



ASSESSING VULNERABILITY, PREPAREDNESS AND MITIGATION MEASURES OF NATURAL DISASTERS IN MUNNAR PANCHAYAT OF IDUKKI DISTRICT, KERALA

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ABSTRACT

Disaster preparedness is a broad notion that covers steps taken to mitigate the effects of disasters and support the vulnerable community's activities. Disaster management plans are required to guarantee that communities are adequately prepared, disaster management plans are required, and community involvement in DRR planning is crucial. In a disaster management strategy, the vulnerability of the poor community must be taken into consideration. In order to make the community resilient to catastrophes and provide it with the capacity to withstand the conditions on its own, the community should be included in the development of the community management plan. It can be challenging to take the first step, but doing so will ensure community safety for future generations.

Highlight: *In this study, the vulnerability, preparedness and mitigation of the community during a disaster time are highlighted in a broader manner.*

KEYWORDS: *Mitigation, Vulnerability, Recovery, DRR committee, DRR plan, Kerala, Munnar*

INTRODUCTION

Disaster preparedness is a wide concept that includes actions made to lessen the consequences of disasters and strengthen the activities of the vulnerable community. It envisions a scenario in which community growth is facilitated by an ongoing, integrated process. National Society programmes, also entail increasing community-organized planning and preparation. Improving the effectiveness and efficiency of community-level emergency response to disasters. This involves assisting local communities and populations in their ongoing efforts to lower risks and set up local response systems to handle emergency situations brought on by disasters. In disaster-affected areas, disaster management is used to deal with the damage caused by floods, landslides, cyclones, etc. The main goal of disaster management initiatives and programmes is to lessen community vulnerability. The inability of an individual or society to anticipate, control, withstand, and recover from the effects of disasters leads to vulnerability. Community-based strategies and initiatives that increase a group's ability to deal with disasters and lessen their consequences on daily life might lessen the vulnerability effect. Disaster mitigation is a method to enhance the community's preventative actions to get rid of or lessen the effects and hazards before a disaster happens. Mitigation is also a part of disaster management activities it is of two types 1) Primary Mitigation and 2) Secondary mitigation. The primary mitigation focuses to reduce the presence of hazards in the community and also to reduce the vulnerability of the community. The secondary mitigation involves people to make them prepared for the hazards its main concept is to create a preparedness capability among the community to reduce the impacts

One of the states that were unable to withstand the effects of the 2018 floods in its districts was Kerala. August of the year 2018 had tremendous flooding that severely damaged 13 of the 14 districts. Beginning on August 14 and lasting till August 19, a second strong rainstorm caused torrential downpours and landslides in several locations around Kerala. The results of many studies show that the smaller the repercussions on the community, the greater the mitigation and preventative actions. Disaster management plans are necessary to ensure that communities are adequately prepared, and community involvement in DRR planning is essential. Idukki's accident caused significant harm that shouldn't occur anywhere else. This study mainly focuses on evaluating the disaster's susceptibility, preparedness for the circumstance in the future, and the mitigation process carried out by various stakeholders in order to improve the community's condition.

METHODOLOGY FOR STUDY

The Munnar Panchayat of the Devikulam block in Kerala was chosen to conduct the study. The criteria used to select these 7 villages was where the previous tragedy occurred. To perform the disaster research study, a sample size of about 100 sample households was chosen. Depending on who was available, 7 to 15 houses from each village were chosen. Using a pre-formatted questionnaire, the sampling data was gathered. With the aid of a baseline, the study was heavily focused on research and information. By randomly selecting 10 families to interview, a questionnaire underwent a piloting test. Based on the results, the



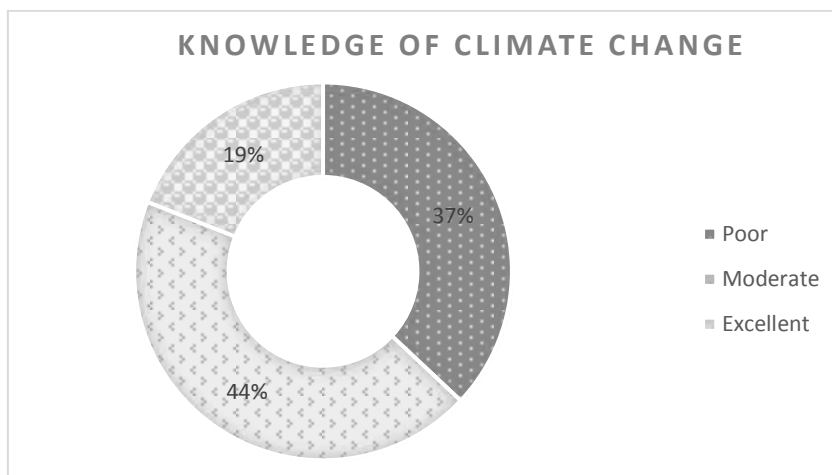
questionnaire was then revised, and data was gathered from sample respondents in the field. The information was gathered between May and July of 2022. Many mathematical and statistical tools were used to complete the analytical representation of the data.

RESULTS AND DISCUSSION

The state of Kerala has its uniqueness in nature and beauty in culture. In July 2018, Kerala, a state in southern India, experienced the worst natural disaster on record. These catastrophes in Kerala during the monsoon season were brought on by the unexpectedly high and severe rainfall. Almost a century's worth of records was broken by this catastrophic deluge. According to the study's statistics, the primary means of subsistence for the population is working on tea estate plantations, where one can make up to Rs. 400–Rs. 500 per day. The estate offers housing for employees, but because it is built on the mountain's base, the community's living circumstances are extremely susceptible to natural calamities. A significant landslide or downpour in this case might have a significant impact on the entire neighbourhood. According to prior experience, the state is susceptible to monsoon rains and landslides from June to August. It has a negative impact on livelihood and cattle, which are essential to the rural economy. By improving the community's preparedness and disaster mitigation, people will be able to leave hazardous areas when a disaster strikes.

Community's Knowledge of Disaster

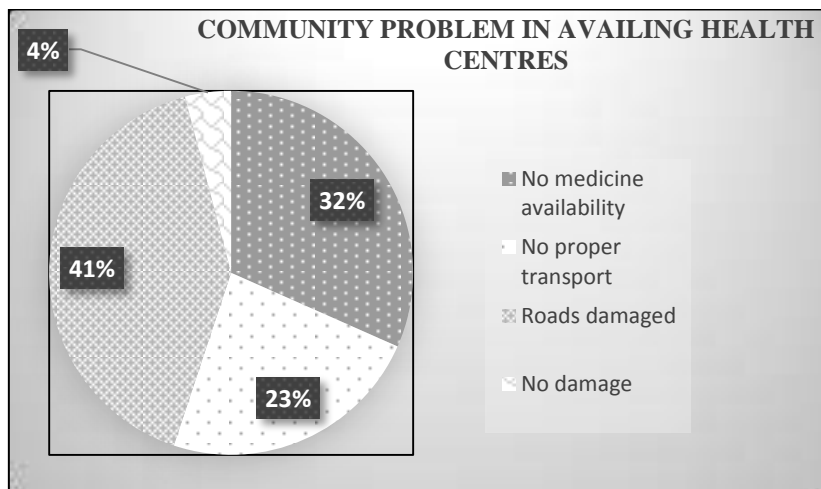
The research study focused to understand the knowledge, and preparedness of the community towards disaster. The capturing of existing status from the locality will help to increase the mitigation of the community. Local residents can significantly help to lessen the loss of life and property. They are typically not helpless victims; instead, they are the most at risk of calamity and bear the brunt of its effects.



According to the previous study, people's activities before to the crisis will significantly lessen its impact on both the individual and community levels. According to the above Chart, 44% of respondents have average awareness of disasters and climate change, compared to 37% who have no concept of what climate change is or how it will affect their lives. The lack of ideas and such poor knowledge make the community more vulnerable.

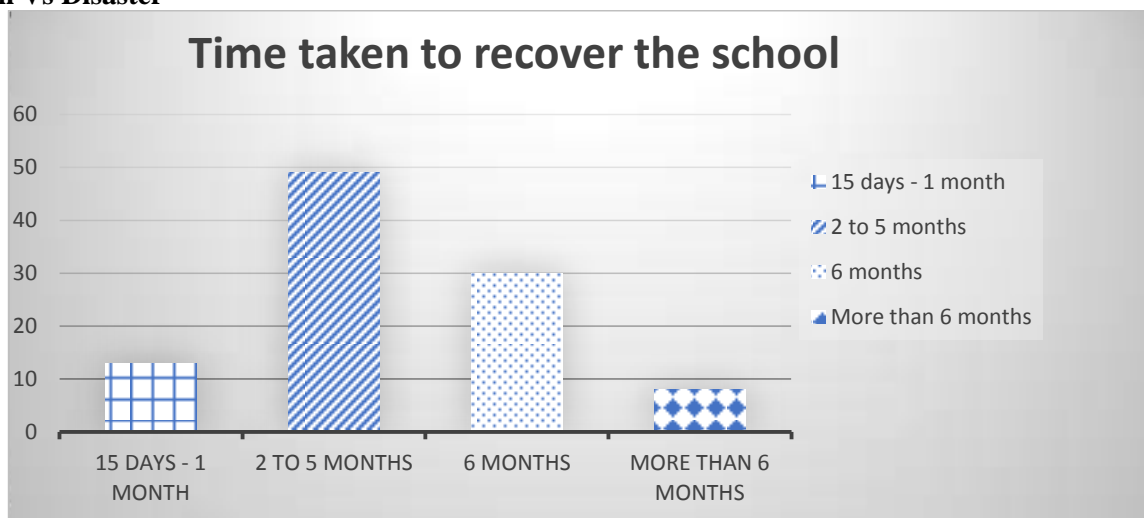
Health Vs Disaster

"Health is a condition of total mental, bodily, and social well-being and not only the absence of disease or disability," according to the World Health Organization. The women in the houses struggled greatly to control the situation during the catastrophe. Children, pregnant women, and elderly people were among the most vulnerable populations in terms of health characteristics. The survey's findings show how challenging it can be for these vulnerable people to access health care during a crisis. Also, it revealed that people are quite vulnerable to disease attacks.



From the above chart, it was noted that 96 of the 100 participants in the sample survey suffered to avail the health services during the disaster. Road conditions were severely damaged and blocked during the disaster period. According to the survey, 41% of the population was unable to reach the hospital due to road obstructions, 23% of people were unable to access sufficient transportation to the hospital, and 32% of community hospitals lacked medical facilities during disasters. In order to limit the risk of losing community life, a major helping hand is required or preemptive activities are required for health reasons.

Education Vs Disaster



After the disaster, it had a terrible effect on the students' schooling. The pupils had a lot of challenges carrying forward with their schooling after the accident. According to the FGD, in order to keep people safe and secure, a portion of the relief camps was held in colleges and schools. Some families stayed there for almost six months, which put the government in a difficult predicament in deciding how to respond. The main challenge students experience in carrying on with their studies following a calamity was discussed throughout the sampling survey. The loss of their books, certifications, friends, and families had an impact on their mental health.

In disaster management efforts, the time frame for recovering the loss is crucial. The graph demonstrates that it typically takes students time between two and five months to experience normal conditions at school events. The Kerala government assisted the students during that particular 2018 period by issuing grades for the upcoming academic year. It was mentioned at the FGD with the afflicted school children that the students had plenty of time to heal from the effects of the calamities.

Gender Vs Disaster

Women were crucial in getting things back to their original state under the post-disaster situations. The survey and focus group discussion with women revealed that the burden of family responsibilities falls disproportionately on women, which has a



significant psychological impact on married women. According to the research, the economic situation and the decreased flow of money to families had a significant negative impact on women's ability to lead stable families.

Difficulties faced by women in disaster

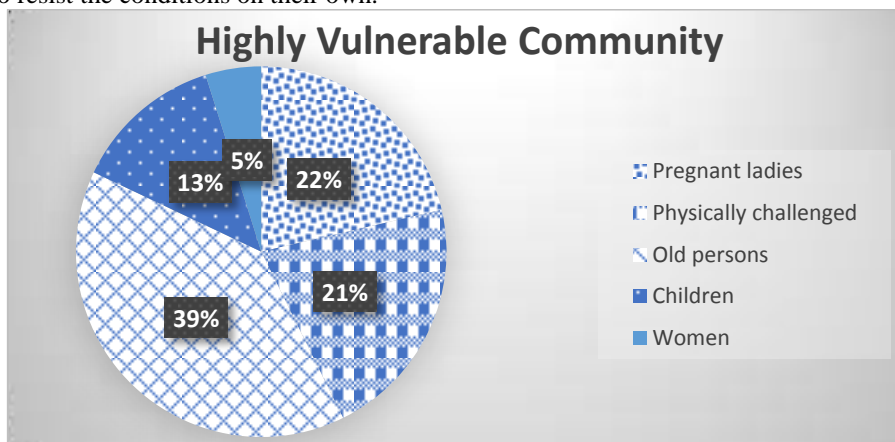
The scenario during the tragedy and the challenges experienced by women and adolescent girls were noticed from FGD with women's groups.

- ✓ The lack of hygienic and sufficient sanitation has a significant negative influence on the health of the women in the community. During the menstrual cycle, adolescent girls are particularly vulnerable to illnesses brought on by germs and other health risks. The girls are put in an unimaginable scenario due to the lack of napkins following the crisis. The majority of the women claimed that amid the crisis, they didn't eat properly. They just ate one meal a day and managed to escape the catastrophe.
- ✓ This is due to the fact that they intended to maintain food for their young children and elderly relatives in the house for their well-being. The fact that they were more concerned with each other's conditions than their own shows that the ladies are infinitely responsible for the catastrophic pattern.
- ✓ For women and teenage girls, the camp experience is also challenging. According to the study's analysis, 34% of community women claimed that the staying camps lacked appropriate amenities and privacy for them. Another key reason why community women preferred not to stay in the camps was the absence of restroom facilities.

Women play a crucial role in maintaining the stability of the family through all disasters and hardships. The benefits of the need they express will go to family members rather than to themselves. For the sake of the family's safety and security, the attention paid to women during impending disasters needs to be improved.

Vulnerable community on forthcoming disasters

The vulnerability of the underprivileged community must be taken into account in a disaster management plan. The community should be included in the evolution of the community management plan in order to make them catastrophe resilient and provide them with the ability to resist the conditions on their own.



These sensitive populations are seriously threatened by climate change. A community that lacks preventive measures and preparation efforts is extremely vulnerable to disasters since the consequences will be severe and it places an unbalanced burden on a family. To the respondents, it was questioned about who is more vulnerable during a time of disaster. The aforementioned diagram illustrates how the local population views the susceptible neighbourhood during a tragedy. According to 39% of respondents, elderly people are extremely vulnerable, and the consequences will be felt both widely by them and by children. Children and the elderly are particularly vulnerable to local illness epidemics during disasters.

Age	Female	Male	Total
1-11	27	17	44
11-21	27	27	54
21-31	36	43	79
31-41	33	30	63
41-51	28	25	53
51-61	23	26	49
61-71	7	11	18
71-81	1	1	2

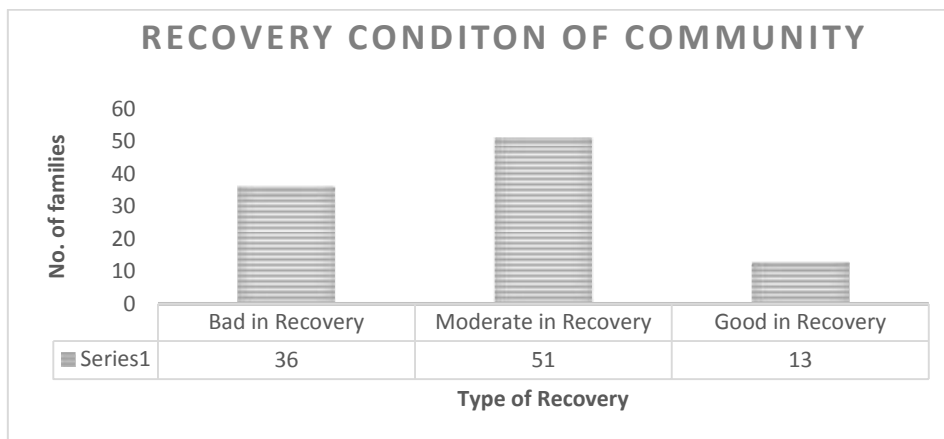


The age distribution of the sample population is shown in the table above. Families with little children under 10 years old and seniors over the age of 50 are particularly at risk in the event of a disaster. Although this sample situation implies a high level of vulnerable conditions the community is coping with in daily life, there are approximately 115 vulnerable members in the set of 100 samples, including children and elderly people.

The risks associated with pregnant women and physically challenged people were discussed throughout the FGD. Pregnant women were put under a lot of stress as a result of the severe mobility restrictions and the lack of medical facilities in the area during the disaster time. Some of them moved as soon as possible to their mothers' homes before the disaster struck, but others stayed and managed it because the risk to them during a disaster is high. The impact of disaster places a heavy burden on the women because they must take care of the children, prepare food, maintain the family's finances with the available funds, and manage the family in a good way until the disaster is over. The women stand by every situation inside and outside the home to protect the children. Yet, none of the women who were interviewed stated that they are particularly vulnerable during a disaster; this indicates that they have accepted it as a yearly occurrence in their lives.

Recovery from disaster

Rebuilding endurance or going back to a normal state is referred to as recovery. Two indicators, "Money spent on the process of recovery after the disaster, and time spent on recovery process after the disaster," were used to evaluate the community's response to the disaster.



After analyzing the respondent's data, it was discovered that 13% of families were in a position to recover quickly from the effects of the disaster, while the remaining 36% of families were in poor condition, and the midrange is high more than 50% of families. Even though the calamity cannot be stopped, individuals nevertheless need to improve their ability to recover from its effects. Since they were the first to respond to the disaster, it is a crucial component.

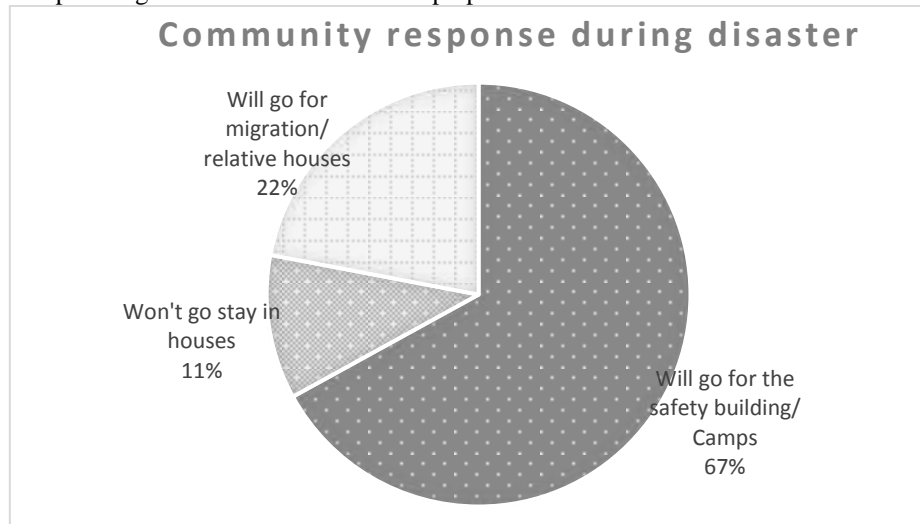
4 - Very low			2 - 4 (Bad in Recovery) - 1
3 - Low			5 -7 (Moderate in Recovery) - 2
2 - Medium			8 - 9 Good in Recovery - 3
1 - High			
Coding on Money spent	How much time your family took to revive back to normal Situation?	Sum	Coding
3	3	6	2
1	1	2	1
2	3	5	2
2	4	6	2
2	4	6	2
1	3	4	1

According to the community's answer, the above table displays the computation and outcomes for two indicators (Time taken for recovery and money spent).

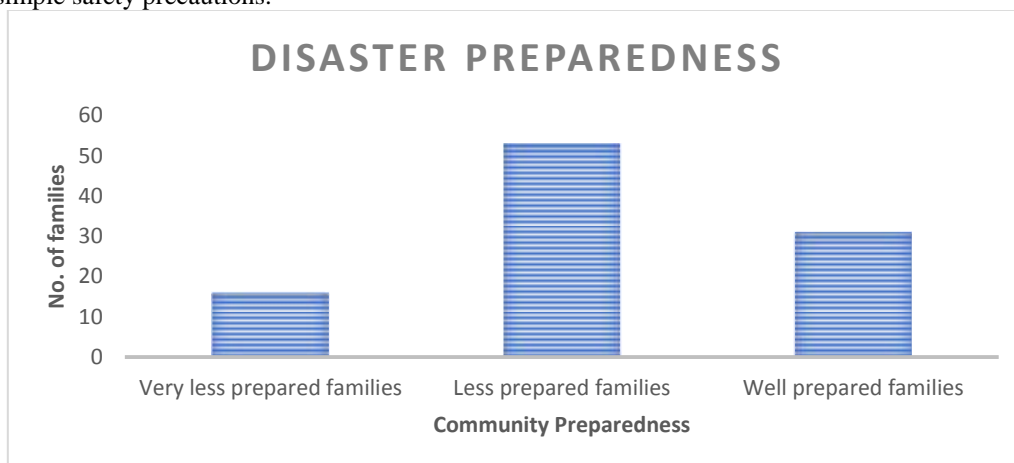


Disaster Preparedness

Disaster preparedness refers to the actions made beforehand to lessen or eliminate the effects of the event. This preparedness involved a variety of activities. The community must act as the first responder to the calamity. They must create the catastrophe plan on their own with assistance from existing planning efforts and the relevant parties. There are numerous methods by which the other stakeholders are planning for disaster readiness and preparedness.



As a result of the lack of disaster safety structures in the communities, individuals became trapped during the 2018 floods. If there was no safety building, the community lost the choice of entering safe areas with the unexpected occurrence of the calamity. In order to securely evacuate the population, the authorities set up camps as soon as possible in and around the estate regions. The community was questioned about their early responses after such a terrible tragedy. The FGD made it quite obvious that the community has developed to take proactive steps to lessen the impact on their family. From the samples taken, 67% of respondents said they would visit the local disaster relief camps. Another 22% of people wish to migrate or go live with a relative in order to be safe. Another 11% of people believe they should take care of their own living arrangements since they don't want to burden the camps any further. If we examine the responses from the past, 90% of the respondents indicated that they were unfamiliar with relief camps. It shows that people in the neighbourhood have taken note of the terrible event and realized they must take some simple safety precautions.



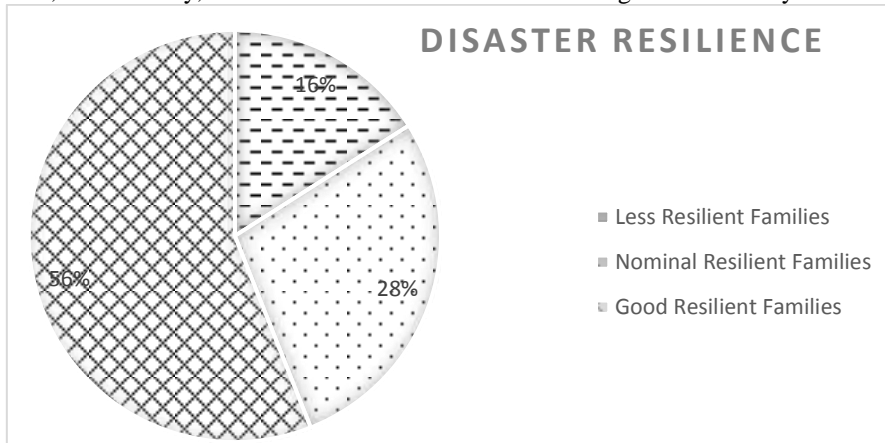
After examining the other sets of data (Safety measures by community, knowledge of disaster safety buildings, prior experience and time to reach safety buildings) from the samples gathered, it was discovered that 16% of families are extremely underprepared for disasters, 53% of families are comparatively underprepared to deal with the disaster's effects, and the remaining 31% of families are well-prepared to deal with the disaster's effects.

Disaster Resilience

The ability to bounce back to normal after a calamity is what resilience is. The safety precautions that a specific household has taken for any danger, such as insurance etc., will determine how resilient they are. The role of the community in lessening the



impact of the calamity on the family is crucial. After the disaster occurred, their forecast or impression should either address the family's current damages or, alternatively, should concentrate on the future damages that a family will face.

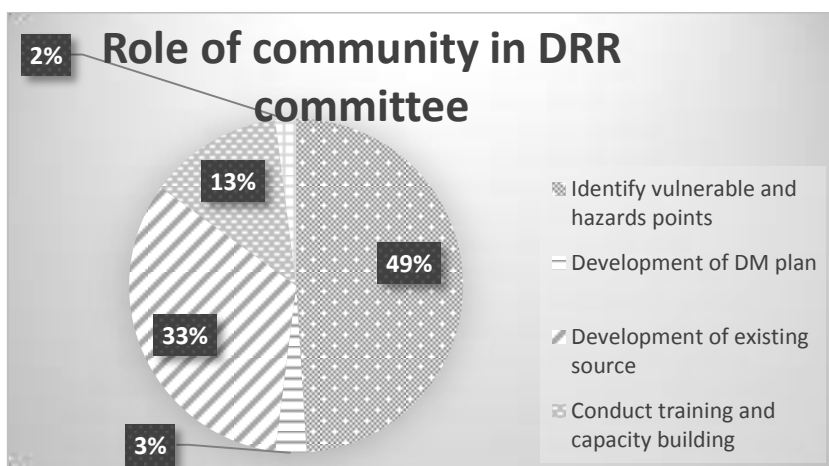


"How much they spend to revive back," "Losses that a family incurs in terms of economics," and "How many months to revive back to the same condition" are indicators to measure the resilience of the families. and insurance that will lower the family's risk. The individuals used to live in estate homes, and they started saving money from their daily expenses to build a more resilient future. The study of the samples obtained aids in understanding community resilience. According to the graph, 16% of families have lower resilience, 28% have nominal resilience, and the remaining 56% have strong resilience. For that 16% of families, strengthening their emergency preparedness is essential and such families need to be covered under the disaster management plan.

Disaster Risk Reduction Committee

In order to lessen the risks and effects of a disaster, the community is given access to safe spaces by the panchayat and the local government. The panchayat members stated in the FGD that in the current scenario during the monsoon season, they began to go at the basic facilities attached structures for the purpose of providing camps to the community in the event of a landslide or flood, under certain criteria.

- There should be enough room at the camp for at least 100 to 150 people to remain, and sleeping arrangements should be made, as well as basic amenities like toilets and power.
- The ability to transport people shouldn't be a barrier to evacuating them to those safe locations.
- For estate workers, it should be on the estate; if not, it should be close by so that people can arrive safely in a short amount of time.



To handle the effects of disasters on the hamlet, the panchayat established a DRR (Disaster Risk Reduction) committee. Once every two months, a meeting is held to discuss the status of the panchayat. This committee's main objective is to develop mitigation measures in advance in order to lessen the impact and increase community resilience to disasters.

It is a well-known reality that in any tragedy, the community is both the first to be impacted and the first to respond. Two-thirds of the female respondents and more than half of the male respondents shared this opinion. A thorough curriculum must be developed in order to train the community, and the training must be formal. The district officials and specialists should deliver the training.



NGOs, Fire & Emergency Services, and Police may also be involved in providing training in their specialized sectors. All three major stakeholders—the community, district governments, and business sector—should contribute at the time of disaster. The preparedness circumstances, in particular the community's participation in the DRR committee, are the main focus of this section. The sample poll reveals that half of the respondents want to concentrate on taking proactive measures before the disaster strikes to save the people and that 49% of the respondents want to identify the susceptible area to take action. The remaining 33% of individuals wish to develop the current sources, which is crucial for being ready to handle impending calamities. The development should concentrate on each and every area mentioned in the current sources, including the staying housing, DRR committee, Recovery steps, and Rehabilitation measures, in order to build an effective working environment for the community.

Disaster Vs Four Capitals

It evaluated the effects of potential disasters or climate change on four types of capital: natural, physical, financial, and human. Via the FGD, the community and its members explored social capital, and the community's DM plan included this discussion. The matrix for calculating climate resilience was also included in the replies.

The Absorption (need to deal with the disaster with no chance to avoid the hazard), Adaptation (option for preparation and moving to a safe zone), and Transformation (3-variable scale) scales were utilised (a permanent change to avoid the entire threat).

Disaster Resilience Matrix	Absorption	Adaptation	Transformation
Physical Capital	57	29	14
Human Capital	6	53	41
Natural Capital	94	0	6
Financial Capital	42	58	0

The evaluation of the five capitals shows how vulnerable, resilient, and ready the community is for the future. The impact on the community throughout the four capitals, the affected assets, and the chosen disaster relief measures are the indicators for the disaster resilience matrix.

CONCLUSION

The research effort has amply demonstrated that Munnar Panchayat is more susceptible to natural and man-made calamities. Even the fundamentals of disaster management would have to be included in the capacity development sectors because the community does not have the knowledge necessary for their safety in the event of a disaster. The results of the research show that the community is vulnerable to disasters including landslides, floods, and high rainfall during the monsoon season, which puts the poor and marginalized groups at greater risk. The stakeholders should develop a safe space for the community to deal with and address calamities.

The local populace must understand their part in the community in order to carry out their duties competently enough to lessen vulnerability. Nature is always an unforeseen factor in everyone's daily lives. In every human-nature conflict, nature triumphs and lessens the conditions of living all over the place, which is why there is a lack of preparedness.

WAY FORWARD

- Regarding the residents' living arrangements in this panchayat, quick action is required. 93% of guests are staying in homes with thatched roofs and asbestos sheeting. When compared to concrete homes, these homes have a very low storm or heavy rain resilience.
- There needs to be immediate action taken in regards to the living conditions of the citizens in this panchayat. Homes with thatched roofs and asbestos sheeting are where 93% of visitors are staying. These homes have a very low storm or heavy rain resistance when compared to concrete homes.
- As a result of the widespread adoption of digital technology, people will benefit greatly from early warning systems and effective monitoring of water flow. Installing such digital surveillance throughout the panchayat will lessen the impact on the populace because many developed such a comprehensive strategy for a specific area and because the government supports those projects.

As a result, the crisis was unexpected, and it will take a long time and significant financial resources to put everything in place that will keep the community safe and resilient during the disaster. In order to improve the quality of life throughout the panchayat, NGOs, people organizations, and the panchayat will work together. Despite the fact that taking the initial step is usually difficult, doing so will ensure community safety for future generations.



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