaksanaan dasar berkesan. Kajian ini memberikan pandangan berharga untuk penggubal dasar, institusi akademik dan komuniti tempatan, menawarkan strategi berasaskan bukti untuk meningkatkan daya tahan sambil memastikan kemampanan ekosistem tanah gambut dan mata pencarian.

RESILIENCE OF PEATLAND FISHING COMMUNITIES, SOUTH SUMATRA, INDONESIA

ABSTRACT

Indonesia's peatlands are rich in natural resources, yet their management remains inadequate, leaving local communities, particularly fishing communities in South Sumatra, to face environmental and socioeconomic challenges with limited support. These communities rely heavily on fishing despite ecosystem instability, and many lack the necessary knowledge and resources to adapt to changing conditions. Without intervention, environmental degradation and economic hardships will continue to threaten their livelihoods and the sustainability of peatland fisheries. This **study** aims to explore the resilience of fishing communities in South Sumatra's peatlands by assessing their socioeconomic conditions, identifying key challenges, analyzing their long-term impacts, and proposing strategies to enhance sustainability. Using qualitative methods, this study employed content analysis with NVivo software, analyzing data from 15 purposively selected informants. Findings indicate that fishing communities in peatlands face significant economic and environmental constraints. Low incomes, poor infrastructure, and limited access to education and markets make them economically vulnerable. Additionally, fishing activities are increasingly challenged by environmental factors such as water acidity, declining fish populations, and land conversion. Despite these hardships, many communities continue fishing, even though economic assessments suggest it is financially unsustainable. This persistence highlights that fishing is not just an economic activity but a deeply rooted cultural and social practice. It emphasizes the need for better governance, sustainable fishing practices, and improved infrastructure to support these communities. Practical

recommendations include corporate social responsibility (CSR) programs for fish stocking, financial assistance, regulatory measures to prevent destructive fishing, and training programs on sustainable resource management. Encouraging sustainable aquaculture, improving financial literacy, and enhancing value-added fish processing are also essential to strengthening economic stability. Despite its contributions, the study has limitations, including a focus on long-term peatland residents, exclusion of transient populations, and a lack of long-term observational data. Future research should explore the impact of large-scale land conversion on peatlands, improve governance systems, and investigate resource management strategies such as silviculture skills and access to credit for fisheries.

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter will provide a comprehensive overview of the study on community resilience to challenges on peatlands linked to sustainable goals. The achievement target is to ensure that people everywhere are aware of sustainable development and a lifestyle that is in harmony with nature. This research will discuss the resilience of fishing communities so that they can survive on peatlands with the various challenges they face.

1.2 Background of Study

Peatlands are important ecosystems essential for storing carbon, regulating water, and conserving biodiversity (Antonoplis, 2023). These distinctive landscapes sustain various species and offer vital ecosystem services that promote sustainable development and climate stability (Fenxia, 2022). Global programs such as the Sustainable Development Goals (SDGs) highlight the necessity of managing peatlands responsibly because of their significance (Peatlands and Climate Planning, 2022). To ensure that peatlands are protected for future generations, SDG 12 emphasises the need for sustainable patterns of production and consumption. Due to resource exploitation, habitat degradation, and inappropriate land use, peatlands face major difficulties globally despite their ecological significance.

Around the world, nations such as Canada, Russia, Finland, and Indonesia have vast peatlands that are used for forestry, fisheries, and agriculture (Drakopoulos & Poe, 2023). To strike a balance between economic activity and environmental sustainability, these landscapes need to be managed carefully. For instance, fish

habitats in Canada have changed as a result of peatland disturbances, and habitat degradation has been caused by unsustainable fishing methods like the use of poison in the Peruvian Amazon (Busetto et al., 2020). These situations highlight how difficult it is to manage peatlands for financial gain while maintaining their ecological roles. Numerous nations, including Canada, have integrated conservation measures to lessen environmental deterioration because they understand how vital it is to maintain wetland biodiversity (Bränström et al., 2023). These international efforts align with SDG 15, which calls for the sustainable use and restoration of terrestrial and freshwater ecosystems to combat biodiversity loss and land degradation.

Indonesia is home to some of the world's most extensive peatlands, including those in South Sumatra, which support diverse flora and fauna (Budiman et al., 2021). These peatlands are also central to the livelihoods of local communities, particularly those engaged in fishing (Armanto et al., 2023). Unlike urban-based farmers who often have access to better infrastructure and resources, fishing communities in Indonesia's peatlands face significant economic and social disadvantages (Armanto & Wildayana, 2022). They rely on fishing as a primary source of income, yet many have limited skills, knowledge, and bargaining power in the market (Wildayana & Armanto, 2021). Environmental challenges such as increasing water acidity, loss of native fish species, and seasonal water fluctuations further threaten their ability to sustain fishing activities (Tanneberger et al., 2022). Without adequate support and sustainable management practices, the future of these communities remains uncertain.

Fishing communities in Indonesia's peatlands persist in their operations despite these obstacles, exhibiting a type of resilience that enables them to adjust to their harsh surroundings (Budiman et al., 2021). Developing methods to improve their long-term sustainability requires an understanding of this resilience, whether it be cultural, social,

or economic (Falah et al., 2021). Indonesia's peatland fishing continues to receive relatively little support, in contrast to other areas where government action has enhanced conservation and livelihoods (Fu & Zhang, 2024). This study intends to provide insight into the methods these communities use to maintain their way of life by examining their resilience. Examining their adaptive abilities will help us understand how social networks, economic tactics, and local knowledge support their survival, which is in line with SDG 12.8, which focusses on raising awareness and developing capacity for sustainable living.

Understanding the resilience of these communities requires not only a conceptual exploration of their adaptive capacities but also a grounded appreciation of the diverse social fabric and livelihood patterns that define their daily lives. Peatland communities in South Sumatra are culturally diverse and socially complex, comprising indigenous groups alongside long-established migrant populations and newer arrivals. The indigenous communities have traditionally lived in close relationship with the peatland ecosystem, relying heavily on natural resources for their livelihoods.

Settled migrants, primarily of Buginese and Banjarnese origin, have integrated into the region over generations, often engaging in fishing, farming, and small-scale trade. More recent migrants, including Javanese and Balinese populations, typically arrived through government-sponsored transmigration programs or independent economic pursuits. In addition, spontaneous migrants have settled in the area seeking employment in plantation sectors or informal business opportunities. Fishing remains a core livelihood across these groups, particularly among older and indigenous residents, serving as both a primary source of income and a cultural tradition.

This study seeks to bridge the knowledge gap on peatland fisheries in South Sumatra by examining the challenges these communities face and identifying

strategies to enhance their resilience. While global and national policies emphasize peatland conservation, little attention has been given to the specific needs of fishing communities that depend on these ecosystems. This study aims to contribute to a more comprehensive understanding of peatland sustainability by analysing their socioeconomic conditions, environmental constraints, and adaptive strategies. The findings will not only support efforts to improve the livelihoods of fishing communities but also inform policy recommendations for balancing economic needs with ecological preservation in Indonesia's peatlands.

1.3 Problem Statement

Indonesia's peatlands are rich in natural resources, yet their management remains insufficient, leaving local communities to navigate environmental and socioeconomic challenges with minimal support (Byg et al., 2023). The fishing communities in South Sumatra's peatlands are among those most affected, relying heavily on fishing despite the instability of the ecosystem (Armanto et al., 2018). However, many of these communities lack the necessary skills and knowledge to manage the peatland environment sustainably (Imanudin et al., 2021a, 2021b). Without proper intervention, the degradation of this fragile ecosystem continues, threatening both livelihoods and biodiversity.

One of the critical issues is the socioeconomic vulnerability of these fishing communities. These communities, composed of indigenous communities and various migrant populations, experience economic hardship due to low incomes, limited education, and inadequate infrastructure (Wildayana & Armanto, 2018). Access to markets and essential facilities is difficult, with poor road conditions and long travel distances exacerbating their struggles. Understanding these fishing communities'

social and economic conditions is essential to designing strategies that enhance their resilience and improve their livelihoods.

The second major challenge is the range of constraints these communities face. Fishing in peatlands presents unique difficulties, including increasing water acidity, seasonal fluctuations in water levels, and the gradual loss of native fish habitats (Yuwati et al., 2021). Additionally, socioeconomic pressures such as market instability, limited access to modern fishing technologies, and the absence of strong policy support further weaken their ability to sustain fishing activities (Syakina et al., 2024a). Without intervention, these challenges could lead to a decline in traditional fisheries, reducing the community's economic security and increasing their reliance on unsustainable practices.

The long-term sustainability of fishing activities in peatlands is also at risk. The combination of environmental degradation and economic uncertainty raises concerns about the future of peatland fisheries. If these challenges persist without mitigation, the ability of communities to continue their fishing traditions may diminish, leading to a potential collapse of the sector (Walpole et al., 2021). Identifying the long-term impacts of these constraints is necessary to understand the risks to future generations and to develop strategies that can sustain livelihoods while preserving the peatland ecosystem.

Despite these challenges, communities continue fishing in peatlands, even though economic assessments indicate that the Benefit-Cost (BC) Ratio of their activities is less than one, meaning they operate at a financial loss (Wildayana et al., 2018). This raises the critical question of why these communities persist in fishing despite the difficulties and what types of resilience enable them to do so. Their persistence suggests that fishing is not only an economic activity but also a cultural

and social practice deeply embedded in their way of life. Exploring their resilience strategies, whether through diversification of income, reliance on local knowledge, or adaptation to environmental conditions, can provide valuable insights for developing policies that support sustainable rural development.

This study is critical due to the need to bridge the knowledge gap on fishing resilience in South Sumatra's peatlands. While previous studies have focused on agricultural resilience and peatland restoration, little attention has been given to how fishing communities adapt to the challenges of living in this unique environment. Understanding their resilience can inform the development of evidence-based strategies that strengthen livelihoods while ensuring the long-term sustainability of peatland ecosystems. This study aims to provide practical recommendations that support both the well-being of peatland communities and the conservation of these vital landscapes by identifying social, economic, environmental, and institutional factors influencing resilience.

Without meaningful intervention, fishing communities in South Sumatra's peatlands will face worsening vulnerabilities. Technical challenges such as declining fish stocks, poor water quality, and lack of equipment will reduce productivity and income. Non-technical challenges such as weak institutional support, market inaccessibility, and social inequality will deepen marginalization. These pressures may lead to the youth's disinterest in fishing, loss of traditional knowledge, and a shift to unsustainable livelihoods. Over time, poverty and environmental degradation could worsen, threatening both community resilience and the sustainability of the peatland ecosystem.

1.4 Research Questions

The research questions are developed to guide the researcher at each stage of the research process. The research questions used are as follows:

1. What are the current socioeconomic and physical infrastructure conditions of the fishing communities in the peatlands of South Sumatra, Indonesia?
2. What are the key challenges faced by the fishing communities in the peatland environment?
3. How would those challenges affect future fishing activity?
4. What resilience strategies enable fishing communities in South Sumatra's peatlands to sustain their livelihoods despite environmental and economic challenges?

1.5 Research Objectives

The research aims to explore the dynamics of community resilience in the unique context of peatland fisheries, shedding light on SDGs 12.8 as developing the rural community.

1. To identify the socioeconomic conditions and physical infrastructure of the fishing communities in peatlands in South Sumatra, Indonesia.
2. To assess the key challenge constraints faced by the fishing communities of the unique peatland environment in South Sumatra, Indonesia.
3. To assess the impact on key challenges for future fishing activities in peatlands in South Sumatra, Indonesia.
4. To propose evidence-based strategies for enhancing the resilience and sustainability of fishing communities in Peatlands, South Sumatra, Indonesia.

1.6 Operational Definition

In this sub-topic, the researcher discussed six key terms crucial to this thesis, namely peatlands, resilience, community resilience, fishing communities, socioeconomic and physical infrastructure, direct and indirect impact of challenges, and sustainability.

1.6.1 Peatlands

Peatlands are integral components of hydrological networks, linking streams, rivers, lakes, and groundwater reserves while playing a critical role in regulating water flows, levels, and quality (Hartmann et al., 2020). They contribute to groundwater supply and water resource management, making them essential for ecological balance and community livelihoods. Peatlands also serve as a unique agricultural medium and habitat for biodiversity (Alikhani et al., 2021).

In Indonesia, peatlands cover an estimated area of 13.4-14.8 million hectares (Mha), with South Sumatra accounting for approximately 5.85 Mha, representing about 43.5% of the total peatland area (Harrison et al., 2020). The peatlands in this study serve as a vital ecosystem for fisheries, supporting local livelihoods through fishery activities adapted to peatland-specific environmental conditions.

1.6.2 Resilience

Resilience is the capacity of a system, community, or individual to absorb disturbances, adapt to changing conditions, and recover from shocks while maintaining essential functions (Beccarello & Di Foggia, 2022). While, based on Fatimah et al. (2023), resilience is the ability of communities to adapt to challenges by adjusting fishing practices, diversifying income sources, and utilizing social networks for support. In the context of peatland fishing communities in South Sumatra, resilience refers to the ability of fishing households to withstand environmental and

socioeconomic challenges while continuing to sustain their livelihoods (Busetto et al., 2020). It involves both coping mechanisms in response to immediate crises and long-term adaptive strategies that enhance stability and reduce vulnerability (Dezzeb et al., 2021).

The resilience of fishing communities in peatlands is tested by various constraints, including environmental stressors such as water level fluctuations, habitat degradation, and extreme weather events (Byg et al., 2023). Socioeconomic constraints, such as market instability, regulatory restrictions, and limited access to infrastructure, further impact the community's ability to maintain consistent livelihoods (Dezzeb et al., 2021). In this study, resilience is understood as the community's capacity not only to adapt to challenges but also to actively shape their pathways of resilience through local strategies, cultural knowledge, and self-driven solutions, including the ability to modify fishing techniques, access alternative income sources, and leverage social networks for support (Fatimah et al., 2023).

1.6.3 Community Resilience

Community resilience refers to the ability of communities to withstand, adapt to, and recover from socioeconomic and environmental challenges while maintaining their core functions and identity (Walpole et al., 2021). A resilient community is characterized by strong social connections, robust infrastructure, and the capacity to promote recovery and adaptation in response to disruptions (Robertson et al., 2021).

For fishing communities in peatlands, resilience specifically pertains to their ability to sustain livelihoods despite environmental vulnerabilities such as fluctuating water levels, declining fish stocks, and socioeconomic challenges including market instability and regulatory constraints (Fu & Zhang, 2024). Community resilience in this context involves collective action, resource-sharing, and local knowledge

application to sustain livelihoods and ensure long-term ecological balance (Zeballos-Velarde et al., 2023).

In alignment with the research objectives, resilience in peatland fishing communities can be operationalized through four key dimensions, which are social and economic stability, adaptation to environmental changes, institutional support and governance, and sustainable resource management. social and economic stability is the ability of the fishing communities to maintain household incomes, food security, and well-being despite environmental and economic disruptions (Robertson et al., 2021). While the adaptation to environmental changes is the community's capacity to employ traditional and modern strategies to cope with seasonal water fluctuations, peatland degradation, and fish stock variability (Gale et al., 2019). Then institutional support and governance is the effectiveness of policies, community networks, and local governance in facilitating sustainable fishing practices and economic security (Girkin et al., 2023; Grover et al., 2024). Lastly, the sustainable resource management is about the adoption of sustainable fishing techniques and conservation efforts to protect peatland ecosystems while ensuring long-term productivity (Zeballos-Velarde et al., 2023).

1.6.4 Fishing Communities

Fishing communities in peatland areas of South Sumatra, Indonesia, are characterized by their dependence on fishery resources for both economic sustenance and nutritional intake (Jalilov et al., 2024). Within peatland ecosystems, fisheries provide a crucial livelihood source, particularly for those with limited alternative income opportunities. Fishing communities in these areas are composed of individuals and households that are substantially dependent on the harvest, processing, and trade

of fishery resources to sustain their social and economic well-being (Wildayana & Armanto, 2021).

1.6.5 Socioeconomic and Physical Infrastructure Conditions

According to Harrison et al. (2020), socioeconomics, also referred to as social economics, is a social science that studies how economic activities influence and shape social structures. This study examines how local, regional, or global economies impact the progress, stagnation, or decline of modern society. Socioeconomic conditions are influenced by differences between groups of people, primarily determined by their financial situations (Armanto & Wildayana, 2022).

In this study, physical infrastructure refers to the essential systems and structures that support the accessibility, mobility, and overall quality of life in peatland-based fishing communities. Based on the framework from PRA (2017), it includes factors such as land availability for agricultural and fisheries-related activities, as well as the distance to main roads and markets. These elements determine how easily community members can access economic opportunities, administrative services, and market outlets for their products. Physical infrastructure thus plays a critical role in supporting the economic viability and resilience of fishing communities, influencing their ability to sustain livelihoods and adapt to challenges.

1.6.6 Direct and Indirect Impacts of Challenges on Peatland Fisheries

Impact refers to an activity or event that influences other activities, with effects that can be either positive or negative and varying in magnitude (Harrison et al., 2020). In the context of fishing communities, the impact is closely linked to the challenges they face and the resulting consequences on their livelihoods. The extent of these impacts can be understood through both direct and indirect effects. Direct impacts occur when an activity immediately influences environmental, social, or economic

conditions, such as physical damage to agricultural land, fishing areas, or essential infrastructure (Hartmann et al., 2020). On the other hand, indirect impacts emerge from more complex pathways, often as a consequence of disrupted systems. For instance, infrastructure damage may not only affect the fishing process but also reduce production and income over time (Jalilov et al., 2024).

1.7 Scope of Study

This research focuses on understanding the resilience and sustainability of fishing communities in South Sumatra's peatlands by examining their socioeconomic conditions, environmental challenges, governance structures, and adaptive strategies. It explores how factors such as age, education, gender roles, and community composition shape economic stability, while also assessing the impact of physical infrastructure on mobility and access to essential services. The study delves into the environmental constraints of peatland fisheries, including acidic water, pollution, and habitat degradation, highlighting how these challenges affect traditional fishing practices and long-term sustainability. Governance and policy shortcomings are also analyzed, particularly regarding unclear land tenure, weak regulatory enforcement, and inadequate financial support. Beyond identifying these constraints, the research investigates how cultural traditions and alternative livelihood strategies, such as aquaculture and resource extraction, contribute to household resilience. This study provides a comprehensive understanding of the key factors shaping the future of peatland fisheries, offering evidence-based recommendations for sustainable development and community empowerment by integrating socioeconomic analysis with environmental and policy considerations. This study also sets boundaries by focusing on fishing communities actively involved in fishing activities within South

Sumatra's peatlands, excluding non-fishing households or transient fishing operations. The study does not cover large-scale commercial fishing but rather small-scale, community-based fisheries that are more vulnerable to environmental and socioeconomic stressors.

1.8 The Significance of the Study

In the peatland fisheries sector of South Sumatra, Indonesia, this study is important in several ways, including theoretical comprehension, policy development, and practical community resilience. The goal of this study is to produce practical insights that promote sustainability and resilience in these delicate ecosystems by investigating the socioeconomic circumstances, major obstacles, and adaptive strategies of fishing communities. The study's conclusions, which provide a nuanced view of the relationship between environmental preservation and the sustainability of rural livelihoods, are directly applicable to policymakers, local communities, and academics.

1.8.1 Contribution to Policymakers

The findings of this study provide critical insights for policymakers at the local, regional, and national levels in Indonesia. Fishing communities in South Sumatra's peatlands face multifaceted challenges, including environmental degradation, fluctuating fish stocks, and socioeconomic instability. Understanding these constraints will help the government design targeted interventions that support sustainable fishing practices while mitigating the adverse effects of peatland degradation.

This study can serve as a foundation for policy development, particularly in integrating fisheries management with peatland conservation strategies. Indonesia has committed to Sustainable Development Goals (SDGs), and this study aligns with SDG

12.8 by providing empirical data that can inform education for sustainable consumption and resource use. Furthermore, the study highlights the necessity of livelihood diversification, advocating for policies that support alternative income sources for fishers, such as sustainable aquaculture and community-based ecotourism.

This research has important implications for climate resilience policies, as peatlands play a critical role as carbon sinks in climate change mitigation efforts. Policymakers can use the findings to better balance environmental conservation with the economic needs of local communities, ensuring that peatland ecosystem management does not undermine local livelihoods. In South Sumatra, policies related to peatland management and fisheries are still evolving, with a focus on both economic development and environmental sustainability. The Indonesian government has initiated programs like the Peatland Restoration Agency (BRG) to rehabilitate damaged peatlands and prevent further degradation, while the Ministry of Marine Affairs and Fisheries has introduced measures to manage fishery resources and promote sustainable fishing practices.

However, these policies often fail to fully address the unique challenges faced by fishing communities in peatland regions. This study contributes by offering insights into the specific needs of these communities, such as livelihood diversification and the protection of traditional fishing practices, which can enhance the effectiveness of existing policies. The study's evidence-based recommendations can be integrated into national peatland restoration initiatives, fisheries governance frameworks, and rural economic development programs, ensuring that both environmental and socioeconomic goals are met.

1.8.2 Contribution to Local Communities

This study provides useful information for fishing communities in the peatlands of South Sumatra by identifying resilience techniques that can help them overcome socio-environmental challenges. Many fishers face financial difficulties due to fluctuating weather patterns, declining fish stocks, and limited access to alternative income sources. By documenting their current adaptation strategies, this study highlights both the strengths and limitations within these communities, supporting informed decisions for long-term sustainability. One example of a resilience technique is *melebung*, a traditional seasonal fishing method that enables communities to harvest fish from natural ponds during the dry season, helping them maintain food security and income stability amid environmental uncertainties.

The study emphasizes the importance of community-based resource management, which can empower local fishers to take an active role in conserving their aquatic ecosystems. Cooperative governance models and Traditional Ecological Knowledge (TEK) are essential aspects of resilience that can be leveraged to improve community well-being (Sakuntaladewi et al., 2024). This study provides a roadmap for integrating traditional fishing knowledge with modern conservation approaches, ensuring that local expertise is valued in the decision-making process. Furthermore, the study can catalyse community-driven initiatives, encouraging local stakeholders to collaborate in addressing shared challenges.

1.8.3 Contribution to the Body of Knowledge

Academically, this study contributes to the growing field of resilience studies by providing empirical evidence on how fishing communities in peatland environments cope with socio-environmental disruptions. Resilience, as a concept, is often studied in urban or disaster-prone contexts (Tan, 2021), but this study expands

its application to rural fisheries, offering new insights into the adaptability of small-scale fishers facing environmental and economic uncertainty.

The study advances literature discussions on resilience by examining both individual and community-level adaptation strategies. It highlights the interplay between social capital, economic stability, and environmental conservation, demonstrating that resilience is not merely about survival but also about the capacity to thrive amid challenges. This perspective aligns with broader discussions in sustainability science, emphasizing the need for holistic approaches that integrate ecological, economic, and social dimensions.

Furthermore, this study advances knowledge of peatland-based fisheries, a field that has received little attention about sustainability and rural development. The study offers useful information for comparative studies on comparable ecosystems around the world by recording the actual experiences of fishermen in South Sumatra. Future studies on peatland management, climate adaptation, and fisheries sustainability can make use of the findings, adding to a body of knowledge that will be useful to scholars, decision-makers, and practitioners.

1.8.4 Contribution to Global Sustainability Efforts

Beyond its local and national significance, this research also contributes to global discussions on sustainability, resilience, and rural development. As peatlands are vital carbon sinks that influence global climate stability, understanding how communities interact with these ecosystems has broader implications for climate change mitigation strategies. The study provides insights that can be applied to similar ecosystems in other parts of the world, reinforcing the need for integrated conservation and livelihood development approaches.

Then, by aligning with SDG 12.8, this study highlights the importance of education and awareness in promoting sustainable resource use. It calls attention to the need for knowledge-sharing mechanisms that empower communities to adopt sustainable practices while maintaining economic security. The study findings can be referenced by international organizations, NGOs, and policymakers working on community-based environmental management, contributing to a more comprehensive understanding of sustainability in diverse socio-ecological contexts.

In summary, politicians, local communities, academic institutions, and the Indonesian government can all benefit greatly from this study. It provides workable answers to the problems that fishing communities in South Sumatra's peatlands face, promoting sustainability, resilience, and well-informed policymaking. The knowledge gained from this study goes beyond Indonesia and significantly advances international initiatives to promote ecological preservation and sustainable rural development.

1.9 Thesis Organisation

This study is structured into six main chapters, each covering different aspects of the research. Chapter One provides an introduction to the research, outlining the background of the study, problem statement, research questions, research objectives, operational definitions, scope of the study, significance of the study, and thesis organization. This chapter establishes the foundation of the study and sets the direction for the research.

Chapter Two presents the literature review, which includes an introduction, identification of knowledge gaps, study rationale, and the conceptual framework. This chapter critically examines existing research related to the study's focus, highlighting gaps that this research aims to address.

Chapter Three outlines the research methodology. It begins with an introduction, followed by a detailed explanation of the research design, data collection methods, data analysis techniques, and the research flowchart. This chapter provides a systematic approach to how the study was conducted, ensuring clarity and reproducibility.

Chapter Four presents the results and discussion of the field study. It explores the current socioeconomic conditions of fishing communities in the peatlands, the major challenges they face, the impact of these challenges on the future of fishing activities, and the resilience strategies employed by these communities in utilizing peatland resources for disaster preparedness. This chapter interprets the findings in the context of the research objectives.

Chapter Five provides the conclusion of the study, summarizing the key findings and discussing their implications. It also highlights the contributions of the research, acknowledges its limitations, and offers recommendations for future studies. This chapter synthesizes the entire research and suggests potential pathways for further exploration.

Finally, the References section includes a comprehensive list of all cited sources, along with appendices and a compilation of related publications. This section ensures proper attribution of scholarly work and provides additional supporting materials for readers.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Indonesia, a country endowed with abundant natural resources, including extensive peatlands, faces significant challenges in managing these ecosystems effectively. Peatlands, which hold critical ecological and economic value, remain underutilized and suffer from mismanagement (Flood et al., 2022). The communities inhabiting these peatlands should ideally play a central role in managing their environment; however, they often lack the necessary skills and knowledge required for sustainable practices (Fu & Zhang, 2024). This situation is exacerbated by minimal government intervention in addressing the pressing issues faced by fisheries-dependent communities, such as poor physical accessibility, rising water acidity, and declining habitats for native peat fish species (Loorbach et al., 2020).

The residents of these peatland areas present a unique cultural composition, characterized by diverse ethnic backgrounds and a predominantly indigenous population. Despite their long-standing dependence on fisheries for livelihood, these communities are often economically marginalized (Opoku et al., 2022). Previous studies by Wildayana and Armanto (2018) reveal that the Benefit-Cost (BC) ratio of fishing activities in the peatlands is less than one, indicating economic losses. Nevertheless, these communities persist with fishing activities, prompting the need to explore the underlying reasons for their resilience and adaptability in the face of adversity.

This research aims to examine the dynamics of community resilience within the context of peatland fisheries, contributing to Sustainable Development Goal (SDG)

12.8, which emphasizes sustainable consumption, production, and the development of rural communities. The study focuses on assessing the socioeconomic conditions of fisheries-dependent communities in South Sumatra, Indonesia, identifying the primary challenges they encounter, analyzing the impacts of these challenges on future fishing activities, and investigating the resilience strategies employed to balance household needs with disaster preparedness and environmental sustainability.

Community resilience forms the theoretical foundation for this study, drawing insights from previous research that examines livelihood sustainability through multiple dimensions (Tan, 2021). Carlson et al. (2012) provided a broad framework for understanding community resilience, while Vatria et al. (2019) highlighted livelihood resilience at smaller scales by analyzing natural, human, physical, financial, social, and institutional aspects. Additionally, Armanto and Wildayana (2018) investigated resilience strategies in response to environmental and socioeconomic changes. However, existing studies have largely overlooked the specific challenges faced by agricultural and fishing communities in peatland ecosystems, underscoring the need for a focused investigation into this area (Imanudin et al., 2024).

The scope of this research encompasses an exploration of community resilience to the challenges posed by the peatland environment, emphasizing sustainable development and lifestyles in harmony with nature. It focuses specifically on fisheries as the primary livelihood of the communities under study. The research begins with an evaluation of these communities' socioeconomic and physical infrastructure conditions, followed by identifying the key constraints affecting their fishing activities and assessing the future impacts of these constraints. Lastly, it delves into proposing evidence-based strategies for enhancing the resilience and sustainability of fishing communities in Peatlands South Sumatra Indonesia.

In this study, the researcher will examine four themes, namely community resilience, fishing communities in peatland, peatlands and their challenges, and socioeconomic conditions and physical infrastructure, and identify gaps in the existing research. Additionally, the topic delves into the conceptual framework that underlies these themes, providing a comprehensive understanding of the relationships and interactions within this research domain.

2.1.1 Community Resilience

Community resilience is a crucial concept in understanding how societies adapt and respond to disruptions, particularly in the context of environmental and socioeconomic challenges (Mendham et al., 2024). In the case of fishing communities in South Sumatra's peatlands, resilience is shaped by their ability to navigate ecological constraints, economic uncertainties, and governance structures that impact their livelihoods (Mishra et al., 2021). While resilience has been widely discussed across multiple disciplines, its application to peatland-dependent fishing communities requires a more specific and localized understanding (Syakina et al., 2024a).

Research on community resilience has evolved over time, with early conceptualisations rooted in ecological and engineering resilience (Maybery et al., 2009), later expanding into social resilience (Muellmann et al., 2021). Scholars such as Opoku et al. (2022) have emphasized that resilience is not merely about returning to a pre-disturbance state but involves transformation, adaptation, and long-term sustainability.

Community resilience, as defined by Carlson et al. (2012), is the capacity of a community and its systems to maintain functional relationships despite significant disturbances. The resilience of a community or region is shaped by the strength of its subsystems, including its economy, infrastructure, governance, and social systems.

These perspectives highlight that resilience is not merely about returning to a previous state but involves transformation and adaptation in response to changing conditions. These frameworks highlight key attributes such as social networks, governance structures, resource availability, and economic strategies that contribute to resilience at different scales.

While the broader literature on community resilience provides a strong theoretical foundation, studies focusing specifically on fishing communities in peatland environments are less extensive. Peatlands present a unique set of challenges, including fluctuating water levels, biodiversity loss, and vulnerability to climate change (Goldstein et al., 2020). Fishing communities in these environments rely heavily on traditional ecological knowledge and adaptive strategies to sustain their livelihoods (Syakina et al., 2024a). Research from Southeast Asian peatland regions, such as in Indonesia and Malaysia, offers comparative insights into how local communities cope with similar challenges. For example, Wildayana and Armanto (2018) highlight how peatland-dependent communities integrate traditional fishing methods with resource management practices to maintain ecological balance and economic stability. Similarly, Nguyen and Akerkar (2020) discuss the role of governance and institutional support in enhancing community resilience, emphasizing the need for localized policies that address environmental degradation and livelihood vulnerabilities.

Building on these studies, this research adopts and adapts the frameworks proposed by Vatria et al. (2019), Tan (2021), Fenxia (2021), and Maybery (2009) to examine the specific resilience mechanisms of fishing communities in South Sumatra's peatlands. Each of these studies identifies core elements of resilience, such as economic stability, social cohesion, governance structures, and environmental

adaptability. However, these frameworks were developed in different geographic and socioeconomic contexts, requiring adjustments to fit the realities of peatland fishing communities. Vatria et al. (2019) focus on institutional roles in community resilience, a perspective that is particularly relevant for understanding how government interventions impact peatland fisheries. Tan (2021) and Fenxia (2021) emphasize social and economic aspects, which are critical in assessing how fishing communities navigate livelihood uncertainties. Maybery (2009) highlights the significance of social assets and economic resources, elements that are essential for sustaining peatland-based livelihoods.

This study seeks to bridge existing knowledge gaps in the resilience literature by integrating them. Unlike previous research, which often examines resilience in agricultural or urban settings, this study focuses specifically on the intersection of peatland ecosystems, fishing communities, and socioeconomic sustainability (Robertson et al., 2021). The findings will provide a nuanced understanding of how South Sumatran fishing communities build resilience through traditional knowledge, resource management, and social networks. Furthermore, by comparing these findings to other Southeast Asian peatland studies, the research aims to highlight both shared challenges and localized adaptations, contributing to a broader discourse on resilience in environmentally sensitive regions.

This research underscores the importance of linking theoretical discussions to real-world applications. While the definition of resilience has been extensively debated in academic literature, its manifestation in peatland fishing communities requires an approach that considers ecological constraints, governance dynamics, and socioeconomic structures (Nguyen & Akerkar, 2020). The study aims to offer practical insights into how communities sustain their livelihoods, adapt to environmental

uncertainties, and navigate institutional frameworks. The conceptual framework used is the pillars of community resilience, which are social, economic, and ecology or environment. The discussion in the following sections will further explore these elements, emphasizing the role of community resilience in shaping the sustainability of peatland fisheries.

2.1.2 Fishing Communities in Peatland

Understanding the resilience of fishing communities in peatland ecosystems requires an in-depth exploration of the complex socioeconomic and environmental dynamics that shape their livelihoods (Schulz et al., 2019). Peatland fisheries are a crucial source of sustenance and income for local communities, yet they are increasingly threatened by ecological degradation, hydrological changes, and socioeconomic pressures (Seminara et al., 2023). This research situates itself within the broader discourse on sustainable fisheries in tropical peatlands, building on existing studies that examine both the challenges and adaptive strategies of fishery-dependent communities (Syakina et al., 2024a). While research on peatland fisheries has grown in recent years, much of the focus has been on conservation and hydrology rather than on the lived experiences and adaptive capacities of the people who rely on these ecosystems (Syakina et al., 2024a).

Several studies have explored the socioeconomic importance of fisheries in peatlands, particularly in the context of livelihood sustainability. Seminara et al. (2024) highlight how tropical peatland conservation efforts often clash with the immediate livelihood needs of local communities. The delicate balance between preserving intact peat swamp forests for carbon storage and ensuring food security and economic stability remains a significant policy challenge. Similarly, Lupascu et al. (2023) emphasize that declining fish populations due to peatland degradation directly affect