A STUDY ON COMMUNITY RESILIENCE AMONG COASTAL COMMUNITY IN ERNAKULAM DISTRICT

PROJECT SUBMITTED

TO

ST TERESA'S COLLEGE (AUTONOMOUS), ERNAKULAM.

Affiliated to

MAHATMA GANDHI UNIVERSITY, KOTTAYAM

IN PARTIAL FULFILLMENT OF THE REQUIREMENT

FOR THE AWARD OF THE DEGREE OF

BACHELOR OF ARTS IN ECONOMICS

Anjana K R	**Reg No: AB22ECO005**
Niranjana Pradeep	**Reg No: AB22ECO012**
Amala Laiju C	**Reg No: AB22ECO019**
Anagha Renjan	**Reg No: AB22ECO037**
Sandriya O S	**Reg No: AB22ECO058**

UNDER THE GUIDANCE OF

Ms. SREETHI KRISHNAN U

ASSISTANT PROFESSOR, DEPARTMENT OF ECONOMICS,

ST TERESA'S COLLEGE (AUTONOMOUS), ERNAKULAM

March 2025

CERTIFICATE

This is to certify that the project titled "**A STUDY ON COMMUNITY RESILIENCE AMONG COASTAL COMMUNITY IN ERNAKULAM DISTRICT**" Submitted in partial fulfillment of the requirement for the award of the degree of Bachelor of Arts in Economics to **St. Teresa's College (Autonomous) (Affiliated to Mahatma Gandhi University, Kottayam)** is a Bonafide record of the work done by the project group under my supervision and guidance.

Head of the Department

Dr. Anupa Jacob

DEPARTMENT OF ECONOMICS
ERNAKULAM
Pin - 682 011
ST. TERESA'S COLLEGE

Guide and Supervisor

Ms. Sreethi Krishnan U

Name and Signature of External Examiner: Linda George

DECLARATION

We hereby declare that the project **"A STUDY ON COMMUNITY RESILIENCE AMONG COASTAL COMMUNITY IN ERNAKULAM DISTRICT"** submitted by us for the B.A. DEGREE IN ECONOMICS is our original work.

Signature of the Supervisor

Ms. Sreethi Krishnan U

Signature of the candidates

Anjana K R

Niranjana Pradeep

Amala Laiju C

Anagha Renjan

Sandriya O S

ACKNOWLEDGEMENT

First of all, we are grateful to God Almighty for his blessings showered upon us for the successful completion of the project.

We would like to acknowledge Dr Alphonsa Vijaya Joseph, Principal of St Teresa's College (Autonomous), Ernakulam for providing the necessary encouragement and infrastructure facilities needed for us.

We would like to thank Dr Anupa Jacob, Head of the Department, for her assistance and support throughout the course of this study for the completion of this project.

We are grateful to our guide Ms. Sreethi Krishnan U, Department of Economics, St. Teresa's College (Autonomous), Ernakulam for her valuable guidance and encouragement in completing this work.

Finally, we would like to thank the respondents of our questionnaire who gave their precious time from work to answer our questions.

Anjana K R

Niranjana Pradeep

Amala Laiju C

Anagha Renjan

Sandriya O S

A STUDY ON COMMUNITY RESILIENCE AMONG COASTAL COMMUNITY IN ERNAKULAM DISTRICT

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CHAPTER 1

INTRODUCTION OF COMMUNITY RESILIENCE IN COASTAL AREAS

1.1 INTRODUCTION

Coastal communities are often struck by natural disasters, rising sea levels, and other climate hazards. As the intensity and frequency of these events increase, governments, businesses, and the general population must enhance their resilience to minimize the impact of the situations. The challenges faced by coastal areas around the world are due to climate change, natural disasters, environmental degradation, and socioeconomic pressures. This brings the importance of community resilience in coastal areas, which is not only the physical and economic recovery but also social unity, mental wellness, and sustainable development. The Ernakulam district of Kerala, located along the Arabian Sea coast; is known for its rich cultural heritage, fishing communities, and diverse ecosystems such as backwaters, mangrove forests, and wetlands, which is a way of livelihood but also protects against storms and coastal erosion. However, this region is prone to natural risks like extreme weather events like storms, heavy floods, and erosion. Therefore, understanding and enhancing community resilience is crucial for mitigating the impacts of coastal disasters.

The capacity of people who are affected by crises, disasters, and underlying vulnerabilities to anticipate, plan for, and minimize the impact of shocks and pressures, as well as to cope with and recover from such impacts without endangering their future prospects, is known as community resilience. (Antronico et al., 2020). By actively influencing and planning for the economic, social, and environmental changes that lead to a community's overall adaptive potential, resilient communities can recover from challenging situations. (Cayamanda, 2020). Resilience is not just a capacity to bounce back to the previous state but also involves a transformation and adaptation into new circumstances that lower the risks in the future (Magis, 2010). It is crucial to build resilience among communities, especially in those areas that are prone to environmental hazards and climate change, which can alter the current state of life.

Community resilience is necessary because of the unique challenges faced in these areas. Coastal towns are frequently at the forefront of climate change due to the increased frequency of extreme weather, which is directly impacted by rising sea levels and results in socioeconomic fallout (Berkes & Ross, 2013). Coastal communities are dependent on natural resources for their livelihood, which makes them vulnerable to environmental changes (Adger, 2000).

Ernakulam District of Kerala is a southern state of India that is home to a wide stretch of coastline and a variety of industries such as fishing, agriculture, and tourism. The area is prone to multiple instances of flooding, coastal erosion, and cyclones in recent times (Menon et al., 2016). These events have not only disrupted the livelihood of people but also encouraged the need for community resilience to protect and sustain the community.

Community resilience gained attention in recent years due to the devastating floods of 2018 and 2019, which highlighted the state's vulnerability to extreme weather conditions. The floods resulted in widespread destruction, displacing thousands of people from their homes and causing significant damage to infrastructure and livelihood (Thomas et al., 2020). A greater emphasis on comprehending and constructing community resilience resulted from the aftermath of these disasters, especially in coastal communities, which were affected the most. The coastal populations in the district face socioeconomic pressures like unemployment, migration, and the loss of traditional livelihoods, along with the physical effects of climate change. Studies on community resilience in the coastal regions of Ernakulam will not only provide light on the resilience situation now but will also identify the critical elements that either support or undermine resilience in these communities (Aldrich & Meyer, 2015).

The floods of 2018 and 2019 highlighted the state's vulnerability to extreme weather conditions, which resulted in widespread destruction, displacing thousands of people from their homes and causing significant damage to infrastructure and livelihood (Thomas et al., 2020). The aftermath of this disaster was giving importance to comprehending and reconstructing community resilience. These areas faced various socioeconomic problems like unemployment, migrations, loss of traditional livelihood, and climate change. A study on community resilience in Ernakulam district will not only provide light on the resilience situation but will also identify the critical elements that support or undermine resilience in these communities (Aldrich & Meyer, 2015).

1.2 LITERATURE REVIEW

Distinctive challenges are faced by coastal areas due to its geographical nature, socioeconomic dependency on marine resources and vulnerability to natural hazards. Ernakulam district is located among the extensive coastline along the Arabian Sea, whose livelihood depends on fishing tourism and other marine activities. However it is exposed to many challenges like cyclones, coastal erosion, sea level rise, socioeconomic disparities etc. This review therefore explain the socioeconomic aspect of these communities and examine the factors that affect the resilience

As the consequences of economic development and globalization lead to an increase in the frequency and impact of natural disasters, the concept of community resilience has returned as a viable method for encompassing risk reduction strategies that emphasize community ownership, security, and support systems. Solidarity, organization, adaptive capacity, and information dissemination are key elements of community resilience.

Community resilience is an important concept that explains the concept of challenges faced by the population due to environmental shocks or socioeconomic disruptions, concerning environmental change, depletion of resources, and human action it is important to increase resilience in coastal areas, (Adger et al., 2005). Adaptation includes several behaviors done by individuals, groups, and governments based on social norms and frameworks of institutions. In this regard, efficient adaptation is often defined as measures that increase weather-handling capacities and manage resources, lest some promote short-term initiatives while compromising long-term resilience (Adger, 1999; Turner et al., 2003). Insofar as decisions that treat it solely as a technical matter may often frustrate genuine adaptations in practice, it is thus critical that local and wider regulatory regimes develop interactions (Adger et al., 2005).

Similarly Cutter et al. (2008) explains the integration of social, economic and infrastructure initiatives that address mitigating and enhancing adaptive capacity. Rising sea levels and storms are major threat and site specific contingencies for coastal communities.

As far as coastal regions are concerned, community resilience encompasses coping strategies with stresses brought about by climatic and natural disasters. Adger (2000) asserts that community

coping capacity, diversity in livelihood, and equity in resource distribution are all supported by evidence.

Norris et al. (2007) described community resilience as composed of adaptive capacities like economic development, social capital, and information sharing, which contribute to the ability of a community to withstand and recover from shocks. It emphasizes the importance of mobilizing local communities to engage in disaster mitigation work and to build organizational linkages that serve as a tool kit of social support. He also states that resilience is not merely the combination of strengths on an individual level rather both the strengths and weaknesses of community resilience are manifestations that flow from shared experiences and resources. The convergence of social capital, economic development, and community capacity for disaster mitigation is presented by Norris et al. (2007). To improve resilience and ensure health, stakeholders must be involved and communicate well.

There is a complex relationship between environmental challenges and socioeconomic patterns. Coastal areas face unique vulnerabilities due to climate change, which mainly affects marine resources and communities' livelihoods. According to (Shyam et al., 2019) coastal communities are more prone to climate change than inland areas which makes the coastal community vulnerable globally, in addition to growing population pressure and demand for marine proteins. The changing climatic conditions like sea level rise, shifting sea water temperature, and current patterns, may benefit for some, but harm others. Therefore climatic changes pose a great threat to the fisher communities whose livelihood is dependent on the sea which may threaten their economic stability, food security, employment pattern.

Holling (1973) in his paper Resilience and stability of ecological systems studied the concept of resilience and stability in ecological systems and distinguished them on the basis of a number of criteria. Resilience is the system’s capacity to endure shocks and preserve connections within its network, whereas stability is the system’s capacity to return to equilibrium state from a disturbance. It supports the theory that, in stark contrast to equilibrium-based ecological models, such complex ecosystems may exhibit considerable resilience during fluctuation. Holling explains that in order to guarantee sustainable resource usage the management should focus on resilience rather than stability and stresses the significance of comprehending natural basins of attraction.

Gallopín, G. C. (2006) in his study Linkages between vulnerability, resilience, and adaptive capacity examined the mutual involvement of vulnerability, resilience, and adaptive capacity within the socio-ecological systems. The paper explains the systematic framework for drawing connections, adaptive capacity to the ability to change, vulnerability to the risk of damage, and resilience to the ability to withstand disruption. A unified conceptual framework would enhance global change research and policy analysis.

Brown (2013) explains the evolving discourse on resilience in the context of global environmental change, which is gaining currency in measures of policy and the academic domain. The critique leveled by the study focuses on resilience for failing to theorize its social dimension deeply and for ignoring issues of power. Brown notes emerging themes of community resilience, transformation, and resilience as a platform for radical change. It notes unresolved tensions between normative and analytical approaches to resilience. Resilience is gaining wider acceptance while concerns about its conceptual vagueness and propensity to reproduce existing inequalities continue. The study suggests that more inclusive approaches that integrate social, political, and cultural concerns into resilience frameworks should be considered.

According to Ostrom (2009), a general framework for understanding the sustainability of any social-ecological system (SES) exists. This study puts such conventional beliefs regarding the inability of resource users to self-organize to the test, arguing that while local governance may contribute to sustainability in some cases, government measures would further threaten escalating resource degradation. The framework specifies the relevant subsystem variables that can influence self-organization, such as the size of resources, governance, and social constraints. Ostrom insists on building the case for interdisciplinary research with bespoke policies instead of blanket solutions. The study points out that management for the sustainability of any SES depends on the dynamic interplay of ecological and social components.

According to Fabbricatti et al. (2020), cultural heritage reinforces community resilience in what they term, "Heritage Community Resilience." The study emphasizes the contribution made through heritage practices. This consists of enhanced social cohesion, disaster risk reduction, and sustainable urban development as learned in case studies taken from the inner peripheral areas of

Italy. The research goes further to identify key players, governance frameworks, and approaches bettering resilience. Results suggest cultural heritage will spur innovation, economic diversification, and participatory governance. The study recommends integrative policies that build a connection between heritage conservation and community sustainability for better growth.

Smit and Wandel (2006) explore adaptation, adaptive capacity, and vulnerability in the context of climate change. These responses are implicated further through both environmental and social aspects towards reducing community vulnerability. The study identifies four approaches to adaptation research: impact assessments, adaptation evaluations, vulnerability indices, and participatory assessment of vulnerability. They emphasize the need to accomplish adaptation into general resource management and development programs.

1.3 SCOPE OF THE STUDY

The study aims to evaluate community resilience by assessing the socio-economic profile which includes their general living standards income levels, employment, education, access to resources, and economic stability, and also looks at the main elements that either support or undermine resilience, including social trust, government efficacy, collective efficacy, and readiness for disasters, by concentrating on Vypin and Fort Kochi which represent different coastal demographics. The findings will help in developing policy recommendations and resilience strategies that enhance the capacity of these communities to withstand and recover from disruptions caused by climate change, economic instability, and natural disasters.

1.4 THEORETICAL FRAMEWORK

Community resilience is defined as the ability to resist and recover from a disaster, crisis, or disturbance through the use of social, economic, and natural resources to endure suffering.

Cutter et al. (2008) proposed a place-based model to understand community resilience, which identifies the key dimensions that contribute to a community's capacity to survive natural disasters,

which include ecological, social, economic, institutional, infrastructure and community competence

The components for community resilience include both physical and perpetual, where physical elements include infrastructure, economic resources, availability and access to service and individuals' perceptions like trust, leadership and previous experience play an important role in shaping perceptions of resilience (Ungar, 2011).

Although there have been various theoretical models and instruments developed for the assessment of community resilience, it is nevertheless true that there is a gap in actualizing resilience assessment at the local level (Cutter et al. 2008). Problems arise due to the excess of orientations and approaches for assessing resilience; these impede the development of standardized tools. Various instruments have filled this void, including the Community Resilience Assessment (CART) and other field-tested tools; however, the measurement and monitoring of resilience is still an arduous process because of the multifaceted and multi-dimensional nature of resilience.

The Conjoint Community Resiliency Assessment Measure (CCRAM) integrates multiple theoretical models to provide a comprehensive tool for assessing community resilience. Developed through mixed methods, CCRAM evaluates community perceptions and provides valuable insights for decision-makers, contributing to resilience-building initiatives (Cohen et al., 2013; Cutter et al., 2008).

1.5 LIMITATION OF THE STUDY

The study is limited to Ernakulam, therefore it does not represent the resilience of the whole coastal community

The study is based on the self -reported data from surveys and interviews, which may be biased or inaccurate.

1.6 STATEMENT OF PROBLEM

The resilience levels of coastal communities mainly depend upon the climatic conditions and socioeconomic challenges. Although numerous efforts have been taken to support the community, the current level of resilience is still unknown. The research aims to explore the essential factors that support or limit resilience in coastal homes.

1.7 OBJECTIVES

1. To identify the socioeconomic status of coastal communities in Ernakulam district.

2. To identify the main factors promoting or hindering community resilience

1.8 METHODOLOGY

The study is conducted to analyze the significance of community resilience among coastal Areas of Ernakulam. Here only primary sources are used for data collection. Primary data is collected from 40 samples. Snowball sampling is a non-probability sampling technique that relies on referrals to build a sample, making it especially useful for reaching hard-to-access populations. This method leverages social networks, where initial participants identify and refer to others, creating a chain reaction that facilitates data collection. We used snowball sampling to collect data from households in Fort Kochi and Vypin, part of the Kochi Municipal Corporation in Ernakulam district.

Primary data was collected using a structured questionnaire, and the responses were analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics such as percentages summarized the data, and regression analysis was conducted to identify significant predictors of community resilience. To evaluate their impact on community resilience, the regression model took into account socioeconomic factors (income, education, and occupation), disaster impacts (income loss from disasters, coping mechanisms), and governance-related factors (social cohesion,

preparedness levels, and trust in local authorities). The study sought to determine the main elements that support or undermine resilience through simple regression analysis

To quantify community resilience, the study utilized the Conjoint Community Resiliency Assessment Measure (CCRAM), which assesses five key dimensions: leadership, collective efficacy, preparedness, place attachment, and social trust. Responses were recorded on a Likert scale, where Strongly Agree = 5, Agree = 4, Neutral = 3, Disagree = 2, and Strongly Disagree = 1. The composite resilience score was calculated by averaging the scores of all five dimensions. The following formula calculates the scores:

$$\frac{\text{The sum of scores of respondents for each statement in the variable}}{\text{(Maximum score x number of statements)}}$$

The composite score of each variable was found and a further average was taken to find out the Community resilience score. These composite scores were categorized into three levels: Low Resilience (1.0 – 2.5), Moderate Resilience (2.6 – 3.5), and High Resilience (3.6 – 5.0). This scoring method provided a structured approach to measuring resilience and allowed for comparative analysis between different respondent groups.

The first set of questions analyze the socioeconomic factors of community resilience. These questions provide a thorough understanding of households' economic stability and resilience by measuring their income ranges, primary and alternative sources of income, education levels, and coping strategies during income disruptions. In the next set of questions, the Conjoint Community Resiliency Assessment Measure (CCRAM) will be the primary assessment technique; quantitative surveys will be integrated with qualitative interviews under its framework (Leykin et al., 2013). CCRAM examines five important dimensions of resilience: leadership, collective efficacy, preparedness, place attachment, and social trust. The data is collected through face-to-face and online surveys of a representative sample of citizens in Vypin and Fort Kochi.

1.9 SCHEME OF STUDY

The first chapter consists of a general introduction, the need for the study, the objective of the study, the scope of the study, methodology, limitations, and a review of the literature.

The second chapter consists of an overview of community resilience, the advantages of community resilience and various other aspects related to community resilience.

The third chapter consists of a detailed graphical study of the responses received from the questionnaire.

The fourth chapter includes the findings, recommendations, and conclusion of our study.

The last part of the study includes the appendix.

CHAPTER 2

COMMUNITY RESILIENCE IN COASTAL AREAS AN OVERVIEW

2.1 What is Community Resilience?

The capacity of a community to adapt to, withstand and recover from adverse circumstances like natural disasters like rising sea level, earthquakes, floods or social problems like economic collapse, pandemics or civil unrest by using resources such as food, energy, communication, transportation and so on, is called community resilience.[1] Resilience is not merely "bouncing back" to how things were but instead could mean coming together as a more adaptive and potentially stronger community afterward. A community can overcome any crisis and rebuild both economically and physically by implementing a clear strategy into action. The experience of losses and traumas as a characteristic of adults, residing otherwise normal situations, ability to function with relatively stable healthy levels of psychological and physical functioning, capacity for generative experiences, and having a breadth of positive emotions after suffering an intensely isolated shock, like the death of a close relative or a violent or life-threatening predicament explain the resilience level.[2]

Resilience is derived from the Latin resalire, to spring back, has become an important term in the language of many disciplines ranging from psychology to ecology. It is an attribute of the community and is an inherent and dynamic part of the community. Developing community resilience benefits disaster planners and community members alike. Community resilience expands the traditional preparedness approach by encouraging actions that build preparedness while also promoting strong community systems and addressing the many factors that contribute to health.

An example of community resilience can be seen in the fishing villages of Kerala, which were severely impacted by the 2004 Indian Ocean tsunami demonstrated remarkable resilience by leveraging traditional knowledge, cultural practices, and strong social bonds to rebuild their lives.They established cooperative societies to pool resources, provided mutual support for

[1] Norris, F. H., Stevens, S. P., Pfefferbaum, B., Wyche, K. F., & Pfefferbaum, R. L. (2008). Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. *American Journal of Community Psychology, 41*(1–2), 127–150.

[2] Bonanno, G. A. (2004). Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? *American Psychologist, 59*(1), 20–28.

families in need, and lobbied for government aid to improve disaster preparedness. Matsyafed, the cooperative federation in Kerala, was designated as the nodal agency for rehabilitation measures in the affected coastal areas, playing a pivotal role in coordinating efforts to restore livelihoods and improve disaster preparedness.[3]

2.2 Geographical Nature of Vypin and Fort Kochi

2.2.1 Vypin

Vypin[4] is an island which is part of the large set of islands in the Kochi region and is situated in the Ernakulam district of the Indian state of Kerala. It is a vital component of the Kochi metropolitan area because of its close proximity to the city. The island's positioning between the backwaters to the east and the Arabian Sea to the west significantly improves its lush scenery and stunning coastline. The island, which is a member of the Vypin Island group, is linked to the mainland using a variety of bridges and ferry services. The Goshree Bridge is the most significant of these links simply because it joins Vypin to Kochi directly, giving access and transportation easier for tourists as well as residents.

The island of Vypin is of moderate size and has an unique landscape. There are numerous backwaters spread throughout the flat plain, mangrove forests, and coastal areas that characterise the topography. The island's ecosystems are benefited by these bodies of water, thereby rendering it an extremely significant ecological area. Unlike coastal Kerala, Vypin has a tropical, monsoon-driven climate. All year long, the island enjoys moderate to high temperatures, frequent rainfall, and high humidity. The island's ecosystem and farming techniques are influenced by the intense rains that occur during the monsoon period, which extends from June to September. Vypin is economically vital to the maritime industry in this region. Significant ports and industrial hubs such as the renowned Kochi Port, one of India's busiest ports, are situated on the island. Vypin has become an essential location for maritime trade as well as commerce. The island's economy additionally depends heavily on agriculture and fishing, with the lush topography permitting a range of cultivation techniques.

[3] https://www.matsyafed.in
[4] https://en.wikipedia.org/wiki/Vypin

Vypin is well-known for its breathtaking beauty on top of its economic importance. Popular sandy spots like Cherai Beach attract both locals and tourists due to the island's picturesque coastlines and plenty of flora. Vypin is a major physical and cultural region in the Kochi area because of its lush surroundings, financial significance, and accessible

2.2.2 Fort Kochi

Fort Kochi[5], located in the city of Kochi in Kerala, holds both historical and geographical significance. Situated on the southwestern coast of India, it lies at the entrance of the Kochi Harbor, bordered by the Arabian Sea to the west and the backwaters of Kochi to the east. This strategic location has not only shaped the region's rich history but also contributed to its vibrant culture and natural beauty. Fort Kochi is part of a group of islands within the Kochi region, positioned on a small peninsula of the mainland. The surrounding islands, such as Vypin and Willingdon, enhance the geographical character of the area, making it easily accessible by water transport. The island nature of Fort Kochi has shaped its unique identity and continues to influence both its infrastructure and its tourism appeal.

The coastal geography of Fort Kochi is another defining feature. Located on the Arabian Sea, the area boasts a distinct coastal landscape characterized by sandy beaches, docks, and piers. Its proximity to the sea has heavily influenced the region's culture and history, particularly in maritime trade. Fort Kochi's picturesque waterfront is famous for traditional Chinese fishing nets that are still in use today, giving the area a unique charm that attracts visitors from around the world. To the east, Fort Kochi is bordered by a network of interconnected lagoons, lakes, and rivers known as the backwaters. These backwaters play a critical ecological role, providing rich biodiversity and supporting activities like fishing, agriculture, and eco-tourism. The backwaters also serve as a natural buffer against the sea, maintaining environmental balance and adding to the region’s scenic beauty.

The tropical climate of Fort Kochi is influenced by the monsoon season and the coastal setting. The region experiences high humidity and warm temperatures year-round, with the southwest monsoon bringing heavy rains between June and September. The monsoon season significantly

[5] https://en.wikipedia.org/wiki/Fort_Kochi

affects the local ecosystem, influencing both the flora and fauna as well as agricultural practices. However, the cool sea breeze offers a pleasant respite from the heat, making Fort Kochi an inviting destination for most of the year. The area's rich ecological features, such as mangrove forests and coastal vegetation, support a wide range of wildlife and attract bird species, making it a popular destination for eco-tourism.

Historically, Fort Kochi's geographical position has been crucial to its development as a major port and trading center for centuries. The region was first under the rule of the native Kochi kings, followed by the Portuguese, Dutch, and finally the British. Its location on the coast made it a strategic point for maritime trade, particularly in spices, which were once in great demand across Europe and Asia. This history of trade and cultural exchange has left behind a legacy of historical landmarks that further contribute to Fort Kochi's cultural vibrancy.

In conclusion, the geographical nature of Fort Kochi is defined by its coastal location, proximity to the Arabian Sea, and the surrounding backwaters. These natural features, along with the area's historical significance and rich biodiversity, make Fort Kochi a culturally vibrant and ecologically important region in Kerala. Its combination of scenic beauty, historical landmarks, and maritime heritage continues to make it a unique and crucial part of the coastal geography of India.

2.3 Key Elements of Community Resilience

2.3.1 Leadership

Leadership plays a crucial role in building community resilience by guiding decision-making, mobilizing resources, and fostering collaboration among stakeholders. Effective leadership ensures that disaster preparedness, response, and recovery efforts are well-coordinated and inclusive. Strong leadership enhances a community's adaptive capacity by facilitating communication, promoting social cohesion, and ensuring equitable resource distribution.[6]

[6] Norris, F. H., Stevens, S. P., Pfefferbaum, B., Wyche, K. F., & Pfefferbaum, R. L. (2008). Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. *American Journal of Community Psychology, 41*(1–2), 127–150.

Leaders, whether formal (government officials, emergency managers) or informal (community organizers, local influencers), help in strengthening resilience by encouraging proactive planning, empowering local populations, and advocating for necessary policies and infrastructure improvements. In times of crisis, decisive and transparent leadership improves trust and cooperation, leading to more effective disaster management and long-term recovery.

2.3.2 Collective Efficacy

Collective efficacy refers to a community's shared belief in its ability to work together to overcome challenges, including disasters. It plays a crucial role in community resilience by fostering mutual support, cooperation, and coordinated action during crises. Community members are more likely to take part in preparedness exercises, support one another in times of need, and share accountability for recovery when there is a high degree of collective efficacy.

Collective efficacy is built through shared experiences, trust, and successful collective actions. Communities with strong social ties and a sense of responsibility are more likely to engage in proactive disaster preparedness and response. Strengthening community networks and encouraging civic participation enhance a community's ability to adapt and recover from disasters. By fostering trust and cooperation, collective efficacy empowers communities to mobilize resources, advocate for disaster resilience policies, and create sustainable recovery plans.

2.3.3 Preparedness

Preparedness[7] is a fundamental aspect of community resilience, enabling individuals, families, and governments to anticipate and mitigate the effects of disasters. Effective preparedness involves developing emergency response plans, conducting risk assessments, and implementing mitigation measures to reduce vulnerabilities. Engaging community stakeholders in pre-disaster planning and conducting practice drills help enhance awareness and readiness. Disaster risk reduction is also aided by preventative measures like moving infrastructure out of high-risk locations and fortifying buildings against possible dangers. Overall, a well-prepared community can respond more

[7] Patel, S. S., Rogers, M. B., Amlôt, R., & Rubin, G. J. (2017). What do we mean by "community resilience"? A systematic literature review of how it is defined in the literature. *PLOS Currents: Disasters.*

efficiently to crises, minimize harm, and recover more sustainably, ensuring long-term resilience against future disasters.

2.3.4 Place Attachment

Place attachment[8] as a key factor in community resilience, emphasizing its role in fostering social connections, collective action, and long-term recovery efforts. Place attachment strengthens resilience by deepening individuals' emotional and cultural ties to their community, encouraging them to engage in disaster preparedness, mitigation, and rebuilding efforts. The study suggests that communities with strong place attachment demonstrate higher levels of cooperation and self-sufficiency, as residents are more invested in protecting and restoring their environment after a disaster. By reinforcing local identity and social networks, place attachment contributes to a community's overall ability to adapt, recover, and sustain itself in the face of adversity.

2.3.5 Social Trust

Social trust plays a crucial role in strengthening community resilience by fostering cooperation, mutual support, and collective action before, during, and after disasters. Trust within a community enhances communication, facilitates resource-sharing, and encourages individuals to follow emergency guidelines and participate in disaster preparedness efforts. High levels of trust between residents and institutions, such as local governments and emergency responders, contribute to more effective disaster response and recovery. When people trust that authorities and their fellow community members will act in their best interest, they are more likely to engage in collaborative problem-solving and recovery initiatives. Social trust also helps reduce misinformation and panic, ensuring that communities can work together efficiently to rebuild and adapt after a crisis. By strengthening relationships and fostering a culture of reliability and cooperation, social trust becomes a key pillar of resilience, enabling communities to navigate challenges with greater cohesion and confidence.

[8] Norris, F. H., Stevens, S. P., Pfefferbaum, B., Wyche, K. F., & Pfefferbaum, R. L. (2008). Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. *American Journal of Community Psychology, 41*(1–2), 127–150.

2.3.6 Local Knowledge

A crucial aspect of community resilience is local knowledge, which involves understanding and addressing vulnerabilities at the community level. It is built through an understanding of existing vulnerabilities and taking proactive steps to address them before a disaster occurs. By strengthening resilience, communities can better withstand hardships and recover more effectively. Three key sub-elements contribute to local knowledge is:

2.3.6.1 Factual Knowledge Base

This includes the information, education, and experience that a community has regarding disasters. It involves learning specific disaster preparedness skills, such as first aid, mitigation strategies, and recovery processes. A well-informed community is better equipped to handle disasters efficiently.

2.3.6.2 Training and Education

Educating the public on disaster preparedness is essential for resilience. Effective practices such as integrating disaster education into school curricula, providing early warning systems, and using media for risk communication. Additionally, conducting community training and simulation exercises strengthens preparedness and enhances the ability to respond effectively.

2.3.6.3 Collective Efficacy and Empowerment

This refers to a community's shared belief in its ability to recover from disasters through self-reliance. Resilience can be strengthened by improving personal and community preparedness, fostering civic responsibility, encouraging bystander response, and promoting self-sufficiency. A community that understands how to mobilize its own resources can better navigate disaster recovery.

2.3.7 Resources

Resources[9] play a vital role in enhancing community resilience by ensuring that individuals and groups have access to essential supplies and support systems before, during, and after disasters. Tangible resources such as food, water, shelter, and medical supplies are crucial for immediate survival, while technical resources like transportation, infrastructure, and machinery aid in response and recovery efforts. Beyond physical assets, resilience also depends on the availability of intangible resources such as social networks, financial support, and human capital, contributing to long-term recovery and sustainability.

2.4 Challenges Faced by Coastal Communities

The challenges faced by coastal communities are:

2.4.1 Climate Change and Rising Sea Levels

One of the most pressing issues is climate change and rising sea levels, which result in flooding, erosion, and loss of land. Coastal areas are at risk of submergence, putting homes, infrastructure, and ecosystems in jeopardy. Fort Kochi's Chinese fishing nets face increasing threats from high tides and storm surges. Vypin Island experiences saltwater intrusion into freshwater sources, affecting agriculture and drinking water.[10]

2.4.2 Loss of Biodiversity and Ecosystem Degradation

Critical ecosystems like mangroves and coral reefs act as natural barriers against storms and support marine biodiversity. However, overfishing, pollution, and urban expansion have caused severe degradation. The backwaters of Fort Kochi and Vypin are witnessing a decline in fish

[9] Patel, S. S., Rogers, M. B., Amlôt, R., & Rubin, G. J. (2017). What do we mean by "community resilience"? A systematic literature review of how it is defined in the literature. *PLOS Currents: Disasters.*

[10] Sreekesh, S., Sreerama Naik, S. R., & Rani, S. (2018). Effect of sea level changes on the groundwater quality along the coast of Ernakulam District, Kerala. *Journal of Climate Change*, *4*(2), 51–65. https://doi.org/10.3233/JCC-1800013

populations, affecting traditional fishing practices. Mangrove destruction due to urban expansion and aquaculture weakens coastal protection and biodiversity.

2.4.3 Pollution and Environmental Degradation

Coastal areas suffer from severe pollution due to untreated sewage, plastic waste, and oil spills, harming marine life and threatening livelihoods. Plastic waste accumulation along Fort Kochi and Vypin beaches impacts tourism and marine ecosystems. Sewage and industrial waste dumped into the backwaters lead to harmful algal blooms. Oil spills from fishing boats and cargo ships disrupt delicate marine ecosystems.[11]

2.4.4 Coastal Erosion and Infrastructure Loss

Rising sea levels, overdevelopment, and mining contribute to coastal erosion, leading to land loss and displacement. Erosion in Fort Kochi threatens historical structures and tourism infrastructure. Vypin experiences rapid coastal erosion, leading to loss of land and displacement. Unplanned sea walls alter water flow, worsening erosion in unexpected areas.

2.4.5 Resource Conflicts and Competition

With rising populations, competition for land, water, and fish stocks is intensifying, leading to frequent disputes. Traditional fishing communities compete with commercial fisheries over dwindling fish stocks. Land-use conflicts arise between tourism developers and local residents. Disputes over backwater areas pit tourism activities against traditional fishing practices.

2.4.6 Health Risks and Public Health Challenges

Climate change and environmental degradation increase the spread of waterborne and vector-borne diseases in coastal areas .Monsoon flooding increases cholera and typhoid risks due to contaminated water. Mosquito-borne diseases like dengue and chikungunya are worsened by

[11] Beatley, T. (1991). Protecting biodiversity in coastal environments: Introduction and overview. *Coastal Management, 19*(1), 1–19. https://doi.org/10.1080/08920759109362128

Communities' are better equipped to cope with rising sea levels, extreme weather events, and other climate-related impacts. This involves investments in education and healthcare, promoting efficient resource management, and aligning with government strategies. For example, communities might learn about constructing flood-resistant homes, implementing rainwater harvesting stagnant water and heavy rainfall. Air pollution from traffic and industries affects respiratory health.

2.4.7 Lack of Infrastructure and Basic Services

Many coastal communities suffer from poor infrastructure, inadequate waste management, and lack of clean water access. Inadequate sewage systems cause pollution and health hazards. Limited access to clean drinking water in Vypin worsens during the dry season. Lack of proper seawalls and drainage leaves coastal areas vulnerable to storm surges and flooding.

2.4.8 Displacement and Migration

Rising sea levels, erosion, and economic hardships force coastal residents to migrate to urban areas, straining resources and eroding cultural identity. Families in Fort Kochi and Vypin are displaced due to flooding and erosion. Residents migrate to Ernakulam city in search of better jobs and living conditions. Traditional fishing communities struggle to sustain their livelihoods, leading to loss of heritage.

2.4.9 Overfishing and Unsustainable Practices

Overfishing and illegal fishing methods deplete fish stocks and disrupt ecosystems, threatening food security and the fishing industry. Fish stocks in the backwaters are declining due to overfishing. Illegal trawling in shallow waters damages marine ecosystems. Bycatch from large fishing vessels reduces local fish populations.

2.4.10 Economic Hardships and Limited Opportunities

Coastal communities struggle with poverty, seasonal employment, and lack of investment, making resilience difficult. Dependence on seasonal tourism leaves residents vulnerable to economic

downturns. Limited access to microfinance and skills training hinders economic growth. Lack of infrastructure for sustainable tourism prevents long-term economic development.

2.4.11 Impact of the COVID-19 Pandemic

The pandemic exposed vulnerabilities in high-density coastal settlements, disrupting livelihoods and public health. Lockdowns impacted fishing communities, leading to economic struggles. Migrant workers were stranded, worsening their hardships. Public health measures were difficult to enforce due to congestion and poor sanitation. Tourism collapsed, impacting livelihoods, including artists in the Fort Kochi Biennale.

2.5 Importance of Community Resilience in Coastal Areas

Community resilience is vital for coastal communities, enabling them to recover from the numerous challenges they face and rebuild their lives. It's essential for restoring normalcy after disruptions and fostering long-term well-being. One key aspect is the development of sustainable livelihoods. Resilience supports diversification, reducing dependence on single, often vulnerable industries like fishing. For example, a coastal community might explore eco-tourism, sustainable aquaculture, or renewable energy initiatives like solar power, creating alternative income streams and lessening the impact of fishing restrictions or declining fish populations. It also enhances the adaptive capacity to climate change. Resilient systems, or participating in government-led coastal protection projects.

Protecting and restoring ecosystems is another crucial element. Resilience recognizes the vital role of healthy ecosystems, like mangroves, coral reefs, and salt marshes, in providing natural defenses against storms, supporting biodiversity, and sustaining livelihoods. A resilient community actively participates in mangrove reforestation projects or establishes marine protected areas to safeguard these valuable resources. Disaster preparedness and response are also fundamental. Resilient communities anticipate potential disasters like cyclones, tsunamis, or floods, develop comprehensive preparedness plans, and establish effective response mechanisms. This includes early warning systems, evacuation plans, and community-based search and rescue

teams. For example, a coastal village might have a designated evacuation route, a community emergency response team, and a system for disseminating warnings through mobile phones or local radio.

Health and well-being are significantly enhanced by community resilience. By mitigating environmental stressors that can lead to health problems like waterborne diseases or malnutrition, resilient communities prioritize access to healthcare, sanitation, and clean water. They might establish community health clinics, promote hygiene education programs, or implement water purification systems. Cultural preservation and identity are also strengthened. Resilient communities often possess a strong sense of cultural identity and traditional knowledge, which are valuable assets in adapting to change and overcoming adversity. They might actively preserve traditional crafts, fishing practices, or storytelling, passing this knowledge down through generations. Finally, community resilience is not just about reacting to immediate crises; it's about long-term sustainability. It involves planning for the future, anticipating potential challenges, and building the capacity to adapt and thrive. This could involve developing sustainable coastal management plans, investing in education and skills training, or promoting economic diversification. In short, community resilience is essential for the progress and well-being of coastal communities, enabling them to not only survive but also to flourish in the face of diverse challenges.

2.6 Comparison of Resilience in Coastal vs. Inland Communities

Coastal communities in Vypin and Fort Kochi, unlike their inland counterparts, face distinct challenges that shape their resilience. Coastal areas are highly vulnerable to sea-level rise, leading to increased coastal erosion and flooding which directly threatens homes, infrastructure like roads and bridges, and livelihoods, particularly fishing. For example, rising sea levels can inundate low-lying coastal homes and damage fishing boats and nets. These communities are also susceptible to storm surges and cyclones, events that can cause devastating damage and displacement, necessitating robust disaster preparedness and response mechanisms. Imagine a cyclone hitting Vypin, destroying homes and forcing residents to evacuate. Another critical issue is salinity intrusion, where saltwater contaminates freshwater sources and agricultural land, impacting food

security and livelihoods. For instance, saltwater intrusion can make it difficult to grow crops or access clean drinking water. Finally, many coastal communities heavily rely on fishing, a livelihood vulnerable to overfishing, pollution from industrial or agricultural runoff, and the impacts of climate change on fish populations. Overfishing can deplete fish stocks, while pollution can contaminate seafood, making it unsafe to eat.

Inland communities in Vypin and Fort Kochi, while not directly exposed to sea-level rise, face their own set of challenges. They can experience flooding from rivers and canals due to heavy rainfall and overflowing water bodies. For example, intense monsoon rains can cause rivers to overflow, flooding homes and businesses. These areas are also susceptible to landslides and soil erosion, often exacerbated by deforestation and unsustainable land use practices. Deforestation on hillsides can make the soil unstable, increasing the risk of landslides during heavy rains. Furthermore, inland areas often experience pressures from rapid urbanization and development, which can strain resources like water and sanitation systems and put pressure on existing infrastructure. The rapid construction of buildings and roads can lead to increased runoff and flooding.

Despite these differing challenges, both coastal and inland communities in Vypin and Fort Kochi share some resilience factors. Strong social networks and community bonds, where neighbors help neighbors, play a crucial role in coping with disasters and recovering afterwards. Local knowledge and traditional practices, such as traditional building techniques or water management systems, often provide valuable insights into adapting to the local environment. Community-based organizations (CBOs), like local fishing associations or neighborhood groups, are vital in disaster preparedness, response, and recovery efforts, often organizing relief efforts and distributing aid.

Building resilience in both types of communities requires targeted strategies. Effective early warning systems, like cyclone alerts or flood warnings disseminated through mobile phones or community announcements, are crucial for providing timely warnings about impending hazards. Investing in resilient infrastructure, such as flood defenses, improved drainage systems, and well-maintained evacuation routes, is essential for minimizing damage and facilitating safe evacuation. Promoting livelihood diversification, such as encouraging coastal communities to develop alternative income sources besides fishing, can reduce dependence on vulnerable sectors. Finally, community participation in planning and decision-making processes is paramount. Engaging communities ensures that solutions are appropriate to their needs and sustainable in the long term,

such as involving local residents in the design of flood defenses. By understanding the unique challenges and shared resilience factors, targeted strategies can be developed to enhance the ability of both coastal and inland communities to cope with environmental hazards and build a more sustainable future.

2.7 Rising Importance of Resilience Building

The increasing importance of coastal resilience in Ernakulam is a complex issue driven by the compounding effects of natural and human-induced challenges. Climate change is a major factor, with rising sea levels leading to increased coastal erosion, flooding, and saltwater intrusion, threatening both human settlements and freshwater sources. More frequent and intense weather events, such as cyclones, storms, and heavy rainfall, pose significant risks to life, property, and infrastructure. Shifts in rainfall patterns and rising temperatures can exacerbate water scarcity, floods, and droughts, impacting agriculture, livelihoods, and overall well-being. Rapid urbanization and development in Ernakulam, often occurring without adequate planning, further intensify these vulnerabilities. Uncontrolled construction and encroachment on coastal areas and natural drainage systems worsen flooding and erosion, damaging both residential areas and critical natural habitats. Socioeconomic vulnerabilities also play a crucial role. Many coastal communities depend on fishing, a livelihood directly threatened by climate change and environmental degradation. Poverty and inequality limit access to resources and information, hindering communities' ability to prepare for and recover from disasters. Building resilience in Ernakulam requires a multi-faceted approach. This includes investing in coastal protection structures, flood control systems, and resilient infrastructure development. Robust disaster preparedness measures, such as early warning systems, evacuation plans, and community-based disaster response mechanisms, are essential. Promoting sustainable development through responsible land use practices, sustainable tourism, and environmentally friendly industries is also crucial. Empowering local communities through education, awareness campaigns, and participatory planning is vital for building resilience from the ground up. Finally, protecting and restoring coastal ecosystems like mangroves and wetlands, which provide natural buffers against coastal hazards, is paramount. By prioritizing these strategies – infrastructure improvements, disaster preparedness, sustainable development, community engagement, and ecosystem

restoration – Ernakulam can protect its coastal areas and communities, preserve its natural resources, and ensure a sustainable future in the face of increasing challenges.

2.8 Community Resilience Initiatives in India

Strong communities are the clue to withstanding the effects of Climate change. While sometimes either community resilience is often connected to instant disaster response, productive strategies need sustained planning that addresses unexpected disasters and ongoing challenges. This planning needs to categorize the complete required community, like access to healthcare.

Well-built communities are built by strengthening the different elements that contribute to their well-being. This goes behind simply developing for disasters. It also points to strong social ties and well-built everyday health and community services.

Community resilience in India involves programs that help communities modify and reclaim from unfavorable changes. These initiatives can assist communities increase social bonds and utilize their infrastructure to resist calamities.

2.8.1 Community Conservation Resilience Initiative (CCRI)

The goal of the Community Conservation Resilience Initiative is put up to the performance of the convention on Biological diversity. This strategic plan decided to by providing policies help on essential and suitable forms of bolster up for community conservation. All the communities involved in this report. All the communities are struggling to distant degrees,with a vast scope of internal and external warning that impact the resilience of their Conservation implementation and their dimensions to protect their environment. And also this initiative is sketched to explore the different ways in which communities save biodiversity, and how their essential work can be assisted.[12]

2.8.2 Coalition for Disaster Resilient Infrastructure (CDRI)

[12] Women, Gender and Climate. (n.d.). *Community conservation resilience initiative (CCRI) in India*. Women, Gender and Climate

The Coalition for Disaster Resilient Infrastructure is a popular effort in India that aims to authorize communities to better prepare to respond to calamities. This project was first introduced by the Indian Prime Minister at 2019 UN climate Action Summit as a plan to address the growing challenges created by climate change. The Indian government takes an important step by orderly recognizing CDRI as an International organisation.focuses on significance of Community led Initiative in raising resilience to Disasters. CDRI has also created a dedicated initiative Infrastructure for Resilient Island States (IRIS) which will work to achieve sustainable development through a systematic approach to promote resilient, sustainable and inclusive infrastructure in Small Island Developing States (SIDS).[13]

2.8.3 Community Resilience Resource Centers (CRRC)

The Community Resilience Resource Center is focused on providing support and intermediations established on science, technology, and innovations to strengthen resilience. This Initiative aims not only to prevent and protect disasters it also to encourage self-resilience and sustainable living. CCRC seeks to decrease threats, change challenges, and reduce the impact of calamities. This will help to make sustainable livelihoods and bolster the general well-being of the community. CRRC will work on implementing plans to upgrade the ecological and economic resilience within communities.[14]

2.8.4 Community Based Micro Climate Resilience

By making inexpensive, flood resistant homes customized to require of urban, poor communities in India .Community based micro climate resilience is serving residents modify to the challenges of climate change. The houses are construct with locally obtained bricks and make use of energy efficient technology and implementations .This Initiative not only for Strengthening Resource management and energy conservation,it also organize the wellbeing and security of community members.[15]

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[13] National Disaster Management Authority. (n.d.). *Leadership initiatives: CDRI - A global partnership to reduce disaster risks*. National Disaster Management Authority, Ministry of Home Affairs, Government of India

[14] India Science and Technology. (n.d.). *Community resilience resource centre (CRRC)*. India Science and Technology.

[15] United Nations Framework Convention on Climate Change. (n.d.). *Community-based micro-climate resilience | India*. UNFCCC.

CHAPTER-3

ANALYSIS AND INTERPRETATION OF DATA

3.1 INTRODUCTION

The data analysis in this study examines various aspects of community resilience among coastal communities in Fort Kochi and Vypin, focusing on key socioeconomic and resilience factors. Variables including age distribution, gender, family size, income levels, and employment sources are examined to determine the socioeconomic status of these communities, which provide insights into their economic stability and social structure. Through an assessment of leadership effectiveness, collective efficacy, readiness, place attachment, and social trust within these communities determining the elements that support or undermine community resilience. Through the interpretation of survey data, this analysis identifies their strengths and weaknesses in responding to socioeconomic and environmental concerns.

3.2 SOCIOECONOMIC ANALYSIS

This section examines key socio-economic indicators, including demographic patterns, income distribution, employment sources, education levels, and financial vulnerabilities among the respondents. By analyzing these factors, the study aims to highlight the economic stability and social adaptability of the communities in Ernakulam district.

TABLE 3.1 AGE OF THE RESPONDENTS

Age Group	Number of Respondents	Percentage (%)
18- 30 years	7	17.50%
31-40 years	12	30%
41-60 years	15	37.50%
Above 60 years	6	15%
Total	40	100%

Source: Primary Data

Table 3.1 reveals that the age distribution of the survey respondents is skewed towards middle-aged individuals, with the (67.50%). Younger respondents constitute (17.50%) of the total, while those above 60 years represent the smallest group, at (15%). This data indicates a sample population with a significant representation of individuals in their middle to later working years.

TABLE 3.2 GENDER OF THE RESPONDENTS

Gender	Number of Respondents	Percentage (%)
Male	8	20%
Female	32	80%
Total	40	100%

Source: Primary Data

Table 3.2 reveals that the majority of the survey respondents are female, accounting for (80%) of the total sample, while males constitute only (20%).

TABLE 3.3 FAMILY SIZE DISTRIBUTION

Family Size	Number of Respondents	Percentage (%)
1-2	6	15%
3-5	26	65%
More than 5	8	20%
Total	40	100%

Source: Primary Data

Table 3.3 reveals that the majority of the respondents belong to a medium-sized family of 5 and fewer members (80%), and some of the families consist of more than 5 members with (20%).

TABLE 3.4 MARITAL STATUS

Family Size	Number of Respondents	Percentage (%)
Single	16	40%
Married	22	55%
widowed	2	5%
Total	40	100%

Source: Primary Data

Table 3.4 reveals that the majority of the respondents are married with (55%) and a significant portion of independent individuals of (40%) are singles.

TABLE 3.5 EDUCATION LEVEL DISTRIBUTION

Education Level	Number of Respondents	Percentage (%)
Primary School	16	40%
Secondary School	3	7.50%
Higher Secondary	12	30%
Graduate	8	20%
Post Graduate or Higher	1	2.50%
Total	40	100%

Source: Primary Data

Table 3.5 reveals that a significant portion of respondents completed only primary schooling (40%), while a combined (52.5%) attained at least a higher secondary education, indicating a mixed educational background.

TABLE 3.6 HOUSEHOLD MONTHLY INCOME DISTRIBUTION

Income Range	Number of Respondents	Percentage (%)
Less than ₹5,000	12	30%
₹5,001-₹10,000	7	17.50%
₹10,001-20,000	7	17.50%
₹20,001-₹30,000	9	22.50%
More than ₹30,000	5	12.50%
Total	40	100%

Source: Primary Data

Table 3.6 indicates that a substantial majority (87.5%) of households earn less than ₹30,000 per month.

TABLE 3.7 MAIN SOURCES OF HOUSEHOLD INCOME

Income Source	Number of Respondents	Percentage (%)
Fishing	2	5%
Small business	9	22.50%
Wage labor	26	65%
Remittances	1	2.50%
Government job	1	2.50%
Others	1	2.50%
Total	40	100%

Source: Primary Data

Table 3.7 shows that wage labor is the dominant source of household income, accounting for 65% of respondents. Small businesses provide income for 22.5%, indicating local entrepreneurship, while fishing, a traditional livelihood, represents 5%. Remittances, government jobs, and other sources each contribute 2.5%.

TABLE 3.8 INCOME LOSS DUE TO NATURAL DISASTERS

Response	Number of Respondents	Percentage (%)
Yes	24	65%
No	16	35%
Total	40	100%

Source: Primary Data

Table 3.8 reveals that the majority of respondents, (65%) experienced income loss due to natural disaster, which indicates the economic vulnerability of the community due to environmental shocks.

TABLE 3.9 ALTERNATIVE INCOME SOURCES DURING INCOME LOSS

Income Range	Number of Respondents	Percentage (%)
Borrowing money	25	62.50%
Reducing household expenses	7	17.50%
Migrating for work	2	5%
Changing occupation	1	2.50%
Relying on savings	5	12.50%
Total	40	100%

Source: Primary Data

Table 3.9 reveals that the majority of them, (62.5%) rely on borrowing during financial instability. Most of the households, (17.5%) reduced their expenses while (12.5%) relied on savings. Migration for work and changing occupation during financial instability is the least common way to manage an income loss.

3.3 FACTORS OF COMMUNITY RESILIENCE

This section explores key dimensions of resilience, including leadership, collective efficacy, preparedness, place attachment, and social trust. Leadership effectiveness and governance play a crucial role in ensuring community stability and efficient disaster response. Collective efficacy measures the strength of social networks and the willingness of individuals to support one another during crises. Preparedness assesses the community's ability to anticipate and respond to emergencies through infrastructure, awareness, and resource availability. Place attachment reflects the emotional and cultural ties residents have with their locality, influencing their commitment to rebuilding and sustaining the community. Finally, social trust highlights the confidence people have in their neighbors and institutions, which is essential for cooperation and coordinated recovery efforts.

TABLE 3.10 LEADERSHIP

Item content	Mean		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
1. The municipal authority (regional council) of my town functions well	2.85	Frequency		8	24	2	6	40
		Percentage		20%	60%	5%	15%	100%
6. I have faith in the decision makers in the municipal authority (regional council)	2.925	Frequency		8	21	11		40
		Percentage		20%	52.5%	27.5		100
11. In my town, appropriate attention is given to the needs of children	2.875	Frequency	2	7	19	8	4	40
		Percentage	5%	17.5%	47.5%	20%	10%	100%

15. I have faith in the ability of the elected/nominated head of my town to lead the transit from routine to emergency management of the town	2.85	Frequency	1	11	14	9	5	40
		Percentage	2.5%	27.5%	35%	22.55	12.55	100%
19. The municipal authority (regional council) provides its services in fairness	2.975	Frequency		7	25	8		40
		Percentage		17.55	62.5%	20%		100%
21. The residents of my town will continue to receive municipal services during an emergency situation	3.05	Frequency	3	11	14	9	3	40
		Percentage	7.5%	27.5%	35%	22.55	7.5%	100%

Source: Primary Data

Table 3.10 explains the Leadership factor of the Conjoint Community Resiliency Assessment Measure (CCRAM), explaining the perceptions of governance and trust in municipal authorities, in which each item reflects how respondents view their local leadership ability to manage social cohesion. The mean scores range from (2.85) to (3.05), indicating a generally neutral to slightly positive perception. For instance, (60%) agree that their municipal authority functions well, with a mean of (2.850, while (62.5%) agree that services are provided fairly, with a mean of (2.975). However, there is lesser confidence in trust among decision-makers and those respecting children's needs, with higher neutral and disagree percentages. The highest mean score (3.05) suggests relative confidence in the continuity of municipal services during emergencies, the combination of agreement and neutrality indicates the possibility to improve the public trust and competence of leadership.

TABLE 3.11 LEADERSHIP RESILIENCE SCORE

		Fort Kochi	Vypin	Total
Low	No. Of respondents	2	4	6
	Percentage	10.0	20.0	15.0
Medium	No. Of respondents	2	7	9
	Percentage	10.0	35.0	22.5
High	No. Of respondents	15	9	24
	Percentage	75.0	45.0	60.0
Very high	No. Of respondents	1	0	1
	Percentage	5.0	0	2.5
Total	No. Of respondents	20	20	40
	Percentage	100%	100%	100%

Source: Primary Data

Table 3.11 explains the leadership resilience score, which compares responses from Fort Kochi and Vypin, and indicates the perceived resilience of leadership in these areas. Among the 40 respondents, 60% rated leadership resilience as High, with Fort Kochi showing a stronger positive perception (75%) than Vypin (45%). (22.5%) of respondents rated resilience as Medium, with a higher percentage from Vypin (35%) than Fort Kochi (10%). The Low resilience category included 15% of total respondents, with Vypin again having a larger share (20%) compared to Fort Kochi (10%). Only 2.5% of respondents rated resilience as Very high, with a single respondent from Fort Kochi and none from Vypin. The distribution suggests that Vypins leadership resilience is rated as strong, more variable on the influence level but less confident than that of Fort Kochi, indicating some specific formative efforts needed in this locality.

TABLE 3.12 COLLECTIVE EFFICACY

Item content	Mean		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
2. There is mutual assistance and concern for others in my town	3.025	Frequency	1	8	24	5	2	40
		Percentage	2.5%	20%	60%	12.5%	5%	100%
7. I can depend on people in my town to come to my assistance in a crisis	3.2	Frequency	5	11	14	7	3	40
		Percentage	12.5%	27.5%	35%	17.5%	7.5%	100%
12. There are people in my town who can assist in coping with an emergency	3.05	Frequency	2	11	16	9	2	40
		Percentage	5%	27.5%	40%	22.5%	5%	100%
16. I believe in the ability of my community to overcome an emergency situation	3.25	Frequency	2	16	14	6	2	40
		Percentage	5%	40%	35%	15%	5%	100%
20. The residents of my town are greatly involved in what is happening in the community	3.05	Frequency	3	9	17	9	2	40
		Percentage	7.5%	22.5%	42.5%	22.5%	5%	100%

Source: Primary Data

Table 3.12 explains the Collective Efficacy factor of the Conjoint Community Resiliency Assessment Measure (CCRAM), explaining the perception of mutual support, involvement and

their town's ability to cope with emergencies. The mean scores for this dimension range from 3.025 to 3.25 indicating a moderate level of confidence in the community's collective strength. For instance, (60%) of respondents are neutral about mutual assistance in their town with a mean of 3.025, suggesting a perceived lack of strong communal ties. The highest score of mean of 3.25 reflects a more positive belief in the town's ability to overcome emergencies, with (45%) agreeing or strongly agreeing. Dependability during a crisis also scored relatively high with a mean of 3.2, though 25% expressed doubt, indicating some vulnerability in social trust. Community involvement through a mean is moderate with a mean of 3.05, showing a mix of engagement and disengagement, with 45% either neutral or disagreeing about residents' involvement in local affairs. Although the community is resilient overall, there is still an opportunity to improve participation and support among members to enhance collective efficacy even more.

TABLE 3.13 COLLECTIVE EFFICACY RESILIENCE SCORE

		Fort Kochi	Vypin	Total
Very Low	No. Of respondents	2	0	2
	Percentage	10%	0%	5%
Low	No. Of respondents	0	1	1
	Percentage	0%	5%	2.5%
Medium	No. Of respondents	7	10	17
	Percentage	35%	50%	42.5
High	No. Of respondents	11	6	17
	Percentage	55%	30%	42.5%
Very high	No. Of respondents	0	3	3
	Percentage	0	15%	7.5%
Total	No. Of respondents	20	20	40
	Percentage	100%	100%	100%

Source: Primary Data

Table 3.13 explains the collective efficacy resilience scores, which compares responses from Fort Kochi and Vypin, and indicates perceived mutual support, involvement, and their town's ability to

cope with emergencies. Among the 40 respondents, 42.5% rated collective efficacy as High, with Fort Kochi showing a stronger positive perception (55%) compared to Vypin (30%). The medium category also accounted for 42.5% of the total, with a higher percentage from Vypin (50%) than Fort Kochi (35%), indicating more moderate confidence in collective resilience. Notably, 7.5% of respondents rated collective efficacy as Very high, with all such responses coming from Vypin, while Fort Kochi had none. The Low and Very Low categories together make up 7.5% of the total, with Fort Kochi contributing the larger share (10%) compared to Vypin (5%). This distribution suggests that while Fort Kochi demonstrates stronger overall collective efficacy, Vypin has a notable segment of respondents with high confidence, pointing to the potential for strengthening shared resilience initiatives across both regions.

TABLE 3.14 PREPAREDNESS

Item content	Mean		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
3. My town is organized for emergency situations	3.325	Frequency	5	12	16	5	2	40
		Percentage	12.5%	30%	40%	12.5%	5%	100%
8. The residents of my town are acquainted with their role is in an emergency situation	3.2	Frequency	3	14	14	6	3	40
		Percentage	7.5%	35%	35%	15%	7.5%	100%
13. In my town, there are sufficient public protection facilities (such as shelters)	3.1	Frequency	3	13	12	9	3	40
		Percentage	5%	32.5%	30%	22.5%	7.5%	100%
17. My family and I are acquainted with the emergency system of my town (to be activated in times of emergency)	3.2	Frequency	2	13	18	5	2	40
		Percentage	5%	32.5%	45%	12.5%	5%	100%

Source: Primary Data

Table 3.14 explains the Preparedness factor of the Conjoint Community Resiliency Assessment Measure (CCRAM), explaining how well residents feel their town is equipped for emergencies. The mean scores for this dimension range from 3.1 to 3.325, suggesting a moderate to positive perception of readiness to emergencies. The highest score (3.325) reflects relative confidence in the town's organization for emergencies, with 42.5% agreeing or strongly agreeing, though 17.5% still expressed doubt. Familiarity with emergency roles and systems shows similar patterns, with a mean of 3.2 for both items, where around 45% of respondents are neutral, indicating potential gaps in personal preparedness and awareness. Public protection facilities scored the lowest (3.1), with 30% neutral and 30% disagreeing or strongly disagreeing, highlighting a perceived shortage of essential infrastructure like shelters. Overall, while the town shows moderate emergency preparedness these results suggest that enhancing communication, training, and infrastructure could strengthen community resilience significantly.

TABLE 3.15 PREPAREDNESS RESILIENCE SCORE

		Fort Kochi	Vypin	Total
Very Low	No. Of respondents	2	0	2
	Percentage	10%	0%	5%
Medium	No. Of respondents	9	9	18
	Percentage	45%	45%	45%
High	No. Of respondents	8	9	17
	Percentage	40%	45%	42.5%
Very high	No. Of respondents	1	2	3
	Percentage	5%	10%	7.5%
Total	No. Of respondents	20	20	40
	Percentage	100%	100%	100%

Source: Primary Data

Table 3.15 explains the preparedness scores, which compares responses from Fort Kochi and Vypin, and indicates the communities' readiness to handle emergencies. Among the 40 respondents, 42.5% rated preparedness as High, with a fairly balanced perception between Fort Kochi (40%) and Vypin (45%). The Medium category also accounted for 45% of the total, with equal representation from both Fort Kochi and Vypin (45% each), indicating a significant portion of respondents expressing moderate confidence in their preparedness. Notably, 7.5% of respondents rated preparedness as Very high, with a higher percentage from Vypin (10%) compared to Fort Kochi (5%), suggesting a slightly stronger sense of readiness in Vypin. The Low and Very Low categories together made up 5% of the total, with Fort Kochi contributing the larger share (10%) while Vypin had no respondents in the Very Low category, highlighting a more consistent preparedness level in Vypin. This distribution suggests that while both regions show substantial confidence in their preparedness, Vypin demonstrates a more consistent and higher level of perceived readiness, pointing to opportunities for enhancing preparedness initiatives more uniformly across Fort Kochi.

TABLE 3.16 PLACE ATTACHMENT

Item content	Mean		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
4. I am proud to tell others where I live	3.525	Frequency	7	13	16	2	2	40
		Percentage	17.5%	32.5%	40%	5%	5%	100%
9. I feel a sense of belonging to my town	3.25	Frequency	6	11	13	7	3	40
		Percentage	15%	27.5%	32.5%	17.5%	7.5%	100%
14. I remain in this town for ideological reason	3.075	Frequency	3	8	20	7	2	40
		Percentage	7.5%	20%	50%	17.5%	5%	100%

18. I would be sorry to leave the town where I live	3.1	Frequency	3	11	14	11	1	40
		Percentage	7.5%	27.5%	35%	27.5%	2.5%	100%

Source: Primary Data

Table 3.16 explains the place attachment factor, the Conjoint Community Resiliency Assessment Measure (CCRAM), explaining the emotional and ideological connection respondents have with their towns. The mean scores for this dimension range from 3.075 to 3.525, suggesting a moderate to positive attachment to the community. The highest score (3.525) reflects pride in telling others where they live, with 50% agreeing or strongly agreeing, though 10% still expressed disagreement. A sense of belonging to the town shows similar patterns, with a mean of 3.25, where around 42.5% of respondents agreed or strongly agreed, but 25% expressed varying levels of disagreement, indicating room for strengthening communal bonds. Ideological commitment to staying in the town scored 3.075, with half of the respondents remaining neutral, reflecting a less decisive emotional connection. The item about feeling sorry to leave the town scored 3.1, with a more divided response: 35% were neutral, 27.5% agreed, and 30% expressed disagreement, highlighting a moderate level of attachment. Overall, while the town shows a fair sense of community attachment, these results suggest that fostering more inclusive social initiatives and strengthening local identity could further enhance community cohesion and resilience.

TABLE 3.17 PLACE ATTACHMENT RESILIENCE SCORE

		Fort Kochi	Vypin	Total
Very Low	No. Of respondents	0	2	2
	Percentage	0%	10%	5%
Medium	No. Of respondents	8	8	18
	Percentage	40%	40%	40%
High	No. Of respondents	11	9	20
	Percentage	55%	45%	50%
Very high	No. Of respondents	1	1	2
	Percentage	5%	5%	5%
Total	No. Of respondents	20	20	40
	Percentage	100%	100%	100%

Source: Primary Data

Table 3.17 explains the place attachment scores, which compares responses from Fort Kochi and Vypin, and indicates the emotional and ideological connection respondents have with their towns. Among the 40 respondents, 50% rated their place attachment as High, with Fort Kochi showing a stronger positive perception (55%) compared to Vypin (45%). The Medium category accounted for 40% of the total, with equal representation from both Fort Kochi and Vypin (40% each), indicating a significant portion of respondents expressing moderate attachment to their community. Notably, 5% of respondents rated place attachment as Very high, with an equal percentage from both regions. The Very Low category made up 5% of the total, with all such responses coming from Vypin, while Fort Kochi had none, suggesting a more consistent positive attachment level in Fort Kochi. This distribution highlights that while Fort Kochi demonstrates stronger overall place attachment, Vypin has a notable segment of respondents with lower attachment, pointing to the potential for community-building initiatives that could strengthen the sense of belonging and pride across both regions.

TABLE 3.18 SOCIAL TRUST

Item content	Mean		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
4. I am proud to tell others where I live	3.25	Frequency	3	13	18	3	3	40
		Percentage	7.5%	32.5%	45%	7.5%	7.5%	100%
9. I feel a sense of belonging to my town	3.2	Frequency	3	14	14	6	3	40
		Percentage	7.5%	35%	35%	15%	7.5%	100%

Source: Primary Data

Figure 3.18 presents the social trust scores, the Conjoint Community Resiliency Assessment Measure (CCRAM), explaining the confidence and sense of belonging respondents feel within their communities. Among the 40 respondents, 40% expressed pride in telling others where they live, with 7.5% strongly agreeing and 32.5% agreeing. A significant portion (45%) remained neutral, while 15% expressed disagreement or strong disagreement, suggesting that while there is a fair degree of local pride, there remains room for building a stronger sense of identity and confidence. Similarly, 42.5% of respondents felt a sense of belonging to their town, with 7.5% strongly agreeing and 35% agreeing. However, 22.5% of respondents expressed some level of disagreement, indicating a notable gap in social cohesion that could be addressed through initiatives aimed at fostering trust and inclusion across both Fort Kochi and Vypin.

TABLE 3.19 SOCIAL TRUST RESILIENCE SCORE

		Fort Kochi	Vypin	Total
Very Low	No. Of respondents	2	0	2
	Percentage	10%	0%	5%
Low	No. Of respondents	0	3	3
	Percentage	0%	15%	7.5%
Medium	No. Of respondents	7	9	16
	Percentage	35%	45%	40%
High	No. Of respondents	10	5	15
	Percentage	50%	25%	37.5%
Very high	No. Of respondents	1	3	4
	Percentage	5%	15%	10%
Total	No. Of respondents	20	20	40
	Percentage	100%	100%	100%

Source: Primary Data

Table 3.19 presents the social trust scores, which compares responses from Fort Kochi and Vypin, and indicates the confidence and trust respondents feel within their communities. Among the 40 respondents, 37.5% rated their social trust as High, with Fort Kochi showing a stronger positive perception (50%) compared to Vypin (25%). The Medium category accounted for 40% of the total, with a higher percentage from Vypin (45%) than Fort Kochi (35%), indicating more moderate confidence in social trust. Notably, 10% of respondents rated social trust as Very high, with Vypin contributing a larger share (15%) compared to Fort Kochi (5%), suggesting stronger peaks of trust in Vypin. The Low and Very Low categories together made up 12.5% of the total, with Fort Kochi contributing the larger share of Very Low responses (10%) while Vypin had more Low responses (15%). This distribution suggests that while Fort Kochi demonstrates stronger overall social trust, Vypin has a notable segment of respondents with high trust levels, pointing to the potential for strengthening shared trust-building initiatives across both regions.

TABLE 3.20 COMPOSITE SCORE OF COMMUNITY RESILIENCE

		Fort Kochi	Vypin	Total
Low	No. Of respondents	2	0	2
	Percentage	10%	0%	5%
Medium	No. Of respondents	2	10	12
	Percentage	10%	50%	30%
High	No. Of respondents	15	8	23
	Percentage	75%	40%	57.5%
Very High	No. Of respondents	1	2	3
	Percentage	5%	10%	7.5%
Total	No. Of respondents	20	20	40
	Percentage	100%	100%	100%

Source: Primary Data

Table 3.20 presents the composite score of community resilience, Among the 40 respondents, 57.5% rated their community resilience as High, with Fort Kochi demonstrating a stronger positive perception (75%) compared to Vypin (40%). The Medium category accounted for 30% of the total, with a significantly higher percentage from Vypin (50%) than Fort Kochi (10%), indicating a more moderate confidence in resilience within Vypin. Notably, 7.5% of respondents rated their resilience as Very high, with Vypin contributing a larger share (10%) compared to Fort Kochi (5%). The Low category made up 5% of the total, with all such responses coming from Fort Kochi, while Vypin had none, suggesting a more consistent positive perception of resilience in Vypin. This distribution indicates that while Fort Kochi exhibits stronger overall resilience, Vypin shows significant potential for growth.

3.4 RESULTS OF REGRESSION ANALYSIS

Regression analysis is a crucial statistical tool used to examine the relationship between various socio-economic factors and community resilience. This section presents the findings from regression models that assess the impact of demographic variables such as age, gender, family size, marital status, education, household income, and income loss on community resilience. By analyzing these relationships, the study aims to identify significant predictors that influence the ability of coastal communities in Ernakulam to adapt to socio-economic and environmental challenges.

TABLE 3.21 REGRESSION ANALYSIS OF AGE

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.318[a]	.101	.078	13.73337

a. Predictors: (Constant), age

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	74.654	6.120		12.198	.000
	age	-4.734	2.289	-.318	-2.068	.045

a. Dependent Variable: CR

The R^2 value of 0.101 indicates that age explains only 10.1% of the variance in community resilience, making it a weak predictor. The coefficient (-4.734) suggests an inverse relationship, where each additional year reduces resilience by 4.734 units. The regression analysis indicates a statistically significant negative relationship ($\beta = -0.318$, $p = 0.045$), indicating that resilience declines with age.

TABLE 3.22 REGRESSION ANALYSIS OF GENDER

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.313[a]	.098	.075	13.75573

a. Predictors: (Constant), gender

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	42.902	10.026		4.279	.000
	gender	11.065	5.437	.313	2.035	.049

a. Dependent Variable: CR

Gender explains 9.8% of the variance in community resilience, making it a weak predictor. The coefficient (B = 11.065, p = 0.049) indicates that females have significantly higher resilience.

TABLE 3.23 REGRESSION ANALYSIS OF FAMILY SIZE

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.282[a]	.079	.055	13.89851

a. Predictors: (Constant), familysize

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	76.658	7.952		9.640	.000
	Family size	-6.751	3.728	-.282	-1.811	.078

a. Dependent Variable: CR

Family size explains only 7.9% of the variance in community resilience, making it a weak predictor. The coefficient (-6.751, p = 0.078) suggests a negative but statistically insignificant relationship, indicating that larger family sizes may be associated with lower resilience, though the effect is not strong enough for firm conclusions.

TABLE 3.24 REGRESSION ANALYSIS OF MARITAL STATUS

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.183[a]	.033	.008	14.24122

a. Predictors: (Constant), marital

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	70.268	6.872		10.226	.000
	marital	-4.515	3.935	-.183	-1.147	.258

a. Dependent Variable: CR

Marital status explains only 3.3% of the variance in community resilience, making it a weak predictor. The coefficient (-4.515, p = 0.258) suggests a negative but statistically insignificant relationship, indicating that marital status has little to no meaningful impact on resilience.

TABLE 3.25 REGRESSION ANALYSIS OF EDUCATION DISTRIBUTION

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.199[a]	.039	.014	14.19723

a. Predictors: (Constant), education

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	57.527	4.794		12.001	.000
	education	2.228	1.783	.199	1.249	.219

a. Dependent Variable: CR

Education explains only 3.9% of the variance in community resilience, making it a weak predictor. The coefficient (2.228, p = 0.219) suggests a positive but statistically insignificant relationship, indicating that higher education levels do not significantly impact perceived resilience.

TABLE 3.26 REGRESSION ANALYSIS OF HOUSEHOLD INCOME

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.269[a]	.072	.048	13.95369

a. Predictors: (Constant), household income

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	70.049	4.751		14.745	.000
	Income	-2.560	1.489	-.269	-1.719	.094
a. Dependent Variable: CR						

Household income explains only 7.2% of the variance in community resilience, making it a weak predictor. The coefficient (-2.560, p = 0.094) indicates a negative but statistically insignificant relationship, suggesting that income levels have little to no meaningful impact on resilience.

TABLE 3.27 REGRESSION ANALYSIS OF INCOME LOSS

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.043[a]	.002	-.024	14.47245

a. Predictors: (Constant), income loss

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	60.833	7.834		7.765	.000
	Income loss	.703	2.652	.043	.265	.792

a. Dependent Variable: CR

Income loss explains only 0.2% of the variance in community resilience, making it a very weak predictor. The coefficient (0.703, p = 0.792) suggests a positive but statistically insignificant relationship, indicating that income loss has little to no meaningful impact on resilience.

CHAPTER 4

FINDINGS, SUGGESTIONS AND CONCLUSION

4.1 INTRODUCTION

Resilience is essential to the survival and development of coastal communities since they are more susceptible to environmental and socioeconomic problems. This study emphasizes the economic circumstances of Fort Kochi and Vypin by looking at employment trends, income levels, education, and demographic traits. In order to examine what strengthens or detracts from resilience, elements including governance, social trust, collective efficacy, readiness, and location attachment are also investigated. This chapter focuses on findings that offer a comprehensive understanding of the challenges faced by coastal populations and highlight areas for policy interventions and community-based initiatives to enhance resilience.

Based on these findings, this chapter also provides recommendations and practical suggestions to strengthen community resilience by improving economic stability, enhancing disaster preparedness, fostering social trust and collective efficacy, and promoting effective governance and leadership in coastal communities.

4.2 FINDINGS

4.2.1 Objective 1: To Identify the Socioeconomic Status of Coastal Communities in Ernakulam District

The study examines the socioeconomic status of coastal communities in Ernakulam district, particularly in Fort Kochi and Vypin. It reveals that the majority of respondents belong to middle-aged groups, with a significant portion of the sample representing women. Most households are medium-sized, with a predominant reliance on wage labor for income. Fishing, the primary livelihood in coastal areas, plays only a minor role in household earnings. A considerable portion of the population has limited educational attainment, with many not progressing beyond primary schooling. Financial instability is evident, as a substantial number of households earn low incomes, with many struggling due to income losses caused by natural disasters. Borrowing money is common in these areas, indicating economic vulnerability and a lack of financial security. Economically, a considerable number of households earn less than ₹5,000 per month, while others

earn between ₹20,001 and ₹30,000. The socioeconomic conditions therein illustrate a community with diverse needs and challenges, primarily in terms of economic stability and accessibility to higher education.

4.2.2 Objective 2: To Identify the Main Factors Promoting or Hindering Community Resilience

Respondents expressed a moderate level of confidence in leadership and governance are important. Although many people think their municipal council does a good job, there is still a lack of trust in the decision-making procedures. The ability of the community to support one another or Collective efficacy, shows potential for improvement, as many respondents feel uncertain about receiving assistance during emergencies. The Preparedness levels are moderate, with some respondents confident in their town's emergency response systems, while others highlight gaps in infrastructure, such as shelters and public protection facilities. Place attachment is generally strong, with many respondents expressing pride in their communities, though some show uncertainty about their long-term commitment to staying. Social trust is also varied, with Fort Kochi demonstrating stronger community ties compared to Vypin

4.2.3. Regression Analysis

The regression analysis examined the relationship between various socio-economic factors and community resilience. The key findings are:

- Age has a statistically significant negative impact on community resilience ($\beta = -0.318$, $p = 0.045$). Older individuals perceive lower resilience, possibly due to reduced adaptability or reliance on external support.

- Gender significantly influences resilience ($\beta = 0.313$, $p = 0.049$). Females, given the dataset's composition, exhibit higher resilience, possibly due to stronger community ties or coping strategies.

- Family Size and Community Resilience is negative but not significant. Larger family size is associated with lower resilience ($\beta = -0.282$, $p = 0.078$), might face greater resource constraints, impacting their resilience.

- Marital Status and Community Resilience is negative but not Significant:as it has a weak, non-significant negative relationship with resilience ($\beta = -0.183$, $p = 0.258$), therefore Being married does not significantly enhance or reduce resilience.

- Education and Community Resilience positive but not Significant that is higher education levels show a weak positive correlation with resilience ($\beta = 2.228$, $p = 0.219$) therefore, education might contribute to resilience, but its impact is not statistically strong.

- Household Income and Community Resilience is negative but Not Significant as higher household income does not significantly improve resilience ($\beta = -0.269$, $p = 0.094$), Economic factors alone do not strongly determine community resilience.

- Income Loss Due to Natural Disasters and Community Resilience is positive but not significant as income loss has a weak, non-significant positive relationship with resilience ($\beta = 0.703$, $p = 0.792$). Those experiencing income loss may have developed coping mechanisms, but the effect on resilience is minimal.

The regression analysis indicates that older individuals perceive lower resilience, while gender plays a role in shaping resilience levels. Family size, education, and income show weak or insignificant relationships with resilience.

Overall, the findings suggest that economic insecurity, lack of trust in governance, and limited preparedness hinder resilience, while community attachment and leadership play crucial roles in strengthening it.

4.3 SUGGESTIONS

4.3.1 Enhancing Economic Stability

To enhance economic stability and reduce financial vulnerability in coastal communities, introduction of skill development programs helps the people to enable earning income beyond wage labour and fishing. Expansion in the access of microfinance and other low interest facilities reduce the dependence of borrowing money from informal sources during crises. Encouraging small businesses and entrepreneurship through training, subsidies help to foster economic resilience. Additionally, encouraging government and private sector investments in sustainable

livelihood opportunities can create long-term economic security, ensuring that coastal communities have stable and diversified income sources to withstand financial uncertainties.

4.3.2 Education and Capacity Building

Improving access to quality education and vocational training is essential for enhancing skill development and creating better livelihood opportunities in coastal communities. Equipping people with relevant skills, conducting awareness programmes on financial literacy, climate change adaptation, and disaster risk management will help the individuals to make informed decisions and strengthen their resilience against socio-economic and environmental challenges. Integration of resilience-building strategies into school curriculums and other training programs would ensure younger generations are better prepared to handle crises and contribute to sustainable development. Providing scholarship would encourage youth to pursue advanced learning which increase their career opportunities

4.3.3 Infrastructure and Sustainable Development

Investing in resilient housing and infrastructure projects to protect coastal communities from threats like floods, storms and rising sea levels, where the homes and public buildings are climate resilient and enhance the safety and long term stability. Improving public transportation and access to essential services would enhance the connectivity in remote areas which would enhance education, health and employment opportunities. Encouraging eco-tourism and heritage conservation projects can also provide alternative economic opportunities

4.4 CONCLUSION

This study on community resilience among coastal communities in Ernakulam district highlights the multifaceted challenges these communities face, including environmental vulnerabilities, socio-economic instability, and inadequate infrastructure. The research analyzed key resilience variables such as social cohesiveness, economic stability, disaster readiness, and governance support to measure the overall resilience of the researched communities.

Findings indicate that while government interventions and local initiatives have contributed to resilience-building, gaps remain in areas such as disaster preparedness, livelihood security, and access to essential services. The resilience assessment revealed that the overall resilience level of the studied communities falls within the moderate range (2.6 – 3.5). Among the areas studied, Fort Kochi exhibited stronger social ties and leadership-driven resilience compared to Vypin, where economic challenges and environmental risks were more pronounced.

To further increase community resilience, the study emphasizes the necessity of focused policy measures. Enhancing economic stability, disaster preparedness, and social cohesion through inclusive governance, improved infrastructure, and sustainable livelihood opportunities will be crucial in building long-term resilience. Community-led initiatives, capacity-building programs, and improved stakeholder collaboration can also play a crucial role in ensuring these coastal communities can resist and adapt to future adversities.

By addressing these problems and harnessing local assets, coastal communities in Ernakulam may move toward a more sustainable and resilient future, assuring their long-term well-being and security.

APPENDIX

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QUESTIONNAIRE

1. Age

    1. below 20
    2. 21-40 years
    3. 41-60 years
    4. above 60 years

2. Gender

    1. Male
    2. Female
    3. Prefer not to say

3. Total Number of members in your family

    1. 1-2
    2. 3-5
    3. More than 5

4. Marital status

    1. single
    2. married
    3. widowed

4. divorced

5. What is your highest level of education?

1. no formal education
2. primary school
3. secondary school
4. higher secondary
5. graduate
6. post graduate or higher
7. Other

7. What is your household's monthly income ?

1. Less than 5,000
2. ₹5,001-₹10,000
3. ₹10,001-20,000
4. ₹20,001-₹30,000
5. More than ₹30,000

8. What are the main sources of income for your household?

1. Fishing
2. Agriculture
3. Small business

4. Wage labor
5. Remittances
6. Government job
7. Other

9. Have you faced any income loss due to natural disasters?

1. Yes
2. no

10. What other source of income is used when there is a loss of income?

1. Borrowing money
2. Reducing household expenses
3. Migrating for work
4. Changing occupation
5. Relying on savings
6. Receiving assistance from government/NGOs
7. Other

11. The municipal authority (regional council) of my town functions well.

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree

5. Strongly Agree

12. There is mutual assistance and concern for others in my town.

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

13. My town is organized for emergency situations.

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

14. I am proud to tell others where I live.

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

15. The relations between the various groups in my town are good.

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

16. I have faith in the decision makers in the municipal authority (regional council) .

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

17. I can depend on people in my town to come to my assistance in a crisis.

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

18. The residents of my town are acquainted with their role is in an emergency situation .

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

19. I feel a sense of belonging to my town.

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

20. There is trust among the residents of my town.

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

21. In my town, appropriate attention is given to the needs of children.

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

22. There are people in my town who can assist in coping with an emergency.

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

23. In my town, there are sufficient public protection facilities (such as shelters).

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

24. I remain in this town for ideological reasons.

1. Strongly Disagree

2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

25. I have faith in the ability of the elected/nominated head of my town to lead the transit from routine to emergency management of the town.

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

26. I believe in the ability of my community to overcome an emergency situation.

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

27. My family and I are acquainted with the emergency system of my town (to be activated in times of emergency).

1. Strongly Disagree
2. Disagree

3. Neutral
4. Agree
5. Strongly Agree

28. I would be sorry to leave the town where I live.

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1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

29. The municipal authority (regional council) provides its services in fairness.

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

30. The residents of my town are greatly involved in what is happening in the community.

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree

5. Strongly Agree

31. The residents of my town will continue to receive municipal services during an emergency situation.

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree