

# Risk Communication in Disaster-Prone Areas in Caramoan, Camarines Sur, Philippines

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## ABSTRACT

The municipality of Caramoan in Camarines Sur lies in the eastern seaboard of the Philippines. As such, while it is a tourist destination in the Bicol Region, it is prone to natural disasters due to its geographic location. This study evaluated the risk communication in Caramoan in terms of phenomenal natural disasters, and the efficiency of risk communication sources, strategies, and platforms utilized. The researchers used a mixed method research design to answer the objectives of the study. A survey questionnaire was used as a research instrument on the 364 respondents from the five selected barangays. Interview questions were used on the three informants from the local agencies in the municipality. This study found that the primary natural disaster experienced was Heavy Rainfall indicated by 363 respondents. Further, the primary reliable sources were TV weather forecasts and the mayor's office with a mean of 3.86 interpreted as Highly Efficient. In the three phases of natural disasters the communication platform primarily utilized was television broadcasting and the communication strategy frequently used was Face-to-face communication with neighbors. The study found that the residents are aware and well-prepared for the natural disasters in their area. Municipality's risk communication in natural disaster preparedness initiatives have

been highly efficient due to their emphasis on community awareness, involvement, and resilience-building. The study recommends 1.) A Risk Communication Plan be drafted to increase the municipality's resistance to its various natural hazards, 2.) Establish a unified and well-coordinated approach to risk communication and consistently solicit feedback from the community to continually improve and adjust ways to communicate to suit specific needs and preferences, and 3.) A study on risk communication messages in three phases of natural disasters be made to increase risk perception and to achieve behavioral change.

**Keywords:** Risk Communication, Disaster Prone Areas, Efficiency of Risk Communication Sources and Strategies, Warnings and Mechanisms for Natural Disaster Preparedness and Resiliency.

## INTRODUCTION

Communication is a part of our daily lives. As we communicate, we use different types of communication such as verbal and non-verbal. Therefore, communication serves as a tool to disseminate information and provide awareness to people about a certain phenomenon. Thus, to communicate effectively and be an efficient communicator it is important to learn, understand, and determine the types of communication to be utilized and most especially determine the target audiences.

Risk communication is a dynamic process that involves exchanging information about risks between experts, decision-makers, and the public. Effective risk communication also encompasses the importance of tailoring messages to diverse cultural and linguistic backgrounds, leveraging multiple communication channels to reach different segments of the population, anticipating and addressing misinformation, and collaborating with trusted community leaders and influencers to amplify messages, recognizing the role of emotions and cognitive biases in risk perception, facilitating two-way communication to address questions and concerns, and narrative techniques to make information more relatable and memorable. By embracing these additional strategies, risk communicators can further enhance their ability to engage, inform, and empower individuals and communities in navigating complex risk landscapes.

In disaster preparedness and mitigation, risk communication is evident to be resilient in a certain phenomenon. Which, according to the World Health Organization (WHO, 2020), risk communication is the real-time exchange of information, advice, and opinions between experts or officials and people who face a hazard or threat to their survival, health, or economic or social well-being. In short, risk communication is the type of communication that aims to prevent hazards or dangers from occurring. Furthermore, Horlick-Jones & Prades (2009) stated that risk communication as a policy tool has become increasingly important in areas as diverse as emergency planning and health communication, including aspects of many of the leading issues of the day. As a part of institutional attempts to inform and influence lay behavior, its use is predicated upon various models of how people make sense of risk-related issues.

According to the UNDRR Status Report on 2019 of Disaster Risk Reduction in the Philippines, the country is prone to natural disasters such as typhoons, earthquakes,

floods, volcanic eruptions, landslides, and fire, since the archipelago is located on the “Pacific Ring of Fire” and along the “Pacific typhoon belt.” The devastation of Typhoon Haiyan in 2013 spurred the Philippines to further develop its disaster management structures and resources by improving communication and institutionalizing roles. Thus, more recent floods, typhoons, and landslides have seen improved communication and coordination that mitigated impacts on lives and livelihoods (CFE-DM, 2021). The Philippines is one of the most geographically and meteorologically vulnerable nations in the world to natural disasters, ranking third globally in terms of disaster risk. The Philippines recorded 304 disaster events between the years 2000 and 2019, affecting an average of 7796 individuals per 100,000 people. This suggests that DRRM activities are being implemented at a high level (Ravago, Mapa, Sunglao, & Aycardo, 2020).

Consequently, natural disasters in the Philippines occur, resulting in losses for both people and their property, therefore, the Congress of Philippines passed the Republic Act No. 10121 on May 27, 2010, which is known as the “Philippine Disaster Risk Reduction and Management Act of 2010.” This Act provides for the development of policies and plans and the implementation of actions and measures about all aspects of disaster risk reduction and management, including good governance, risk assessment and early warning, knowledge building, and awareness raising, reducing underlying risk factors, and preparedness for effective response and early recovery.

The researchers’ interest is to gain and provide a better understanding of natural disaster hazards and their effects, which can help in developing effective strategies for disaster preparedness, response, and mitigation. Further, this study was conducted in the Municipality of Caramoan, Camarines Sur which is well-known for its magnificent ambiance due to the marvel

islands and white sands which became a tourist destination in the Philippines. The study of Bradecina et al. (2011), citing Escandor (2010) stated that, Caramoan, Philippines is a town endowed with nature's beauty preserved by its seclusion. The primary attraction of the area is the scenic

view of the beachscapes which is defined by unique geologic configurations, white sands, and clear waters. Its beauty is further boosted by unexplored lakelets, subterranean passages, and caves in small limestone islands.



Source: DENR-MGB

Figure 1. Map of Caramoan, Camarines Sur.

### Objectives

Generally, this research study aimed to assess the risk communication in the Municipality of Caramoan, Camarines Sur in terms of the efficiency of dissemination of warnings and mechanisms for natural disaster preparedness and resiliency.

Specifically, it aims to:

1. Determine the phenomenal natural disasters experienced in the selected Barangays of Caramoan, Camarines Sur.
2. Determine the efficiency of risk communication sources.

3. Identify the risk communication strategies utilized before, during, and after the natural disaster.

### MATERIALS & METHODS

This study used a mixed method, quantitative and qualitative research design using a descriptive survey and interview questions.

The respondents of the survey questionnaire were 364 adult residents of the five selected barangays from the 49 barangays in Caramoan, Camarines Sur. The five barangays were selected based on the data of MDRRMO of Caramoan, on the recent severe natural disaster occurrence in the

Municipality and the most affected barangays. To determine the desired sample size, the study used the Slovin Formula. Simple random sampling was used on the 364 respondents distributed in the five barangays as follows: Daraga (82), Mandiclom (52), Maligaya (48), Pili-Centro (62), and Tabgon (120). The three key informants of the study were from the Municipal Disaster Risk Reduction and Management (MDRRM) Officer, Municipal Agriculture (DA) Staff, and Municipal Environmental and Natural Resources Officer (MENRO),

The researcher sought approval from the University Dean and Thesis Adviser, provided a letter of permission for the LGU-Caramoan through the Office of the Mayor, and requested data on the five most affected barangays of the recent natural disaster that occurred in Caramoan from the Municipal Disaster Risk Reduction Management Office. A permission was sought from the Punong Barangay of five selected barangays in Caramoan to conduct the study and gather relevant data from its constituents. Further, the approval of the above-mentioned local agencies and officials was also sought.

The research instruments used were survey questionnaire and interview questions. The questionnaire was validated and approved by three experts and semi-structured questions for the key informant's open interview. An audio and video recording were used in the interview. The information gathered from the key informants was analyzed and coded. Deductive coding was used to analyze the information gathered from the key informants. For the survey, the researchers personally administered the data gathering. Part 1 of the survey questionnaire was on the phenomenal natural disasters experienced in the selected barangays of Caramoan, Camarines Sur. Part 2 was on the risk communication strategies and messages utilized before, during, and after the natural disaster. Part 3 was on sources of risk communication in the Municipality. Lastly, Part 4 was on efficiency of risk

communication along the disaster preparedness and resiliency.

## STATISTICAL ANALYSIS

Statistical treatment used in the study were frequency counts, ranking method, and mean. Frequency count and ranking method were used in natural disasters experienced by the respondents, and risk communication platforms and strategies. Mean was used in the efficiency of risk communication sources, and efficiency of risk communication along dissemination of warnings and mechanisms established on Natural Disaster Preparedness and Resiliency

The researchers used a Likert-four point scale to determine the responses on the efficiency of risk communication sources and strategies and on the efficiency of risk communication.

Rating Scale	Range	Interpretation
4	3.26 – 4.00	Highly Efficient
3	2.51 – 3.25	Moderately Efficient
2	1.76 – 2.50	Fairly Efficient
1	1.00 – 1.75	Not Efficient

## RESULT AND DISCUSSION

The study focused on the phenomenal natural disasters experienced in the selected Barangays of Caramoan, Camarines Sur, risk communication sources and their efficiency, risk communication strategies utilized before, during, and after the natural disaster, and the efficiency of risk communication along the efficiency of dissemination of warnings and mechanisms for natural disaster preparedness and resiliency. It is limited only on the experiences of the respondents in Caramoan, Camarines Sur and the flood prone areas.

### *Natural Disaster Indicators in Selected Barangays of Caramoan, Camarines Sur*

The top three frequent natural disasters experienced by the residents in Caramoan were Heavy Rainfall (363 respondents), Typhoons (360 respondents), and Landslides (359 respondents). These

highlight the diverse range and high prevalence of natural disasters in Caramoan. However, tsunamis, volcanic eruptions, and wildfires were not experienced in the municipality. In addition, from the interview Informant A stated,

*“In our municipality, we experience quite different compared to other municipalities because we have almost all the risks. It is because compared to others we have a land area and the water geographic area... the main two types of hazards in our locality is the flooding and landslide, we can also experience storm surge, earthquake, and also the heavy ashfall coming from the Mayon Volcano of Albay”*

Caramoan a neighbouring municipality of the province of Catanduanes considered typhoon-prone and often poses a significant threat which is in the periphery of the country that is near the Pacific Ocean. This is supported by the UNDRR Status Report on 2019 of Disaster Risk Reduction in the Philippines stated that the country is prone to natural disasters such as typhoons, earthquakes, floods, volcanic eruptions, landslides, and fire due to being nearly located on the “Pacific Ring of Fire” and along the “Pacific typhoon belt.”

The findings of this study is supported by Xue et al. (2022), in Sichuan Province of southwest China, an area that is prone to natural disasters. People who live in disaster-prone areas are often threatened by multiple disasters combined because of the chain reaction between different natural

disasters; for example, it can cause severe secondary disasters like landslides and collapses in the area. Furthermore, according to the UNDRR Status Report (2019), the location and geographical context of the Philippine Island, which is situated in the "Ring of Fire" between the Pacific and Eurasian tectonic plates, played a significant role in the natural disaster that occurred. Typhoons, storm surges, and rising sea levels were among the coastal hazards that posed a high risk to public safety. One's susceptibility is increased by natural disasters including flooding, landslides, droughts, and tsunamis.

The table below illustrates the prevalence of various natural disasters experienced by the residents in selected barangays in Caramoan, Camarines Sur. The data gathered indicate that the residents are aware of the natural disasters that they have been and may experience in their area that could probably cause damages and loss of lives and properties. The municipality of Caramoan is considered a disaster-prone area they were located on the periphery of the Partido area has a land and water geography and is near the Pacific Ocean. The aftermath of typhoons Ullyses and Rolly underscores the substantial damage on agriculture and coastal livelihoods. Landslides are caused by heavy rainfall, and typhoons, that affect the residents and damage their properties. Further, based on the interview with the informants, earthquake is seldom experienced.

**Table 1. Natural Disasters Experienced by Respondents.**

NATURAL DISASTERS INDICATORS	Frequency (N=364)	Rank
HEAVY RAINFALL	363	1
TYPHOON	360	2
LANDSLIDE	359	3
EARTHQUAKE	348	4
EL NIÑO/LA NIÑA	347	5
FLOODS	335	6
STORM SURGE	190	7

**Efficiency of Risk Communication Sources**

The TV weather forecast and the Mayor's office were the primary effective risk

communication sources for spreading knowledge and awareness about natural disasters with a mean of 3.86 interpreted as

Highly Efficient. This was closely followed by the Barangay-Local Government Unit (BLGU) with the weighted mean of 3.85 with the same interpretation. The sources listed above were thought to be the most reliable and efficient for the residents of Caramoan in terms of risk communication during natural disasters. Information sources on natural disasters play a crucial role in preparedness and resiliency. Informant A stated that,

*“the main sources are the people or the barangay constituents, the barangay officials, because they are the first person or the individuals that can experience the said hazard.”*

Informant B also added that,

*“yung involvement dapat ng community yun ang pinaka importante na hinde lang dapat one sided yung communication, I mean hindi lang dapat si ano kung sino yung involve, dapat pinaka, natatarget ang zero casualty or damage ng disaster kung community na involve ay nakikipag tulongan sa office or sa agency concerns.”*

[Involvement of the community is crucial. It is not just about one-sided communication; I mean it should not only involve those who are directly affected. The primary goal should be to target zero casualties or damage from the disaster when the community involved collaborates with offices or agencies addressing concerns].

**Table 2. Efficiency of Risk Communication Sources.**

<b>RISK COMMUNICATIONS SOURCES</b>	<b>Weighted Mean</b>	<b>Verbal Interpretation</b>	<b>Rank</b>
TV WEATHER FORECASTER	3.86	Highly efficient	1.5
OFFICE OF THE MAYOR	3.86	Highly efficient	1.5
BARANGAY LOCAL GOVEREMENT UNIT-OFFICIALS	3.85	Highly efficient	3
LOCAL/MUNICIPAL-DRRMC	3.79	Highly efficient	4
PAG-ASA	3.80	Highly efficient	5.5
NATIONAL-DDRMC	3.80	Highly efficient	5.5
OFFICE OF THE GOVERNOR	3.49	Highly efficient	7
NATIONAL TELE-COMMUNICATION (NTC)	3.73	Highly efficient	8
DEPARTMENT OF EDUCATION (DepEd)	3.36	Highly efficient	9
DEPARTMENT OF HEALTH (DOH)	3.13	Moderately Efficient	10
BUREAU OF FIRE PROTECTION(BF)	3.07	Moderately Efficient	11
RADIO BROADCASTER	3.06	Moderately Efficient	12
OLD VILLAGER (MATANDANG-NAYON)	3.00	Moderately Efficient	13
MUNICIPAL HOSPITAL	2.71	Moderately Efficient	14
DEPARTMENT OF SCIENCE AND TECHNOLOGY (DOST)	2.61	Moderately Efficient	15
PHILIPPINE NATIONAL POLICE (PNP)	2.60	Moderately Efficient	16
PHILIPPINE ARMY	2.59	Moderately Efficient	17.5
DEPARTMENT OF THE INTERIOR AND LOCAL GOVERNMENT(DILG)	2.58	Moderately Efficient	17.5
RURAL HEALTH UNIT(RHU)	2.53	Moderately Efficient	19
NON-GOVERNMENT ORGANIZATION(NGO)	2.48	Fairly efficient	20
<b>GRAND MEAN</b>	<b>3.19</b>	<b>Moderately Efficient</b>	

**Legend: 1.00 – 1.75 = Not Efficient    1.76 – 2.50 = Fairly Efficient    2.51 – 3.25 = Moderately Efficient    3.26 – 4.00 = Highly Efficient**

Risk communication sources play an important role in influencing the residents of Caramoan to be aware and prepared for natural disasters. Resiliency will be attained when the community is well-prepared for a

phenomenal natural disaster. The involvement of the community residents with local agencies should be in harmony to have a better connection to attain the goals of surviving and mitigating or preventing

the damages or losses that they may experience when a natural disaster occurs. According to Ner et. al. (2022), to ensure interoperability at different scales, a consistent organizational structure of actors and their responsibilities is shared from the local to the national level. Estrella (2023) shares a compelling a view on risk communication as an invaluable tool for fostering trust and helping the locals make informed decisions. She also affirmed that concerned LGU officials must remember strategic behavior, and changed approaches to motivate action. Further, Sato et al. (2020), supported the findings that compared to risk communications during a crisis, those during a non-crisis period are more likely to target "changes in risk perception and concern alleviation." A large group or mass communication is likely to be the venue for risk communications that seek "changes in risk perception and concern alleviation." On the other hand, initiatives that focus on "decision making and behavior change" are probably carried out on an individual or small group basis. Risk communicators may be able to learn from methods in other disciplines or from interventions carried out in diverse settings by reviewing previous activities.

### ***Risk Communication Strategies Used Before, During, and After Natural Disasters.***

Risk communication strategies and platforms serve as tools for safety measures and intervention by the local agencies to the residents and vice-versa to prepare and be resilient to natural disasters. Data show that in Caramoan, risk communication strategies and platforms were utilized to identify the hazards or natural disasters that they may experience in their area. These were utilized before, during, and after the natural disaster to provide accurate information for them to prepare, mitigate, or prevent the total damages or loss caused by natural disasters. To provide awareness to the residents Informant A stated that,

*“We use the social media platform, we also have this what we called Info-link, made by the smart to us... we have a partnership with different radio station... they provide us a certain-minutes in their radio time for us to deliver a message to Caramoan...we provide a pamphlets... we conduct meetings with the Barangay Disaster Risk Reduction and Management Council (BDRRMC)...we also use the traditional “Bandilyo”,... the barangay officials or volunteers gather and disseminate the upcoming disasters.”*

The strategies and platforms to disseminate information are the ways, medium, and resources utilized efficiently to rapidly disseminate accurate information to the residents. It is an important role of a risk communication source to deliver the message that the receiver will perceive and take action to prevent or mitigate the potential damages and losses of a phenomenal natural disaster they may experience.

Risk communication strategies and platforms are vital in achieving the goals of survival in times of natural disaster in the municipality of Caramoan. In the study of Ferrer et al. (2021), communication strategies utilized in Cabanatuan City, CDRRMO conducts training on communication strategies through the local government units, distributes stickers, and actively posts on social media accounts. Information Education and Communication (IEC) materials like flyers, leaflets, and posters from the national government, are updated and localized so that urban and rural barangays can use them. The significance of risk communication strategies and platforms is further articulated by Fathollahzadeh et al. (2022) who stated that effective risk communication is necessary to limit morbidity and mortality and minimize damage to the national economy and public health infrastructure. Therefore, efficiency contributes to minimizing damage to public health infrastructure as well as economic losses, by fostering a well-informed responsive community that can adapt and

protect itself during the crisis. Adequate information on natural disasters, and utilizing proper strategies and platforms were important to educate the residents and influence their perception and behavior to take action to be aware and prepare for the hazards of natural disasters.

The table below shows the frequency and ranking of the risk communication strategies utilized to disseminate efficiently the information before, during, and after a natural disaster in the Municipality of Caramoan, to lessen, mitigate, and prevent the possible damages or losses and be resilient from a natural disaster. Findings shows that the top 3 risk communication

strategies before the natural disaster were face-to-face communication with neighbor, social media news, television broadcasting. During the natural disaster television broadcasting was considered as rank 1, text/chat messages were rank 2, and social media news was the rank 3. After the natural disaster, face-to-face chats with neighbors and house-to-house visits were considered as top risk communication strategies, followed by text/chat messages. However, the table shows that the strategy of face-to-face chat with neighbors and the platform of television broadcasting were consistently utilized before, during, and after a natural disaster.

**Table 3. Risk Communication Strategies/Platforms**

RISK COMMUNICATION STRATEGIES	BEFORE		DURING		AFTER	
	Frequency (N=364)	Rank	Frequency (N=364)	Rank	Frequency (N=364)	Rank
FACE-TO-FACE CHAT WITH NEIGHBORS	364	1	52	1	364	1.5
HOUSE-TO-HOUSE VISITS	277	3	2	3	364	1.5
INDIGENOUS MEDIUM "BANDILYO"	349	2	1	4	121	3
WARNING DEVICE	196	4	10	2	92	4
SYMBOLIC CHURCH BELL	10	6	0	5.5	10	5
PRINT MEDIA; NEWSPAPERS/FLYERS	26	5	0	5.5	2	6
<b>RISK COMMUNICATION PLATFORMS</b>						
TEXT/CHAT MESSAGES	358	3	165	2	360	1
TELEVISION BROADCASTING	359	2	309	1	348	2
SOCIAL MEDIA NEWS	360	1	159	3	339	3
PHONE/TELEPHONE CALLS	328	4	31	5	247	4
RADIO BROADCASTING	137	5	32	4	60	5
VIDEOCALLS/CONFERENCE	110	6	30	6	54	6
TWO WAY RADIO	22	7	1	7	4	7
EMAILS	2	8	0	8	0	8

Interestingly, the study of Sato et al. (2020) shows that risk communications before the crisis or disaster that are aimed to effect "changes in risk perception and concern alleviation" are best presented in a large group or mass communication, whereas those that aim at "decision making and behavior change" are likely to be conducted during the crisis or disaster at the individual or small group level. This coincides with the findings of the present study that risk communication done before the disaster uses platforms such as social media, tv

broadcasting, and text/chat messages. These platforms are used to reach more audiences and at the same time make the respondents perceive a greater risk of will happen during the actual disaster. On the other hand, the risk communication strategies used during the disaster are face-to-face communication with neighbors, house-to-house visits, and bandilyo which are small groups. These were aimed to make the respondents decide and change behaviors of not leaving their houses to leaving their houses to avoid death.



***Efficiency of Risk Communication along: 1.) Dissemination of Warnings and 2.) Mechanisms established on Natural Disaster Preparedness and Resiliency.***

Table 4 shows the efficiency of Risk Communication along dissemination of warnings in the Municipality of Caramoan and mechanisms established on natural disaster preparedness and resiliency. Based on the data gathered, the most efficient indicator on dissemination of warnings is “Community members are aware of potential disasters in their area” with a mean of 3.73 and interpreted as Highly Efficient. This was followed by the “Warnings alert residents of the potential damages to life and properties caused by natural disasters” with a mean of 3.63 with the same interpretation. And the third was “Social Media such as Facebook and Messenger are utilized to disseminate the warnings to the community” with a mean of 3.57 and has the same interpretation.

On the efficiency of risk communication along mechanism established on natural disaster preparedness and resiliency in the municipality, the most efficient mechanism was “The community members’ level of preparedness for natural disaster” with a mean of 3.56 and was interpreted as Highly Efficient. This was closely followed by the “Recovery capacity of a community from a natural disaster” with a mean of 3.52 with the same interpretation, and the third most efficient was “Accessibility of Emergency Shelters” with a mean of 3.57 with the same interpretation.

Between dissemination of warnings and mechanisms established on natural disaster preparedness and resiliency, the dissemination of warnings had an average weighted mean of 3.50 which is interpreted as Highly Efficient. This means that while the respondents perceived both to be Highly Efficient, dissemination of warnings is more efficient than the mechanisms established. This may be because in reality, the dissemination of warnings every time there

is a disaster is more visible for them than the mechanisms established.

The risk communication along dissemination of warnings of LGU-Caramoan with their MDRRMO has provided awareness to the residents in times of natural disasters. Further, LGU-Caramoan enacted Ordinance No.2 Series of 2011 “to establish an MDRRM Council to serve its functions and duties”, this enables the locals to lessen and minimize the impact or potential damages during extraordinary natural catastrophes by being resilient and ready.

According to Bollettino et al. (2020), Filipinos who think that climate change is directly affecting them are also more likely to plan and make preparations in practical ways, including improving their homes and preparing for calamities. One could argue that a more cohesive intervention framework connecting disaster preparedness and climate change adaptation would be beneficial for policies and programs. In addition, Informant A who is the Head of Office of the MDRRMO-Caramoan, showed the researchers their Eight-year DRRM Plan covering 2022-2030 that will serve as their basis in ensuring the safety of the residents and the municipality. Hence, the risk communication in the municipality of Caramoan with the local agencies utilized their resources to provide adequate information and perform safety measures and interventions to influence their residents.

The Philippine National DRRM Framework has four priority areas: Disaster Prevention and Mitigation, Disaster Preparedness, Disaster Response, and Recovery and Rehabilitation, with increasing prioritization for prevention and mitigation. To ensure interoperability at different scales, a consistent organizational structure of actors and their responsibilities is shared from the local to the national level. The DRR law also mandated the creation of disaster risk reduction and management plans at the national, regional, and local levels. The National Disaster Risk Reduction and

Management Plan (NDRRMP), Regional Disaster Risk Reduction and Management Plans (RDRRMPs), and Local Disaster Risk Reduction and Management Plans (LDRRMPs) form part of a network of plans as prescribed by RA 10121 or the DRRM Law. As mandated by the law, each LGU is tasked to produce its own LDRRMP. The LDRRMP is the plan that lays out the implementation of DRRM programs, projects, and activities at the local level (Ner, Okyere, Abunyewah, & Kita 2022).

The indicators involve the formation, designing, and execution of a community-based disaster risk reduction plan in harmony with the national, provincial, and town/city disaster risk reduction and management plan. It also encompasses the performance of local disaster risk-saving drills and simulation, conception, and production of brochures, booklets, and

pamphlets. When all these provisions are properly implemented in the coastal communities, it will ensure safety and security among residents. They will learn to become more independent in protecting themselves against disaster (Pesimo et al., 2019).

The findings underscore the critical importance of effective risk communication in building community resilience and preparedness for natural disasters. The Municipality of Caramoan exhibits a proactive and adaptable approach to risk communication, yet ongoing efforts are necessary to address emerging challenges and sustain progress. By fostering a culture of collaboration, innovation, and resilience, LGU-Caramoan can continue to serve as a model for disaster preparedness and response in the region, ultimately ensuring the safety and well-being of its residents in the face of adversity.

**Table 4. Efficiency of Risk Communication along Dissemination of Warnings and Mechanisms on Natural Disaster Preparedness and Resiliency.**

INDICATORS	Weighted mean	Verbal Interpretation	RANK
<b>A. DISSEMINATION OF WARNINGS</b>			
Community members are aware of potential disasters in their area.	3.73	Highly efficient	1
Warnings alert residents of the potential damages to life and properties caused by natural disasters.	3.62	Highly efficient	2
Social Media such as Facebook and Messenger are utilized to disseminate the warnings to the community.	3.57	Highly efficient	3
Public Education and Training on Disaster Preparedness	3.35	Highly efficient	4
Warnings are disseminated before the disaster by the BDDRMO & Brgy. Tanod to give a sense of urgency.	3.23	Moderately Efficient	5
<b>AVERAGE WEIGHTED MEAN</b>	<b>3.50</b>	<b>Highly Efficient</b>	
<b>B. MECHANISM ESTABLISHED ON NATURAL DISASTER PREPAREDNESS AND RESILIENCY</b>			
Community members' level of preparedness for natural disaster	3.55	Highly efficient	1
Recovery capacity of a community from a natural disaster.	3.51	Highly efficient	2
Accessibility of Emergency Shelters.	3.51	Highly efficient	3
The LGU-Caramoan enacted Ordinance No.2 Series of 2011 to establish an MDDRM Council to serve its functions and duties.	3.26	Highly Efficient	5
BDRRMO was equipped and monitored by MDDRMO-Caramoan	3.48	Highly efficient	4
Availability of Emergency Evacuation Routes	3.25	Moderately Efficient	6
Coordination among local agencies during disaster	3.00	Moderately Efficient	7
Availability of Emergency Communication System	2.95	Moderately Efficient	8
Availability of Emergency Kit	2.95	Moderately Efficient	9

<b>AVERAGE WEIGHTED MEAN</b>	<b>3.27</b>	<b>Highly Efficient</b>	
<b>GRAND MEAN</b>	<b>3.38</b>	<b>Highly Efficient</b>	

**Legend:** 3.26 – 4.00 = Highly Efficient 2.51 – 3.25 = Moderately Efficient 1.76 – 2.50 = Fairly Efficient 1.00 – 1.75 = Not Efficient

## CONCLUSION

Caramoan is challenged by natural disasters, particularly heavy rainfall, typhoons, and landslides. Despite the varied array of hazards, the community's perception overwhelmingly identifies typhoons as the most significant threat, exacerbated by the municipality's proximity to the typhoon-prone province of Catanduanes. Effective risk communication channels, including TV weather forecasts, the Mayor's office, and Barangay LGU officials, emerge as critical conduits for disseminating timely and relevant information to residents, enabling proactive measures in disaster preparedness and response. The collaborative efforts between residents and local agencies, particularly evident in the involvement of barangay constituents and officials, highlight the pivotal role of community engagement in mitigating disaster impacts and fostering resilience. Furthermore, the municipality's proactive approach to risk communication, characterized by the utilization of traditional and digital platforms and strategic partnerships with local authorities, demonstrate a commendable commitment to enhancing community awareness and preparedness. However, there exist opportunities for improvement, particularly in infrastructure development, community participation, education, and climate change adaptation measures. While LGU-Caramoan's initiatives have proven effective in raising community resilience and minimizing disaster impacts, sustained efforts are imperative to address evolving challenges and ensure continued progress. By embracing resident feedback, expanding collaborations, and remaining abreast of technological advancements, LGU-Caramoan can further enhance its risk communication strategies and bolster the community's resilience to future natural disasters.

## Recommendations

After a thorough discussion of the results, the study recommends: 1.) A Risk Communication Plan be drafted to increase the municipality's resistance to its various natural hazards. To effectively influence a variety of audiences, ensure that the risk communication messages are clear, understandable, and sensitive to cultural differences, 2.) Establish a unified and well-coordinated approach to risk communication and consistently solicit feedback from the community to continually improve and adjust ways to communicate to suit specific needs and preferences, and 3.) A study on risk communication messages in three phases of natural disasters be made to increase risk perception and to achieve behavioral change.

### Declaration by Authors

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