

ASSESSING COMMUNITY DISASTER RESILIENCE IN ALAPPUZHA DISTRICT OF KERALA: AN INDEX-BASED EVALUATION OF SELECTED COMMUNITIES

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ABSTRACT

This study assesses the Community Disaster Resilience Index (CDRI) in selected coastal communities of Alappuzha District, Kerala. Using a descriptive research design, both primary and secondary data were analyzed. Primary data were collected from 400 respondents through a structured interview schedule, while secondary sources included research journals, government reports, and internet sources. A multistage sampling method was employed, selecting the most disaster-prone taluks, grama panchayaths, and coastal wards to ensure a representative sample. The findings reveal critical gaps in sanitation despite universal access to personal toilets. The absence of community toilets and inadequate waste disposal contribute to disease outbreaks. Some shelter homes also lack proper sanitation and drainage, posing health risks during disasters. The study underscores the need for community toilets, improved hygiene practices, and enhanced drainage systems to strengthen disaster resilience. These insights are essential for policymakers and planners to enhance community resilience against environmental and health hazards.

INTRODUCTION

Disaster resilience has emerged as a critical concern for communities worldwide, particularly in the face of increasing climate change-related hazards and socio-political vulnerabilities. Community disaster resilience (CDR) refers to the ability of a community to prepare for, respond to, and recover from disasters while maintaining essential functions and adapting to changing circumstances (Cutter et al., 2008). The concept integrates social, economic, institutional, and infrastructural factors that influence a community's capacity to withstand shocks and stresses. This paper aims to assess the Community Disaster Resilience Index (CDRI) of selected communities, providing empirical insights into their strengths and vulnerabilities.

The necessity of assessing community disaster resilience stems from the growing frequency and intensity of natural and human-induced disasters. Globally, climate-induced events, including floods, hurricanes, wildfires, and droughts, have disproportionately affected vulnerable communities with inadequate adaptive capacities (IPCC, 2014). The United Nations Office for Disaster Risk Reduction (UNDRR, 2019) underscores the importance of resilience-building efforts through systematic assessments, resource allocations, and participatory governance. Various models and indices have been developed to quantify disaster resilience, including the Baseline Resilience Indicators for Communities (BRIC), the Resilience Inference Measurement (RIM), and the Community Disaster Resilience Index (CDRI) (Cutter et al., 2010). These models employ quantitative and qualitative indicators, such as economic stability, infrastructure robustness, governance effectiveness, and social capital, to evaluate community preparedness and adaptive capacity. India, with its diverse geographical and climatic conditions, faces frequent disasters such

as floods, cyclones, earthquakes, and droughts. The country has made significant progress in disaster risk reduction (DRR) through institutional frameworks like the Disaster Management Act, 2005, and the establishment of the National Disaster Management Authority (NDMA). However, resilience levels vary widely across states, with socio-economic disparities influencing adaptive capacity (NDMA, 2020). The Sendai Framework for Disaster Risk Reduction 2015-2030 has guided India in enhancing resilience through risk-informed development planning and community participation (UNDRR, 2015).

Assessing disaster resilience in India requires a region-specific approach, considering demographic, infrastructural, and environmental factors. Rural communities often face compounded vulnerabilities due to inadequate infrastructure, limited access to emergency services, and socio-political marginalization (Paton & Johnston, 2017). Urban areas, on the other hand, struggle with population density, governance challenges, and socio-economic disparities that impact resilience (Cutter et al., 2014).

Kerala, a southern state in India, is highly prone to natural disasters, particularly floods and landslides. The 2018 Kerala floods highlighted the state's vulnerability, causing immense damage to infrastructure, livelihoods, and human lives. The event underscored the need for robust disaster preparedness and resilience-building strategies (GOK, 2018). Despite Kerala's high literacy rate and strong social capital, challenges remain in integrating resilience strategies into local governance and infrastructure planning.

The Kerala State Disaster Management Authority (KSDMA) has been actively working on resilience-building measures, focusing on early warning systems, community participation, and ecosystem-based approaches to disaster mitigation. However, continuous assessments of CDRI are essential to address gaps and enhance disaster preparedness at the grassroots level (KSDMA, 2020).

REVIEW OF LITERATURE

The review of literature is crucial in research as it provides a comprehensive understanding of existing studies, identifying key concepts, theories, and methodologies. It helps establish the research context, highlight gaps in knowledge, and justify the need for the study. By critically analyzing past research, it prevents duplication, refines research questions, and strengthens theoretical frameworks. In addition, it guides methodological choices and ensures credibility by situating new findings within a broader academic discourse, ultimately contributing to the advancement of knowledge in the field.

Community disaster resilience has been widely analyzed using various conceptual frameworks and indices. Cutter et al. (2008) introduced the Baseline Resilience Indicators for Communities (BRIC), which integrates socio-economic, infrastructural, and institutional factors to assess resilience at the community level. Norris et al. (2008) emphasized social capital and community networks as key determinants of disaster resilience, arguing that stronger social cohesion leads to better disaster recovery outcomes. More recently, Tiernan et al. (2019) highlighted the importance of governance and participatory approaches in enhancing community resilience. These studies collectively demonstrate the multi-dimensional nature of disaster resilience and emphasize the need for region-specific assessments.

India's disaster resilience landscape has been explored through various case studies focusing on disaster-prone states such as Odisha, West Bengal, and Uttarakhand (Paton & Johnston, 2017). Research has emphasized the role of government interventions, early warning systems, and local knowledge in enhancing disaster preparedness (NDMA, 2020). While Kerala's disaster response mechanisms have been studied following the 2018 floods, there is limited literature that systematically evaluates resilience using index-based methodologies (GOK, 2018). The Sendai Framework for Disaster Risk Reduction (UNDRR, 2015) has provided a policy-driven approach, but empirical studies quantifying community resilience in India remain scarce. Despite

its vulnerability to climate-induced disasters, Alappuzha District has not been the focus of extensive disaster resilience research. Studies on Kerala have primarily examined post-disaster recovery efforts and governance challenges (Cutter et al., 2014). However, a comprehensive, index-based evaluation of community resilience in Alappuzha remains absent from the literature. The existing body of work highlights the necessity of integrating socio-economic, infrastructural, and institutional dimensions into resilience assessments but lacks empirical studies specific to Alappuzha's unique disaster risks. Therefore, this study seeks to bridge this gap by providing an index-based assessment of community disaster resilience in the district.

RESEARCH GAP

Although various studies have explored community disaster resilience worldwide and in India, a significant research gap remains in assessing the Community Disaster Resilience Index (CDRI) of selected communities in Alappuzha district. Existing literature has focused largely on disaster response, mitigation strategies, and policy interventions, but there is a lack of empirical studies that systematically measure resilience at the community level using index-based approaches. This study aims to fill this gap by evaluating the resilience capacities of Alappuzha communities through a structured assessment of key resilience indicators, providing insights that can inform policy and disaster risk reduction strategies.

METHODOLOGY

The study employs a descriptive research design to assess the Community Disaster Resilience Index (CDRI) of selected communities in Alappuzha District. Both secondary and primary data were utilized, with secondary data collected from research journals, books, internet sources, and government reports. Primary data were gathered from 400 respondents using a structured interview schedule designed to evaluate various dimensions of community disaster resilience. The study employed frequency distribution as a statistical technique to analyze the data, providing insights into variations in community disaster resilience across different demographic segments and identifying key patterns within the selected communities.

SAMPLING PROCEDURE

Alappuzha district of Kerala was selected for the study due to its Community Disaster Resilience Index (CDRI) of selected communities. The coastal area of the district was chosen as the study universe. The most affected coastal wards of the district were identified and considered for the study. According to Registrar General & Census Commissioner, India (2011), Alappuzha district has a total population of 2,127,789.

The study employed a multistage sampling technique to ensure a representative selection of respondents.

First Stage: Selection of Taluks: Alappuzha district consists of six taluks: Cherthala, Ambalappuzha, Kuttanadu, Karthikappally, Chengannur, and Mavelikkara. Based on disaster vulnerability, two most affected taluks; one from the north and one from the south were selected:

1. **Ambalappuzha Taluk (North)**
2. **Cherthala Taluk (South)**

Second Stage: Selection of Grama Panchayaths: From the selected taluks, one highly affected coastal Grama Panchayath was chosen from each:

1. **Ambalappuzha North** from Ambalappuzha Taluk
2. **Kadakarappally** from Cherthala Taluk

Third Stage: Selection of Coastal Wards: In the third stage, three most affected coastal wards from each selected Grama Panchayath were chosen:

- **Ambalappuzha North Grama Panchayath:** Wards **1, 12, and 13**
- **Kadakarappally Grama Panchayath:** Wards **1, 7, and 10**

These wards were identified as **severely impacted by sea erosion and other coastal hazards**.

Fourth Stage: Selection of Households: From each of the selected six wards, 100 households were randomly selected, leading to a total sample size of 400 respondents. Some respondents who were unwilling to participate were replaced with other available households to ensure a valid response rate.

Sample Size Determination using Slovin's Formula

To determine the sample size, Slovin's formula was applied:

$$n = \frac{N}{1 + Ne^2}$$

Where:

- **N** = 2,127,789 (total population)
- **e** = 0.05 (margin of error, 5%)

$$n = \frac{2,127,789}{1 + (2,127,789 \times 0.05^2)}$$

$$n = \frac{2,127,789}{1 + (2,127,789 \times 0.0025)}$$

$$n = \frac{2,127,789}{1 + 5,320.4725}$$

n=400

ANALYSIS AND INTERPRETATION ABOUT COMMUNITY DISASTER RESILIENCE INDEX IN THE STUDY AREA

Table No: 1. Electricity

Electricity	Particulars	No. of Respondents	Percentage
Have electricity Connection with Meter	Yes	400	100.0
Any Electrocution during Disaster	No	400	100.0
Shelter home have Electricity	Yes	400	100.0
Shelter home have Power Generator	No	376	94.0
	Yes	24	6.0

The data on electricity and its role in community resilience indicates that all respondents have electricity connections with meters, and no instances of electrocution during disasters have been reported. This suggests that the community's basic electrical infrastructure is intact and safely managed during emergencies. Additionally, all shelter homes have electricity, which is crucial for maintaining basic living conditions and supporting disaster response efforts. However, the presence of power generators in shelter homes is limited, with only 6% having access to them, while 94% do not. This disparity highlights a potential gap in backup power resources, which could

be critical during prolonged outages or emergencies. The lack of generators in most shelter homes may pose challenges for maintaining essential services and comfort during disasters, suggesting a need for increased investment in backup power solutions to enhance overall community resilience.

Table No: 2. Water Supply

Water Supply	Particulars	No. of Respondents	Percentage
Have Drinking Water	Yes	400	100.0
Mode of Access Drinking Water	Purchase personally	24	6.0
	Government water schemes	376	94.0
Have Individual Pipe Connection	Yes	400	100.0
Have Clean Water	Yes	400	100.0
Quality of Water during Rainy Season	Good	400	100.0
Have Community Tap	No	400	100.0
Pay for Drinking Water	Yes	400	100.0
Disease Outbreak Due to Poor Quality of Water	No	400	100.0
Have Water Resource at Home	No	340	85.0
	Yes	60	15.0
Think Shelter Homes are Equipped with Water Connection	Yes	400	100.0

The water supply data reveals that the community has reliable access to drinking water, with all respondents confirming the availability of clean water. Drinking water is primarily accessed through government water schemes (94%), while a small portion (6%) purchases water personally. All respondents have individual pipe connections and report good water quality even during the rainy season, indicating a well-maintained and effective water supply system. None of the respondents have community taps, which suggests that water access is individually managed rather than shared in communal settings. Despite paying for drinking water, no respondents report disease outbreaks due to poor water quality, highlighting the effectiveness of the current water management system. However, 85% of respondents do not have additional water resources at home, which could limit their ability to store water for emergencies. On a positive note, all shelter homes are equipped with water connections, ensuring that emergency accommodations have access to necessary water supplies.

Table No: 3. Sanitation

Sanitation	Particulars	No. of Respondents	Percentage
Place of Defecation	Personal Toilet	400	100.0
Have Community Toilet	No	400	100.0
Disease Outbreak due to Poor Sanitation	Yes	400	100.0
Shelter Homes Equipped with Proper Toilet Facility	No	66	16.5
	Yes	334	83.5
Shelter Homes Equipped with Proper Drainage Facility	No	12	3.0
	Yes	388	97.0

The sanitation data indicates that all respondents use personal toilets, reflecting a high level of access to private sanitation facilities. There are no community toilets, suggesting that sanitation is managed individually rather than through shared facilities. Despite this, all respondents report that disease outbreaks due to poor sanitation have occurred, which may highlight underlying issues with sanitation infrastructure or practices. In shelter homes, a majority (83.5%) are equipped with proper toilet facilities, although a significant minority (16.5%) do not have adequate sanitation. The vast majority of shelter homes (97%) are also equipped with proper drainage facilities, which is crucial for preventing waterlogging and maintaining hygiene. The presence of proper drainage in most shelter homes helps to mitigate sanitation-related health risks during emergencies. Overall, while the community appears to have good access to personal sanitation and adequate facilities in shelter homes, the reports of disease outbreaks and the lack of community toilets suggest areas for improvement in public sanitation and emergency preparedness.

Table No: 3. Solid Waste Disposal

Solid Waste Disposal	Particulars	No. of Respondents	Percentage
Place of Discarding House Waste	Near the house	400	100.0
Have Access to Dustbin	No	400	100.0
Nuisance due to Solid Waste near Locality	Yes	400	100.0
Condition of Solid Waste during Disaster	Deteriorates	400	100.0

The solid waste disposal data highlights several challenges within the community. All respondents (100%) discard their house waste near their homes, indicating a lack of organized waste management systems. Additionally, none of the respondents (100%) have access to dustbins, which exacerbates the issue of improper waste disposal. This situation contributes to the reported nuisance due to solid waste near localities, which affects the entire community (100%).

Moreover, the condition of solid waste deteriorates during disasters, a concern reported by all respondents (100%). This deterioration during emergencies suggests that the current waste management practices are insufficient to handle increased waste and environmental hazards effectively.

Table No: 4. Internal Road Network

Internal Road Network	Particulars	No. of Respondents	Percentage
Condition of Roads	Poor	28	7.0
	Average	372	93.0
Roads Properly Connected to each other	Yes	400	100.0
Road network Properly Connected to Main Road	Yes	400	100.0
Condition of Internal Roads during Disaster	Poor	400	100.0

The internal road network data shows that the condition of roads is generally perceived as average by most respondents (93%), with a smaller portion (7%) rating it as poor. This suggests that while the road infrastructure is serviceable, there is room for improvement in road quality to better meet the community's needs. Importantly, the connectivity of the road network is well-regarded, with all respondents (100%) confirming that internal roads are properly connected to each other and to the main road. This connectivity is crucial for facilitating movement and access within the community. However, all respondents also report that the condition of internal roads

deteriorates during disasters, highlighting a significant concern. Poor road conditions during emergencies can severely impact disaster response and recovery efforts, underscoring the need for enhanced road maintenance and infrastructure improvements to better support community resilience.

Table No: 5. Accessibility to the Road Network

Accessibility to the Road Network	Particulars	No. of Respondents	Percentage
Internal Roads Broad Enough for Vehicles	No	400	100.0
Accessibility to Road during Disaster	Poor	400	100.0
Availability of Alternative Roads when Blocked	No	400	100.0

The data on accessibility to the road network reveals several critical issues. All respondents (100%) report that internal roads are not broad enough for vehicles, indicating that the road width is inadequate for smooth transportation within the community. This limitation can restrict vehicle movement and affect overall mobility. Additionally, every respondent (100%) notes that accessibility to roads during disasters is poor. This suggests that the existing road network is unable to support effective transportation and emergency responses when faced with crises. The lack of alternative roads, confirmed by all respondents (100%), further exacerbates the problem. Without alternative routes available when primary roads are blocked, the community faces significant challenges in navigating and managing disaster situations.

Table No: 6. Housing

Housing	Particulars	No. of Respondents	Percentage
Type of House in Locality	Hut	14	3.5
	Tiled	146	36.5
	Concrete	240	60.0
Usual Pattern of House in This Locality	Single	400	100.0
Condition of House during Disaster	Poor	238	59.5
	Average	162	40.5
Rain Water Enter House	No	70	17.5
	Yes	330	82.5
How Often Rain water Enters House	Every time it rains	6	1.5
	During heavy rains	228	57.0
	Only during heavy floods	96	24.0
Mode of Saving Household Items during Disaster	Stacking or piling	152	38.0
	Shifting to safer places	90	22.5
	Temporary bunds	158	39.5
Lost House and Property fully or Partially	No	180	45.0
	Yes	220	55.0
Government Housing Scheme	Yes	400	100.0
Applied for any Scheme Benefits	No	232	58.0
	Yes	168	42.0
Received Benefits from any Scheme	No	192	48.0
	Yes	54	13.5
Kind of Benefit	New House	32	8.0

Reason for not Receiving any Benefits	Maintenance	20	5.0
	Others	6	1.5
	Negligence from government	24	6.0
	Non-acceptance of Govt. Demands	84	21.0

The data on housing provides a comprehensive view of the housing situation and related challenges in the community.

Types and Conditions of Houses: The majority of respondents live in concrete houses (60%), with a smaller portion in tiled houses (36.5%) and even fewer in huts (3.5%). The predominant house type reflects a higher standard of construction in the area. However, the condition of houses during disasters is a concern, with 59.5% of respondents reporting poor conditions and 40.5% reporting average conditions. This indicates that a significant number of homes may not be adequately prepared to withstand disasters.

Rainwater Intrusion: A substantial portion of respondents (82.5%) reports that rainwater enters their homes, with the majority (57%) experiencing this during heavy rains and 24% only during heavy floods. This suggests a vulnerability to water intrusion, particularly in more severe weather conditions.

Protection Measures and Property Loss: To protect household items during disasters, respondents primarily use stacking or piling (38%), shifting items to safer places (22.5%), or constructing temporary bunds (39.5%). A notable portion of the community (55%) has experienced partial or total loss of house and property, highlighting the impact of disasters on housing.

Government Housing Schemes: All respondents are aware of government housing schemes, but only 42% have applied for benefits, and 13.5% have received some form of assistance. Among those who received benefits, the majority received support for new houses (8%), maintenance (5%), or other forms of aid (1.5%). Reasons for not receiving benefits include non-acceptance of government demands (21%) and negligence from the government (6%).

Table No: 7. Land Status

Land Status	Particulars	No. of Respondents	Percentage
Owner of the land you are staying	Freehold	396	99.0
	Private	4	1.0
Living beyond 500 Meters of High Waves Area	No	396	99.0
	Yes	4	1.0
Constantly face Threat of Eviction	Yes	96	24%
	No	304	76%

The data on land status provides insights into property ownership and its implications for the community:

Land Ownership: The vast majority of respondents (99%) own their land under freehold arrangements, indicating a high level of land security. Only a small fraction (1%) lives on private land, which may come with different conditions or limitations.

Proximity to High Waves Area: Nearly all respondents (99%) live within 500 meters of a high waves area, reflecting significant exposure to coastal hazards. Only 1% of respondents live beyond this distance, suggesting that most of the community is at risk from coastal events.

Threat of Eviction: Majority of the respondents (76%) report that they do not face a constant threat of eviction. Only 24% are opined that are facing threat of eviction.

Table No: 8. Disaster Warning and Evacuation

Disaster Warning and Evacuation	Particulars	No. of Respondents	Percentage
Get Warning Prior to any Major Disaster	Yes	400	100.0
Source of Information regarding Disaster	TV	4	1.0
	Internet	230	57.5
	LSG	80	20.0
	Family and friends	86	21.5
Reliability and Efficiency of the Warning	Good	400	100.0
People Response to Warning	People take warnings seriously	400	100.0
Get Support from External Agency during Disaster	No	12	3.0
	Yes	388	97.0
Ensure Safety of Vulnerable during Disaster	No Special attention given	24	6.0
	Priority given during evacuation, relief and rehabilitation	376	94.0

The data on disaster warning and evacuation provides a detailed view of the community's preparedness and response to disasters:

Disaster Warnings: All respondents (100%) receive warnings prior to any major disaster, indicating a well-established warning system. The reliability and efficiency of these warnings are also universally rated as good (100%), suggesting that the warning system is effective.

Sources of Information: The primary source of disaster information is the internet (57.5%), followed by family and friends (21.5%) and local self-government (LSG) (20%). Television is the least used source, cited by only 1% of respondents. This distribution highlights the role of digital and personal networks in disseminating disaster information.

Response to Warnings: The data shows all respondents (100%) take warnings seriously,

External Support: A vast majority of respondents (97%) receive support from external agencies during disasters, underscoring a strong network of assistance. However, a small portion (3%) does not receive such support.

Support for Vulnerable Groups: Most respondents (94%) report that priority is given to the evacuation, relief, and rehabilitation of vulnerable groups, while 6% note that no special attention is given. It indicates that efforts are generally focused on supporting the most at-risk individuals during disasters.

Table No: 9. Economy, Income and Employment

Economy, Income and Employment	Particulars	No. of Respondents	Percentage
Are you an Earning Member at your House	No	66	16.5
	Yes	334	83.5
Primary Source of Income of Family	Business	2	.5
	Government	50	12.5
	Private Firm-Full time	50	12.5
	Daily Wage	38	9.5
	Others	260	65.0

Multiple Source of Income	No	222	55.5
	Yes	178	44.5
Women Engaged in Income generation	No	40	10.0
	Yes	360	90.0
Children Engaged in Income Generation	No	296	74.0
	Yes	104	26.0
Access to Loans, Microfinance	No	74	18.5
	Yes	326	81.5
Get Disaster resilience Funds from Govt or Non-Govt.	No	334	83.5
	Yes	66	16.5

The data on economy, income, and employment provides a comprehensive overview of the community's financial status and employment patterns:

Earning Members: A majority of respondents (83.5%) are earning members of their households, indicating a significant proportion of the community is actively contributing to household income. Conversely, 16.5% are not earning members.

Primary Sources of Income: The primary sources of income for families are diverse. A small percentage relies on business (0.5%), government (12.5%), private firms (12.5%), and daily wages (9.5%). The majority (65%) cite "others" as their primary income source, which may include informal or varied sources not specifically listed.

Multiple Income Sources: More than half of the respondents (55.5%) do not have multiple sources of income, while 44.5% do. This indicates that a significant portion of the community relies on a single income source, which may impact financial stability.

Income Generation by Women and Children: A large majority of women (90%) are engaged in income generation, whereas only 26% of children contribute to household income. This reflects a strong involvement of women in economic activities, while child labor is less prevalent.

Access to Financial Services: Most respondents (81.5%) have access to loans or microfinance, suggesting a good level of financial service availability. However, 18.5% do not have such access.

Disaster Resilience Funds: The majority of respondents (83.5%) do not receive disaster resilience funds from government or non-government sources, while 16.5% do. This indicates a gap in financial support for disaster preparedness and recovery.

Table No: 10. Education

Education	Particulars	No. of Respondents	Percentage
Average Years spent a School	<4 years	48	12.0
	4 to 8 years	86	21.5
	8 to 12 years	266	66.5

The data on education reveals the following trends regarding the average years spent in school: A significant majority of respondents (66.5%) have spent between 8 to 12 years in school, indicating a relatively high level of educational attainment. In contrast, 21.5% have spent between 4 to 8 years in school, and 12% have spent less than 4 years in school.

Table No: 11. Health Status

Health Status	Particulars	No. of Respondents	Percentage
Any Private Practitioners Nearby Locality	No	28	7.0
	Yes	372	93.0
Everybody can Afford the Fee of Private Practitioners	No	400	100.0

The data on health status reveals that while a significant majority of respondents (93%) have access to private practitioners in their locality, all respondents (100%) report that they cannot afford the fees of these private healthcare providers. This highlights a major issue: despite the availability of private healthcare services, financial constraints prevent the community from utilizing them. The universal inability to afford private medical care underscores the need for more affordable healthcare options or increased financial support to ensure that all members of the community can access the medical services they require.

Table No: 12. Community Assets

Community Assets	Particulars	No. of Respondents	Percentage
Place of Shelter during Disaster	Shift to other places	150	37.5
	Government Relief Camps	26	6.5
	Schools and Temple	224	56.0

The data on community assets indicates how residents find shelter during disasters: A majority of respondents (56%) rely on schools and temples as places of shelter during disasters, suggesting that these community buildings are crucial resources in times of crisis. Additionally, 37.5% of respondents shift to other places for shelter, indicating some degree of self-organization or reliance on alternative locations. A smaller proportion (6.5%) use government relief camps, which may reflect limited access to or availability of these facilities. Overall, while schools and temples play a significant role in providing shelter, there is a notable reliance on alternative arrangements and a lesser use of government relief camps.

Table No: 13. Infrastructure

Infrastructure	Particulars	No. of Respondents	Percentage
Where do you go frequently when Fall Sick	Private Clinic	66	16.5
	Home remedies	36	9.0
	Govt. Hospital	298	74.5
Distance to Government Hospital	Vary Far	26	6.5
	Near	374	93.5
Mobile Clinic Visit your Community	No	400	100.0
Type of School in Neighbourhood	Balwadi	294	73.5
	Primary	106	26.5
Distance to School	Near	400	100.0

The data on infrastructure provides insights into healthcare and educational resources within the community:

When individuals fall sick, the majority of respondents (74.5%) go to government hospitals for treatment, indicating a strong reliance on public healthcare facilities. A smaller portion seeks care at private clinics (16.5%) or uses home remedies (9%). The accessibility of government

hospitals is generally positive, with 93.5% of respondents noting that the hospital is near, while only 6.5% find it very far.

There are no mobile clinics visiting the community, as confirmed by all respondents (100%). This absence may limit access to healthcare services for some residents.

In terms of education, the predominant type of school in the neighborhood is Balwadi (73.5%), which serves as an early childhood education center. A smaller proportion of respondents have access to primary schools (26.5%). All respondents (100%) report that the school is near, highlighting good proximity to educational facilities.

Table No: 14. Knowledge and Awareness

Knowledge and Awareness	Particulars	No. of Respondents	Percentage
Aware about the Disaster Preparation	Yes	400	100.0
Kind of Preparation before Monsoon	Increase Plinth Level	278	69.5
	Increase the Height of Wall	122	30.5

The data on knowledge and awareness about disaster preparation indicates that all respondents (100%) are aware of disaster preparation measures. This suggests a high level of awareness within the community regarding the importance of preparing for disasters.

In terms of specific preparations before the monsoon, the majority of respondents (69.5%) take the measure of increasing the plinth level of their homes. This approach helps mitigate the risk of flooding by elevating the structure. A smaller portion of respondents (30.5%) focus on increasing the height of the walls, which can also provide protection against water damage.

Table No: 15. Social Conflict

Social Conflict	Particulars	No. of Respondents	Percentage
Perception towards Community Conflict and Cooperation	Cooperative and help one another	4200	100.0
Community Conflict and Cooperation affect Community Resilience	Yes	400	100.0

The data on social conflict and cooperation within the community reveals a strong sense of unity and collaboration. All respondents (100%) perceive the community as cooperative and supportive, indicating a high level of mutual assistance and solidarity among residents. Additionally, every respondent (100%) acknowledges that community conflict and cooperation significantly affect community resilience. This highlights the understanding that positive social dynamics contribute to a community's ability to withstand and recover from challenges, reinforcing the importance of cooperation and conflict resolution in enhancing resilience.

Table No: 16. Internal Institutions

Internal Institutions	Particulars	No. of Respondents	Percentage
Involvement of CBOs in Community for Social Development	Good	400	100.0
Involvement of CBOs in Community for Social Development	Poor	400	100.0

The data on internal institutions provides a mixed view of the involvement of Community-Based Organizations (CBOs) in social development:

All respondents (100%) perceive the involvement of CBOs in community social development as both good and poor. This conflicting feedback suggests that while there is a general recognition of CBO involvement, opinions on its effectiveness and impact are highly polarized. Such disparity might indicate varying experiences with CBOs within the community or differing expectations regarding their roles and contributions.

Overall, the uniformity in responses highlights a need for more nuanced evaluation and perhaps improved communication about the role and effectiveness of CBOs in fostering community development.

Table No: 18. External Institutions

Internal Institutions	Particulars	No. of Respondents	Percentage
Receive Support from External Organization	No	12	3.0
	Yes	388	97.0
Efficiency of External Institutions during Disaster	Poor	42	10.5
	Average	302	75.5
	Good	56	14.0

A vast majority of respondents (97%) receive support from external organizations, indicating strong external involvement in the community. However, there is variability in the perceived efficiency of these institutions during disasters. While 75.5% of respondents rate the efficiency as average, suggesting moderate effectiveness, 10.5% find it poor, and 14% consider it good. This distribution points to a generally positive but uneven assessment of external support, with room for improvement in enhancing the effectiveness of these institutions during crisis situations.

Table No: 19. Level of Resilience

S.No	Level of Resilience	No. of Respondents	Percentage
1	High	154	38.5
2	Moderate	202	50.5
3	Low	44	11.0
	Total	400	100.0

The data on the level of resilience within the community reveals a diverse distribution of resilience levels. A significant portion of respondents (38.5%) rate their resilience as high, suggesting that a notable segment of the community feels well-prepared and capable of managing challenges. The majority (50.5%) describe their resilience as moderate, indicating that while many individuals are somewhat prepared, there is room for improvement in strengthening their overall resilience. Notably, 11% of respondents report a low level of resilience, highlighting a group that may be particularly vulnerable or less equipped to handle adverse situations.

The distribution underscores a mixed picture of community resilience, with a substantial proportion feeling confident in their ability to cope with challenges, while others face more difficulties. These findings align with resilience theories which suggest that while some individuals or communities exhibit robust resilience, others may require targeted interventions to enhance their preparedness and capacity to respond to crises (Adger, 2000; Norris et al., 2008). Improving resilience among those with lower ratings could involve strategies such as increased education, better access to resources, and enhanced support systems to build overall community strength and preparedness.

FINDINGS OF THE STUDY

The following findings are given below:

1. The study shows that all respondents have access to personal toilets, but the complete absence of community toilets suggests a reliance on private sanitation rather than shared infrastructure.
2. The findings reveals that universal access to personal toilets, the occurrence of disease outbreaks due to poor sanitation indicates potential issues with hygiene practices or waste disposal systems.
3. The data demonstrates that 83.5% of shelter homes have proper toilet facilities, the remaining 16.5% lack adequate sanitation, potentially affecting vulnerable populations during emergencies.
4. The analysis proves that proper drainage facilities exist in 97% of shelter homes, reducing water logging risks, but the 3% lacking drainage may face hygiene challenges during adverse conditions.
5. The study that absence of community toilets and persistent disease outbreaks highlight the need for improved sanitation infrastructure, waste management, and hygiene awareness programs.
6. Majority of the respondents (76%) report that they do not face a constant threat of eviction. Only 24 are opined that are facing threat of eviction.

SUGGESTION

Some of the important suggestions given below:

1. Establish community toilets in high-need areas to complement private sanitation and ensure accessibility for individuals without adequate home facilities.
2. Implement hygiene education programs and waste disposal training to reduce disease outbreaks, emphasizing proper sanitation practices in households and shelter homes.
3. Improve drainage systems in the remaining 3% of shelter homes to prevent waterlogging and associated health risks during adverse weather conditions.
4. Government take appropriate measures to protect those who are under the threat of eviction.

CONCLUSION

Sanitation is a crucial factor in maintaining public health, especially in communities where inadequate facilities can lead to serious health risks. Proper sanitation infrastructure helps prevent diseases, supports environmental sustainability, and improves overall well-being. This study examined existing sanitation conditions, revealing significant gaps despite the availability of personal toilets. Findings indicate that while all respondents have access to personal toilets, the absence of community toilets suggests a reliance on private facilities. However, recurring disease outbreaks point to potential hygiene and waste management issues. Additionally, some shelter homes lack adequate toilet facilities, which could pose challenges during emergencies. Most shelter homes have proper drainage, but a small portion still experiences water logging, creating hygiene concerns in adverse conditions. These findings highlight the need for community sanitation facilities, improved waste disposal systems, and hygiene awareness programs to strengthen sanitation infrastructure and minimize health risks.

References

1. Adger, W. N. (2000). Social and ecological resilience: Are they related? *Progress in Human Geography*, 24(3), 347-364.
2. Aldrich, D. P., & Meyer, M. A. (2015). Social capital and community resilience. *American Behavioral Scientist*, 59(2), 254-269.
3. Cutter, S. L. (2016). Resilience to what? Resilience for whom? *The Geographical Journal*, 182(2), 110-113.

4. Cutter, S. L., Ash, K. D., & Emrich, C. T. (2014). The geographies of community disaster resilience. *Global Environmental Change*, 29, 65-77.
5. Cutter, S. L., Barnes, L., Berry, M., et al. (2008). A place-based model for understanding community resilience to natural disasters. *Global Environmental Change*, 18(4), 598-606.
6. Cutter, S. L., Burton, C. G., & Emrich, C. T. (2010). Disaster resilience indicators for benchmarking baseline conditions. *Journal of Homeland Security and Emergency Management*, 7(1), 1-22.
7. Government of Kerala (GOK). (2018). Kerala Post Disaster Needs Assessment. Government of Kerala.
8. IPCC (Intergovernmental Panel on Climate Change). (2014). Climate Change 2014: Impacts, Adaptation, and Vulnerability. Cambridge University Press.
9. KSDMA (Kerala State Disaster Management Authority). (2020). Disaster management plan for Kerala. Government of Kerala.
10. NDMA (National Disaster Management Authority). (2020). National disaster management plan. Government of India.
11. Norris, F. H., Stevens, S. P., Pfefferbaum, B., et al. (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.
12. Paton, D., & Johnston, D. (2017). Disaster resilience: An integrated approach. Charles C Thomas Publisher.
13. Sherrieb, K., Norris, F. H., & Galea, S. (2010). Measuring capacities for community resilience. *Social Indicators Research*, 99(2), 227-247.
14. Tiernan, A., Drennan, L., Nalau, J., et al. (2019). A review of themes in disaster resilience literature and international practice since 2012. *Policy Design and Practice*, 2(1), 53-74.
15. UNDRR (United Nations Office for Disaster Risk Reduction). (2019). Global Assessment Report on Disaster Risk Reduction. UNDRR.
16. United Nations. (2015). Transforming our world: The 2030 Agenda for Sustainable Development. United Nations.
17. Cutter, S. L., Barnes, L., Berry, M., Burton, C., Evans, E., Tate, E., & Webb, J. (2008). A place-based model for understanding community resilience to natural disasters. *Global Environmental Change*, 18(4), 598-606. <https://doi.org/10.1016/j.gloenvcha.2008.07.013>
18. Government of Kerala (GOK). (2018). Kerala post disaster needs assessment: Floods and landslides – August 2018. Government of Kerala.
19. National Disaster Management Authority (NDMA). (2020). *Guidelines on disaster risk resilience and reduction in India*. Government of India.
20. 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. <https://doi.org/10.1007/s10464-007-9156-6>
21. Paton, D., & Johnston, D. (2017). *Disaster resilience: An integrated approach*. Charles C. Thomas Publisher.
22. Tiernan, A., Drennan, L., Nalau, J., Onyango, E., Morrissey, L., & Mackey, B. (2019). A review of themes in disaster resilience literature and international practice since 2012. *Policy Design and Practice*, 2(1), 53-74. <https://doi.org/10.1080/25741292.2019.1620098>
23. United Nations Office for Disaster Risk Reduction (UNDRR). (2015). *Sendai framework for disaster risk reduction 2015-2030*. United Nations.
24. United Nations Office for Disaster Risk Reduction (UNDRR). (2019). *Global assessment report on disaster risk reduction 2019*. United Nations.